Walter Feit (1930–2004)

Leonard Scott, Ronald Solomon, John Thompson, John Walter, and Efim Zelmanov

Walter Feit died on July 29, 2004, at age seventy-three after a long illness. He had been on the faculty at Yale for forty years, and the following is taken from his obituary at the Yale website. It summarizes Walter's achievements and stature, and provides touching detail on Walter's childhood during the Second World War.

"Professor Feit's 1963 paper with John G. Thompson, 'Solvability of groups of odd order', filled an entire issue of the *Pacific Journal of Mathematics* and is widely regarded as the most influential paper ever written on finite group theory. It energized the field, providing both inspiration and technical tools for the research that finally culminated in the complete classification of simple finite groups.

"Finite group theory was only one of several areas invigorated by Professor Feit's insights. His paper with Graham Higman became a fundamental building block and stimulated a large body of research on combinatorial structures. His work on Schur indices revitalized progress in that subject as well.

"Feit joined the Yale faculty of mathematics in 1964. He served the Yale mathematics department in several administrative roles, acting as director of undergraduate studies, director of graduate studies, and chairman. His standing in the mathematics community was marked by award of the American Mathematical Society Cole Prize in Algebra, election to the National Academy of Sciences and the American Academy of Arts and Sciences, editorship of various journals, and vice presidency of the International Mathematical Union.

"Walter Feit was born in Vienna, Austria, in 1930. In August of 1939 his parents saved his life by placing him on the last train (KinderTransport) allowed to carry Jewish children out of Austria. He arrived in England just as the British government was evacuating all children from London. After being relocated a few times, he settled in a refugee hostel in Oxford. In 1943 he won a scholarship to an Oxford technical high school. His teachers were very encouraging, and he recorded that it was at this time that he became 'passionately interested in mathematics'.

"In 1946 Walter moved to the United States to stay with an aunt and uncle. In a letter recovered from the time of his arrival in New York, he poignantly describes his first experiences of the new world; see http://www.math.yale.edu/public_html/WalterFeit/ToNewYork/Welcome.html.

"The following September he entered the University of Chicago and joined its energetic mathematical community. Within four years he had obtained the university's master's degree in mathematics; he later received his Ph.D. from the University of Michigan. In 1953, at the age of twenty-two, he joined the Cornell University mathematics faculty.

"Walter Feit visited Oxford University many times, but the 1990 International Symposium on the Inverse Galois Problem held there at University College in honor of his sixtieth birthday was an especially joyful occasion.

"In October 2003, on the eve of Professor Feit's retirement, colleagues and former students

gathered at Yale for a special four-day Conference on Groups, Representations and Galois Theory to honor him and his contributions. Nearly eighty researchers from around the world met to exchange ideas in the fields he had helped to create.

"Professor Feit is survived by his wife, Dr. Sidnie Feit, of Hamden, Connecticut; his son, professor of mathematics Paul Feit, of Odessa, Texas; and his daughter, artist Alexandra Feit, of Haines, Alaska. A memorial service was held on Sunday, October 10, 2004, at the New Haven Lawn Club, 193 Whitney Avenue, New Haven, CT."

This memorial article presents five contributions, in rough historical order, from mathematicians commenting on Walter, both mathematically and personally, at various times in his career, all mentioning the odd order paper. These are followed by some quoted excerpts from remarks delivered by Walter's Yale colleagues George Seligman, Roger Howe, and Dan Mostow at the memorial service. Another selection from that service, by Shreeram Abhyankar, is included in a section on Walter's later years. Walter's graduate students and postdocs, and the conferences and volumes written in his honor are listed in a final section.

—Len Scott

The first contribution is from John Walter, who was Walter Feit's roommate during part of their time together at Michigan. John was himself a major player in the coming developments regarding groups of even order and the early days of the Classification, especially in his work with Gorenstein. John takes us from the days at Michigan to the Chicago group theory year, 1960–61, where much of the work on the odd order paper, cited above, was done.

The Early Years

John H. Walter

I would like to look back to the early years of a fifty-three-year friendship with Walter Feit in an effort to remember and convey the circumstances of his first years as a mathematician. I met Walter in the fall of 1951 at the University of Michigan, where we both had entered graduate school. He was born in Austria and had emigrated first to England and then to the United States, where he was raised in Miami by an aunt and uncle. His parents were unable to obtain a visa and vanished in the Holocaust. He never spoke much about this. I did not understand why at the time. However, it was clear then and more clear now that he had a sense of history, and mathematics gave him the opportunity to participate. The Holocaust was certainly a tragedy

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for all those whom it touched as victims. But this was a part of history which caught up with him in his youth without giving him any choice.

