The Virtual Truth

Volume I, February 2020
Real News, Real Facts All the Time

ARE WE LIVING IN A COMPUTER SIMULATION?

NEW YORK—If you, me and every person and thing in the cosmos were actually characters in some giant computer game, we would not necessarily know it. The idea that the universe is a simulation sounds more like the plot of "The Matrix," but it is also a legitimate scientific hypothesis. Researchers pondered the controversial notion Tuesday at the annual Isaac Asimov Memorial Debate here at the American Museum of Natural History.

Moderator Neil deGrasse Tyson, director of the museum's Hayden Planetarium, put the odds at 50-50 that our entire existence is a program on someone else's hard drive. "I think the likelihood may be very high," he said. He noted the gap between human and chimpanzee intelligence, despite the fact that we share more than 98 percent of our DNA. Somewhere out there could be a being whose intelligence is that much greater than our own. "We would be drooling, blithering idiots in their presence," he said. "If that's the case, it is easy for me to imagine that everything in our lives is just a creation of some other entity for their entertainment." A popular argument for the simulation hypothesis came from University of Oxford philosopher Nick Bostrum in 2003, when he suggested that members of an advanced civilization with enormous computing power might decide to run simulations of their ancestors. They would probably have the ability to run many, many such simulations, to the point where the vast majority of minds would actually be artificial ones within such simulations, rather than the original ancestral minds. So simple statistics suggest it is much more likely that we are among the simulated minds.

And there are other reasons to think we might be virtual. For instance, the more we learn about the universe, the more it appears to be based on mathematical laws. Perhaps that is not a given, but a function of the nature of the universe we are living in. "If I were a character in a computer game, I would also discover eventually that the rules seemed completely rigid and mathematical," said Max Tegmark, a cosmologist at the Massachusetts Institute of Technology (MIT). "That just reflects the computer code in which it was written."

Furthermore, ideas from information theory keep showing up in physics. "In my research I found this very strange thing," said James Gates, a theoretical physicist at the University of Maryland. "I was driven to error-correcting codes—they're what make browsers work. So why were they in the equations I was studying about quarks and electrons and supersymmetry? This brought me to the stark realization that I could no longer say people like Max are crazy."

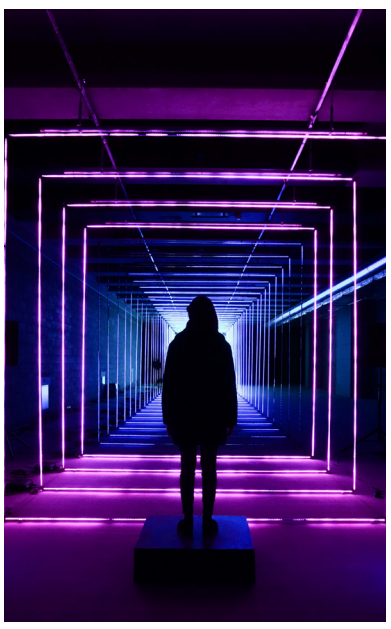


image: Pexels

Yet not everyone on the panel agreed with this reasoning. "If you're finding IT solutions to your problems, maybe it's just the fad of the moment," Tyson pointed out. "Kind of like if you're a hammer, every problem looks like a nail."

And the statistical argument that most minds in the future will turn out to be artificial rather than biological is also not a given, said Lisa Randall, a theoretical physicist at Harvard University. "It's just not based on well-defined probabilities. The argument says you'd have lots of things that want to simulate us. I actually have a problem with that. We mostly are interested in ourselves. I don't know why this higher species would want to simulate us." Randall admitted she did not quite understand why other scientists were even entertaining the notion that the universe is a simulation. "I actually am very interested in why so many people think it's an interesting question." She rated the chances that this idea turns out to be true "effectively zero."

Such existential-sounding hypotheses often tend to be essentially untestable, but some researchers think they could find experimental evidence that we are living in a computer game. One idea is that the programmers might cut corners to make the simulation easier to run. "If there is an underlying simulation of the universe that has the problem of finite computational resources, just as we do, then the laws of physics have to be put on a finite set of points in a finite volume," said Zohreh Davoudi, a physicist at MIT. "Then we go back and see what kind of signatures we find that tell us we started from non-continuous spacetime." That evidence might come, for example, in the form of an unusual distribution of energies among the cosmic rays hitting Earth that suggests spacetime is not continuous, but made of discrete points. "That's the kind of evidence that would convince me as a physicist," Gates said.

Yet proving the opposite—that the universe is real—might be harder. "You're not going to get proof that we're not in a simulation, because any evidence that we get could be simulated," said David Chalmers, a professor of philosophy at New York University.

By Clara Moskowitz
Excerpt from "Are We Living in a Computer Simulation?"
April 7, 2016, *The New Yorker*

SCIENCE, MATH AND REALITY

Science is trying to make sense of reality, which—as you'll know if you have experience with reality—is pretty darn hard. Things are born. Things die. Things leave maddeningly partial fossil records. Things exhibit qualitatively different behaviors at quantum and relativistic scales. Reality is kind of a mess.

Science quests to make sense of all this. It aims to predict, classify, and explain. And in this endeavor, it sees mathematics as a vital assistant: the Q to its James Bond, supplying helpful gadgets for the next adventure…

Whereas science sees itself as the protagonist of an action movie, mathematics sees itself as the auteur director of an experimental art project.

That's because, on a fundamental level, mathematicians do not care about reality.

I'm not talking about the odd habits of mathematicians—muttering to themselves, wearing the same trousers for weeks, forgetting their spouse's names on occasion. I'm talking about their work. Despite the aggressive ad campaign about its "real-world usefulness," mathematics is pretty indifferent to the physical universe.

What math cares about are not things but ideas.

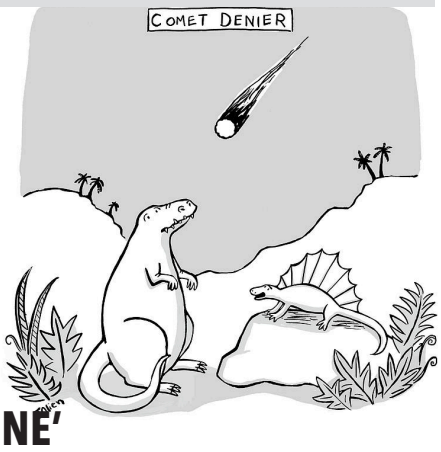
Math posits rules and then unpacks their implications by careful reasoning. Who cares if the resulting conclusions—about infinitely long cones and 42-dimensional sausages—don't resemble physical reality? What matters is their abstract truth. Math lives not in the material universe of science but in the conceptual universe of logic.

Mathematicians call this work "creative." They liken it to art.

That makes science their muse. Think of a composer who hears chirping birds and weaves the melody into her next work. Or a painter who gazes at cumulus clouds drifting through an afternoon sky, and models her next landscape on that image. These artists don't care if they've captured their subjects with photorealistic fidelity. For them, reality is nothing more or less than a fertile source of inspiration.

That's how math sees the world, too. Reality is a lovely starting point, but the coolest destinations lie far beyond it.

from *Math with Bad Drawings*, by Ben Orlin. p. 32-34



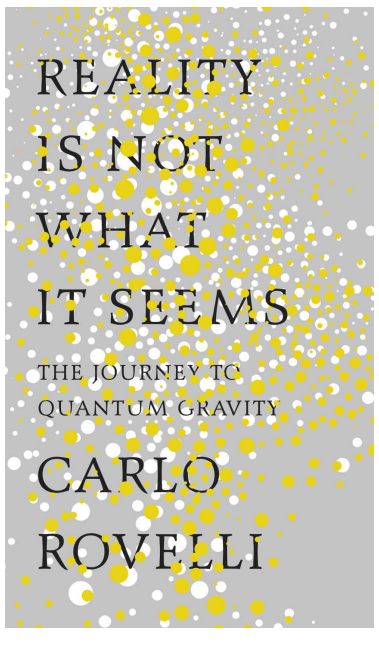
"That thing's always been there."

PLATO & THE PHYSICISTS

Aristotle speaks extensively about the ideas of Democritus, and with respect. Plato never cites Democritus, but scholars suspect today that this was out of deliberate choice and not for lack of knowledge of his works. Criticism of Democritus's ideas is implicit in several of Plato's texts, as in his critique of 'physicists', for example. In a passage in his Phaedo, Plato has Socrates articulate a reproach to all 'physicists' which will have a lasting resonance. He complains that when 'physicists' had explained that the Earth was round, he rebelled because he wanted to know what 'good' it was for the Earth to be round; how its roundness would benefit it. Plato's Socrates recounts how he had at first been enthusiastic about physics, but had come to be disillusioned by it:

'I had expected to be first told that the Earth was flat or round, but also that, afterwards, the reason for the necessity of this shape would be explained to me, starting from the principle of the best, proving to me that the best thing for the Earth is to have this shape. And if he had said that the Earth was at the centre of the world, then to show me how being at the centre was of benefit to the Earth.'