Walter had earned bachelor's and master's degrees from the University of Chicago. Because of his interests, his advisors recommended he go to Michigan, where Richard Brauer was on the faculty. Michigan was an attractive place for us to be. T. H. Hildebrandt was then chairman and had built up the department, appointing Brauer just after the

Walter Feit

end of World War II. There was a lot of interesting activity in many fields. For example, Raoul Bott was starting his career there and was a focus of attention. Raymond Wilder was the leader in topology. Also active were Edwin Moise and Hans Samelson. R. M. Thrall was working on the theory of rings. Among the junior faculty were Jack MacLaughlin, whom I knew from Caltech, and Alex Rosenberg, who had just come from Chicago.

Walter stood out, having done well in an advanced and very competitive mathematics program at Chicago led by an outstanding faculty. I am not sure what aroused his interest in group theory, but I remember knowing that he was advised to go to Michigan to work with Brauer. He reflected the feisty and competitive spirit that existed at Chicago, along with a sense of fellowship among the undergraduate math students, and he carried this over to Michigan. At the basis of this was an ethic that valued good work and a profound respect for mathematics as a discipline. I remember the somewhat presumptuous discussions about who was the more important algebraist, André Weil or Richard Brauer. But I have always felt that the basis for this impertinence was Walter's strongly felt respect for mathematical accomplishment and a loyalty to institutions that served him well in his career. Because of our common interest, there was a lot to talk about.

The group theory program at Michigan being led by Brauer certainly fulfilled our expectations. His seminar was on the modular representations of finite groups, a subject which he initiated. This was a stimulating and memorable event in a very exciting year. Walter additionally took an informal

reading course from Brauer on class field theory. In the summer of 1952 Brauer invited Michio Suzuki to Michigan for a few weeks. He talked in the seminar on his recent thesis [9], in which he characterized the linear fractional groups $PSL(2, p)$. His argument was based on character theory, where he focused on a particular class of irreducible characters, called exceptional characters, which are present when there exist subgroups of a simple group whose conjugates intersect only in the identity subgroup. A great deal of information about these irreducible characters can be obtained directly from the irreducible characters of these subgroups and the characters that they induce. It was clearly an important concept, and it seemed to us that it might open up a new direction that could be usefully exploited. Indeed, this is what happened.

At the end of the academic year, Brauer announced that he had accepted a position at Harvard. Walter was already working with Brauer, and he continued this relationship by correspondence. He had found an improved and useful bound for the number of ordinary characters in a p-block, which he and Brauer later extended [1]. I worked with Jean Dieudonné, who replaced Brauer at Michigan. During the next year Walter and I, together with another student of Brauer, W. P. Brown, lived together at an apartment in Ann Arbor. In that atmosphere, representation theory was often discussed.

Dieudonné was an interesting, dynamic leader in the Bourbaki group. He lectured on the classical groups at Michigan. G. de B. Robinson was visiting J. S. Frame at Michigan State, and they, together with Thrall, ran a seminar on the characters of the symmetric group, which alternated between Ann Arbor and East Lansing. We all attended. I worked with Dieudonné on the classical groups, and this led me to other problems after I finished at Michigan. R. M. Thrall was in the process of changing his field of interest to game theory, and Walter worked on his game theory project as a convenient way of gaining support; he did not talk much about his mathematical efforts in this direction. His real interest was in finite groups and algebraic number theory. At the end of the year he accepted an instructorship at Cornell and departed. He continued to work with Brauer by correspondence. In the summer of 1954 he returned to Michigan to clear up some formal requirements for his degree. Brauer had supervised and approved his thesis but had resigned from Michigan's faculty; nevertheless, the necessary institutional arrangements were made (with Thrall as the formal advisor) for the awarding of Walter's doctorate.

During the years 1954–59 I kept track of what was going on in finite groups, often by talking with Walter. He worked on some problems in the exceptional character theory of groups containing Frobenius groups as subgroups. In the meanwhile, Suzuki, using the exceptional character theory, had proved the solvability of finite groups of odd order in which the centralizer of every nonidentity element was abelian [10]. This result was published in 1957. Then in 1959 John Thompson finished his thesis at Chicago, in which he developed some new techniques in constructing maximal subgroups containing Sylow groups. He also noted the relevance of Feit's work on exceptional character theory that is associated with Frobenius groups. Based on [3], [4], [5], and the methods of John's thesis [11], they saw the possibility of extending Suzuki's work to show the solvability of finite groups of odd order. Thus Walter and John began an important and fruitful collaboration. At first with Marshall Hall, they showed the solvability of groups of odd order in which the centralizer of every element is nilpotent [7]. This prepared the way for showing that finite groups of odd order are solvable.

Taking note of this activity, the mathematics department of the University of Chicago, led by Adrian Albert, decided to have a Finite Group Theory Year in 1960–61. This was a remarkably well-timed decision. I was then investigating groups with a dihedral Sylow 2-subgroup in which the centralizer of a central involution has an abelian 2 complement, with the hope of solving the problem using Suzuki's exceptional character theory and obtaining a generalization of Suzuki's thesis. So when Walter told me about the Group Theory Year, I applied to Chicago and received an offer of a visiting assistant professorship. Again Walter and I crossed paths.

Many stimulating mathematicians were there for the Year. Feit and Thompson set the pace working on the odd order problem. At the afternoon teas there were stimulating conversations; in particular, one could follow the latest about the status of Feit and Thompson's work. Michio Suzuki had been invited and was characterizing an important class of doubly transitive groups that are now known as the Suzuki groups. Daniel Gorenstein was starting to turn his attention to finite group theory, and we worked together on groups with dihedral Sylow 2-subgroups. Among the other attendees were Graham Higman, Jon Alperin, Paul Fong, Norman Blackburn, Noburo Ito, and G. E. Wall.

During the Year a lot of important work was done. Feit and Thompson reduced the odd order conjecture to a problem concerning generators and relations, which was solved in the next academic year [8]. In the following summer, Walter also collaborated with Graham Higman on a crucial result in the theory of finite BN-pairs of rank 2 [6]. Gorenstein and I solved the first dihedral Sylow 2-subgroups problem mentioned above. Then, based on the pattern of argument worked out in the odd

order paper, we started on the characterization of groups with dihedral Sylow 2-subgroups (without the previous restriction on the centralizer of a central involution). Alperin worked on p-groups and broadened his field of interests to both finite groups and representation theory. Graham Higman worked on an interesting class of 2-groups related to the Suzuki groups mentioned above. Truly, these were exciting events, and we can look back to the crucial role that Walter played in them.

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Next, John Thompson takes us through the time of the odd order paper itself. John has, of course, received many honors, including the Fields Medal and the Wolf Prize, in addition to the Cole Prize he shared with Walter. After that time, he and Walter continued to share mathematical interests and remained personal friends. John was a speaker at both the retirement conference held for Walter at Yale in 2003 and the memorial service for Walter a year later.

For Walter

John Thompson

I was lucky to team up with Walter. He had completed his Ph.D. with Brauer; I had studied Hall's work; we both benefited from Suzuki; and we both had the confidence to attack the odd order problem, which still looks to me like granite. I think there are only a few who understood the precision and

subtlety with which Walter handled a variety of character-theoretic situations. Suzuki and, of course, Brauer appreciated Walter's strength. But only Walter and I knew just how intertwined our thinking was over a period of more than a year.

Walter Feit and John Thompson

There was a false dawn of a few days when we thought the thing was done. Walter then discovered that there was one case that our techniques did not cover, and he told me of this. If Walter had not found the gap, I almost certainly would not have found it; we would have submitted a flawed manuscript, and eventually someone would have blown the whistle. If that had happened, it is doubtful that we could have generated a new head of steam to bust the difficulty, which in fact took us several additional months of thought and nail biting.

For forty-five years Walter and I were in touch often, and I was always comfortable being with him. We had fun, we shared mathematical interests, and we shared views on the passing parade. One cannot reasonably ask for more from a friend.