How completely off track the great Plato was here!



from *Reality is Not What it Seems*, by Carlo Rovelli

TOO MANY FACTS

In 1963, Bernard K. Forscher of the Mayo Clinic complained in a now-famous letter printed in the prestigious journal Science that scientists were generating too many facts. Titled "Chaos in the Brickyard," the letter warned that the new generation of scientists was too busy churning out "bricks"—facts—without regard to how they go together.5 Brickmaking, Forscher feared, had become an end in itself. "And so it happened that the land became flooded with bricks.... It became difficult to find the proper bricks for a task because one had to hunt among so many.... It became difficult to complete a useful edifice because, as soon as the foundations were discernible, they were buried under an avalanche of random bricks."

from *Too Big to Know*, by David Weinberger citing Bernard K. Forscher, "Chaos in the Brickyard," letters section of *Science*, October 18, 1963,

FACTS ARE 'SOMETHING DONE'

Facts are not just any sort of knowledge, such as also existed in the ancient and medieval worlds. A fact is a unit of information that has been established through uniquely modern methods. Fact, etymologically, means "something done"—that is, an act or deed—a sense that still survives in phrases like accessory after the fact. It was only in the 16th century—an age that saw the dawning of a new empirical spirit, one that would issue not only in modern science, but also in modern historiography, journalism, and scholarship—that the word began to signify our current sense of "real state of things."

from "In Defense of Facts," by William Deresiewicz, *Atlantic Monthly*, Jan/ Feb. 2017

THE TRUE HISTORY OF FAKE NEWS

In the long history of misinformation, the current outbreak of fake news has already secured a special place, with the president's personal adviser, Kellyanne Conway, going so far as to invent a Kentucky massacre in order to defend a ban on travelers from seven Muslim countries. But the concoction of alternative facts is hardly rare, and the equivalent of today's poisonous, bite-size texts and tweets can be found in most periods of history, going back to the ancients.

Procopius, the Byzantine historian of the sixth century AD churned out dubious information, known as Anecdota, which he kept secret until his death, in order to smear the reputation of the Emperor Justinian after lionizing the emperor in his official histories. Pietro Aretino tried to manipulate the pontifical election of 1522 by writing wicked sonnets about all the candidates (except the favorite of his Medici patrons) and pasting them for the public to admire on the bust of a figure known as Pasquino near the Piazza Navona in Rome. The "pasquinade" then developed into a common genre of diffusing nasty news, most of it fake, about public figures.

Although pasquinades never disappeared, they were succeeded in the seventeenth century by a more popular genre, the "canard," a version of fake news that was hawked in the streets of Paris for the next two hundred years. Canards were printed broadsides, sometimes set off with an engraving designed to appeal to the credulous. A best-seller from the 1780s announced the capture of a monster in Chile that was supposedly being shipped to Spain. It had the head of a Fury, wings like a bat, a gigantic body covered in scales, and a dragon-like tail. During the French Revolution, the engravers inserted the face of Marie-Antoinette on the old copper plates, and the canard took on new life, this time as intentionally fake political propaganda. Although its impact cannot be measured, it certainly contributed to the pathological hatred of the queen, which led to her execution on October 16, 1793.

The Canard enchainé, a Parisian journal that specializes in political scoops, evokes this tradition in its title, which could be translated figuratively as "No Fake News." Last week it broke a story about the wife of François Fillon, the candidate of the center-right who had been the favorite in the current presidential election campaign. Madame Fillon, "Penelope" in all the newspapers, reportedly received an enormous government salary over many years for serving as her husband's "parliamentary assistant." Although Fillon did not denounce the story as a canard—he admits hiring his wife and says there was nothing illegal about it—"Penelope Gate" has pushed Donald Trump off the front pages and may ruin Fillon's shot at the presidency, possibly to the benefit of France's own, Trump-like, far-right party, the National Front.

The production of fake, semi-false, and true but compromising snippets of news reached a peak in eighteenth-century London, when newspapers began to circulate among a broad public.

image: Getty Images iStockphoto

In 1788, London had ten dailies, eight triweeklies, and nine weekly newspapers, and their stories usually consisted of only a paragraph. "Paragraph men" picked up gossip in coffee houses, scribbled a few sentences on a scrap of paper, and turned in the text to printerpublishers, who often set it in the next available space of a column of type on a composing stone. Some paragraph men received payment; some contented themselves with manipulating public opinion for or against a public figure, a play, or a book.