The next contribution was written by the editor-organizer of this Notices *article, Len Scott, who was Walter's first student at Yale. The time was the height of the emotional impact of the then just-published odd order paper.*

Walter as an Icon

Len Scott

The work that Walter and John did was once described by the mathematician R. H. Bruck as a cosmic event of the first order of magnitude. It brought literally hundreds of young mathematicians into group theory. I guess I was one of them. Walter and I arrived at Yale in the same year, 1964,

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and I took Walter's first course taught at Yale, Characters of Finite Groups. It was pretty tough on me, taking thirty hours outside of class just to keep up. A high point was the proof that CN groups of odd order were solvable, an early model case for the odd order paper that Feit and Thompson had treated in collaboration with Marshall Hall. The name CN comes from the defining property that centralizers of elements are nilpotent. The work builds on a paper of Suzuki, demonstrating solvability of odd order groups in which centralizers of elements are abelian. As enthusiastic and intensely interested as I was, I rarely even heard what Walter was saying in class, since it required so much attention to copy down what was written on the board for later study, but I did get many chances that year to talk to Walter during his office hours, where I would bring in some difficulty I was having. I suppose you could call the sessions inspiring, since they left me with some realization of how far I had yet to go. I remember in particular struggling with the proof of a character isometry result which involved an intricate argument with three summation indices, none of which could be manipulated in the usual way by exchanging two at a time. Walter handled my question easily, then explained, "It's just a triple sum that has to be straightened out."

Now, I have given this example to illustrate what it was like taking a course from Walter, and I believe Walter's line here and in other cases was delivered with the entirely constructive purpose of showing me where I needed to be. But as I got to know Walter over the years, I began to realize he really was the master of the disarming one-liner, a playful turn of phrase that could completely change the perceived context of a conversation. I have thought through the examples of these things that I have heard from the Feit family, and I have to say the best one in my memory comes from Sidnie. But it is so much like Walter, I have to wonder if they had somehow, directly or indirectly, collaborated. The year was 1966, just a few days past the time that, here in New Haven, my wife had given birth to our son. We called him Walter, certainly partly in honor of Walter Feit, but also partly in honor of my paternal grandfather, who was also named Walter. But my total immersion in Walter's courses was so well known at Yale, it was hard to persuade anyone there that my grandfather had anything to do with it. One day Sidnie came up to me and said, "It was so nice of you to name your son after my husband." In something of a stumble, I tried to explain that, "Well, I also had a grandfather named Walter." Sidnie quickly interrupted, "And he didn't mind." This little addendum of course completely changed the framework and meaning of my reply, and I was completely unprepared. I stumbled out

something, probably without much detectable conviction.

Walter's enormous stature in my mind only grew as I progressed toward my degree. I remember when some of the earliest sporadic simple groups beyond the Mathieu groups were beginning to emerge. Zvonomir Janko came to Yale to give a talk about a sporadic group he was proposing, not yet proved to exist at the time. An actual existence proof was often quite laborious, and before it was attempted, one could try to see if the proposed group had a plausible subgroup structure. A further approach was to study consequences of the subgroup structure for the characters of representations. Any inconsistency and the hope for a possible new group would have to be given up. But when Janko gave his talk, he was quite confident and even buoyant, describing how beautifully the proposed group's subgroup structure seemed to fit. When one of the audience members asked the inevitable question about the characters, Janko seemed prepared and said, "My group is safe from the character theory." When the audience member persisted, Janko simply continued, "Because Walter Feit has stopped trying to find contradictions in its character table." There were no further questions.

In later years I returned to Yale, one year as an assistant professor and still later as a visiting professor for a term. With the Classification on the horizon, I had by then moved toward Lie theory and algebraic groups, but always with representations of finite groups in mind. I would sometimes see Walter at a conference or other occasion (he made some brief visits to my university), and we would reminisce over dinner and discuss the topics of the day. But though he always treated me as a colleague and a friend, I never escaped thinking of him as my teacher and larger than life.

Ron Solomon was Walter's student at Yale in an exciting period. Today he and Richard Lyons continue the production, begun with Daniel Gorenstein's collaboration, of a multivolume set which will eventually detail a second-generation proof of the classification of finite simple groups. Of course, at the time on which Ron focuses his discussion, the first proof was only beginning to be considered a possibility, and many of the sporadic finite simple groups had yet to be discovered.

The Classification Years, and History

Ron Solomon

Walter Feit's name will always be inextricably linked with his greatest accomplishment, the odd order paper of Feit and Thompson [FT]. As I wrote in [So], this paper was "a moment in the evolution of finite

group theory analogous to the emergence of fish onto dry land." It defined the monumental scale of the classification project for finite simple groups and threw down a gauntlet to other researchers in the field. It resolved a seemingly intractable case of the problem and offered entirely new and powerful ways of thinking about finite simple groups—ways of thinking that proved powerful enough to complete the entire project.

By the time I arrived at Yale as a graduate student in the autumn of 1968, evolution had progressed, fish were walking, and I was already enamored of finite groups, though I knew little more than Sylow's theorems. Walter was teaching the third semester of a course on modular representation theory that would later form the opening chapters of his book on that subject. I would have to content myself with reading the Yale Lecture Notes, which instilled in me a lifelong affection for Green's theory of vertices and sources.

A year later, while taking his course on character theory, I asked Walter to be my thesis advisor. He offered me the choice of the two problem areas he thought most promising: the classification of finite simple groups and the representation theory of finite groups of Lie type. The latter area was closer to the character theory course I was taking, and had been pioneered by Steinberg, whose recent stay at Yale had led to the wonderful *Lectures on Chevalley Groups*. But, feeling my strengths were not in character theory, I prudently chose the classification problem, where the character theory appeared largely to have already been done, thanks to Brauer, Suzuki, and Feit, and now the focus for attacking the general case had become the "local analysis" methods of Thompson, Gorenstein, and Walter. There was an element of sadness in foregoing the benefits of my character theory education, but I did get later some solace from finding a characterization of $U_3(4)$ that invoked Feit's Coherence Criterion.

In a tradition of which I was doubly a beneficiary, John Thompson sent his best recent Ph.D. students to Yale as postdocs, and Walter reciprocated by sending his to Chicago. (I profited from this arrangement upon graduation in 1972.) Thus Goldschmidt came to Yale in 1969, and Lyons in 1970. Also, Len Scott returned from his Chicago postdoc to spend the 1970–71 year at Yale. And so I was blessed to study with four of the finest group theorists and four of the finest human beings anyone could ever hope to encounter. Indeed, the entire mathematical environment at Yale combined the highest intellectual standards with the finest collegial atmosphere. Passing years and greater experience have made clear what a rare and remarkable privilege it was to study there at that time.

Fueling the excitement in the field were the discoveries each year of new sporadic simple groups. Indeed, I had the pleasure of presenting Lyons a congratulatory cigar on the occasion of Charlie Sims's delivery of a healthy Lyons group. Conway had recently constructed three new groups involved in the automorphism group of the remarkable Leech lattice. This motivated a long paper by Walter on integral representation theory in which he managed to blend many of his favorite topics, including number theory, modular representations, finite reflection groups, and low-dimensional representations. In particular, he achieved a characterization of the Conway groups Co_2 and Co_3 as groups with a faithful rational-valued irreducible character of degree 23. This permitted Walter's student, Dan Fendel, to characterize Co_3 by the centralizer of a central involution, which in turn set the stage for my dissertation problem. Walter was also interested at the time in the determination of all primitive subgroups of $SL(n, \mathbf{C})$ for small values of n, a project going back to the work of Moore, Dickson, Blichfeldt, and Mitchell. At one point I heard someone tell David Wales, "Walter Feit says that problem is easy." To which David responded, "Everything is easy for Walter Feit."

Walter loved conversation, and his judgments and opinions—whether mathematical, political, or culinary—were never hedged or falsely polite, but always were leavened with wit and delivered with a twinkle in his eye. When I asked his opinion of a certain new paper in representation theory, he replied that the author had "found an excellent way of encoding our ignorance on the subject." When I expressed my fears in 1976 that the Classification Project would soon be finished, he reassured me that it would keep me busy for many more decades—quite prescient. With equal confidence, when I told him my fears about the drift of American politics around 1994, he asserted that the pendulum would soon swing back to the middle. After a visit to IHÉS (Bures-sur-Yvette) he said that he now had a constructive proof of the existence of the worst bakery in France.

Though Walter never formally lectured on the history of our subject, his personal relationship with the great men of the past was palpable. "Schur was the idea man," he would say, and you almost felt Walter had been there in Berlin in 1910.

Walter was especially fond of Burnside, whose portrait stared down from his office wall. Walter wrote: "When I first studied group theory I found his book a cornucopia of interesting results, and thumbing through it, I often found new and interesting observations." And of Burnside's $p^a q^b$ theorem, he said: "I would guess the elegance of both the statement and the proof have attracted

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more people to the study of characters than any other result in the subject." I'm sure Walter realized that the odd order paper, titanic rather than elegant, had likewise attracted many brilliant young minds into his beloved subject. He would have treasured these comments I received on October 7, shortly before the memorial service for Walter, from Raphael Rouquier:

> I had a mythical vision of him [Walter], as I was fascinated by the Odd Order paper more than fifteen years ago, and, like many others I imagine, that pushed me in this field. Later on, when I met him, he turned out to be very humane and very accessible to the beginning mathematician I was.