"News of this sort- indeed, of most sorts- could not be published in France before 1789, but it traveled by word of mouth and underground gazettes, thanks to nouvellistes who fulfilled the same function as paragraph men."

In 1772 the Reverend Henry Bate (he was chaplain to Lord Lyttleton) founded The Morning Post, a newspaper that piled paragraph upon paragraph, each one a separate snippet of news, much of it fake. On December 13, 1784, for example, The Morning Post ran a paragraph about a gigolo serving Marie-Antoinette:

The Gallic Queen is partial to the English. In fact, the majority of her favorites are of this country; but no one has been so notoriously supported by her as Mr. W—-. Though this gentleman's purse was known to be dérangé when he went to Paris, yet he has ever since lived there in the first style of elegance, taste and fashion. His carriages, his liveries, his table have all been upheld with the utmost expense and splendor.

Bate, who came to be known as "Reverend Bruiser," went on to found a rival scandal sheet, The Morning Herald, while The Morning Post hired a still nastier editor, also a chaplain, Reverend William Jackson, known as "Dr. Viper" for "the extreme and unexampled virulence of his invectives…in that species of writing known as paragraphs." The two men of the cloth, Reverend Bruiser and Dr. Viper, slugged it out in their newspapers, setting a standard for scandal that makes the Murdoch press look mild.

News of this sort—indeed, of most sorts—could not be published in France before 1789, but it traveled by word of mouth and underground gazettes, thanks to nouvellistes who fulfilled the same function as paragraph men. They picked up "news" from places where gossips gathered, such as certain benches in the Tuileries Gardens and the "Tree of Cracow" in the garden of the Palais Royal. Then, sometimes for the sheer pleasure of transmitting information, they scribbled the latest items on bits of paper, which they traded among themselves in cafés or (lacking the Internet) left on benches for others to discover.

The police did their best to repress the nouvellistes, although the demand for inside information about the secret ways of les grands (the great) kept attracting new, self-appointed "reporters." When hauled off to the Bastille, nouvellistes were always frisked, and notes were sometimes discovered in the pockets of their waistcoats. I have found some examples of this incriminating evidence in the Bastille archives—crumpled scraps of paper covered with scribbling, testimony to a primitive variety of journalism two centuries before smart phones.

The police especially hunted out the semi-professionals who combined items, usually no longer than a paragraph, into manuscript gazettes known as "nouvelles à la main." Some of these underground newspapers made it into print. Thus a typical entry from La Chronique scandaleuse:

The duke of…surprised his wife in the arms of his son's tutor. She said to him with the impudence of a courtier, 'Why weren't you there, Monsieur? When I don't have my squire, I take the arm of my lackey.'

One of the best-sellers in this genre was Le Gazetier cuirassé (The Iron-Plated Gazeteer) which was produced in London and probably was inspired by the scandalous London press, although its news was all French. A typical item was a one-sentence paragraph: "It is reported that the curé of Saint Eustache was surprised in flagrante delicto with the deaconess of the Ladies of Charity of his parish—which would be greatly to their honor, since they are both in their eighties."

Of course, much of this muckraking concerned little more than the sexual peccadillos of the great, but some of it had political implications, just as today in the case of the fake news about supposed orgies involving Hillary Clinton. The fate of Marie-Antoinette is the most spectacular example of how such slander could have disastrous consequences, but there were other instances. As I argued in Poetry and the Police: Communication Networks in Eighteenth-Century Paris, the circulation of mendacious rumors, many of them in songs and poems no longer than today's tweets, led to the fall of the ministry of the Comte de Maurepas and a transformation of the political landscape in April 1749.

Although news of this sort could whip up public opinion, sophisticates knew better than to take it literally. Most of it was fake, sometimes openly so. A footnote to a scandalous item in Le Gazetier cuirassé read: "Half of this article is true." It was up to the reader to decide which half.

By Robert Darnton
"The True History of Fake News", February 13, 2017. *New York Review of Books*

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CROSSWORD ACTION

Across
7. a 3D computerized space or world that anyone can interact with
8. statements proven to be true

Down
1. a computer-generated image based on the user's POV in the real world, cannot tell the difference between real, and the virtual world they see
2. type of programming language used to create interactive effects in web browsers
3. the study of reality, existence, and knowledge
4. video game-engine used for game design and 3D modeling
5. Greek Philosopher, founder of the School of Philosophy
6. a form of news that is based on misinformation