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The final authored contribution comes from Efim Zelmanov, a Fields Medalist and Walter's colleague for many years at Yale before moving to his present position at UCSD. He spoke at both the retirement conference for Walter and the later memorial service.

Walter as a Colleague

Efim Zelmanov

I first met Walter in 1989, when I came to the United States. The thing that impressed me most was how unassuming and approachable and normal he was. And yet he was the Feit of the Feit-Thompson Odd Order Theorem—that is, a semi-god. He was so different from the scientific bosses in the Soviet Union.

I must say that in my opinion, by its elegance and forcefulness, the Odd Order Theorem is easily the best single theorem in group theory. (The Classification of Finite Simple Groups, which is the culmination of all efforts, looks rather like a sequence of theorems.)

Walter never preached; it was the priceless casual side remarks that he made. For example, I remember he said that all most interesting cases are always low-rank and low-dimensional—that's where all exceptional and unexpected things happen. He also made some remarks about history

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and politics, which were very educational for a young American.

Walter liked to tease people. It was always done with wonderful humor and with that special twinkle in his eyes. And he enjoyed being answered in kind.

I never felt any difference in age.

Now I think that I was so lucky to have met Walter and to have been his colleague.

More Quotes from Colleagues

We quote here some of the remarks of other of Walter's Yale colleagues, made at the memorial conference in October of last year.

The first is by George Seligman. "My acquaintanceship with Walter dates from his coming to Yale in 1964. ...Our lunchtime conversations treated mainly history and society, both mathematical and general. I was surely the beneficiary, especially when it came to British history.

"An exception to his generally easygoing nature could be recognized when it came to the quality and the status of the mathematics department. As chairman he joined a revolt of the chairs when salaries were being targeted to bear the force of budgetary cutbacks. In consideration of appointments, he stood for aggressive campaigns to recruit and appoint scholars on the basis of quality, with only secondary consideration as to field. He was a model for us all."

By Roger Howe: "...Many people have said that he [Walter] always had a twinkle in his eye and a funny quip. He knew how to be serious, but he preferred humor.

"He was quiet, he was modest, but he was completely self-confident. For example, he was far from athletic. In the U.S. today many might think that was something to apologize for, but for Walter it was part of his philosophy of life. He would never harangue, but when there was a news item about some prominent athlete getting injured, Walter would point out how dangerous sports are. ..."

By Dan Mostow: "...Anyone...who ever discussed world affairs with Walter knows what a history buff he was. He knew, in detail, the history of every country, ancient or modern, as far as I could tell. So it is significant that he refrained from telling his own history to his children until begged by [his daughter] Alexandra ten years ago to relate his family history. ...

"I conjecture he remained silent all those years because he did not want to exploit his status as a child of the Holocaust. Closely related was his determination to enjoy the positive side of life despite the traumatic separation from and tragic loss of his parents. ...

"Walter's positive outlook shaped his life both professionally and personally. In his mathematical career he achieved historical standing. In his

personal life he aimed high and competed successfully for the hand of the comely, brilliant Cornell undergraduate Sidnie Dresher. As a parent he was able to offer his children the love and moral support that his parents did not live long enough to offer him.

"Walter and Sidnie have donated generously to charities, especially those that help refugees. They have been generous with their hospitality for students and colleagues. They have done much to help make Yale a friendly mathematical center."

Later Years

In Walter's later years his interests turned to Galois theory as well as to older interests in representation theory. He was the coorganizer of a number of conferences in the former subject, and organizers of conferences in his honor often also invited a Galois theory contingent. This was especially true at the sixtieth birthday celebration conference held at Oxford, which emphasized the inverse Galois problem. One of the speakers there was Walter's old friend from Cornell, Shreeram Abhyankar, who also spoke at Walter's memorial. Here are some of his remarks from the latter occasion:

"I met Walter in 1957—Walter and Sidnie both—when I went to Cornell as an assistant professor, as was Walter, and immediately we all three became very close friends.

"Now there are many amusing memories of that year. We used to have lunch together almost every day in the faculty club, where there was good apple pie, and so we both felt that maybe we put on too much weight, so we decided to go on a diet together. And the condition was that in a month or so, the person who would succeed more was to get a quarter. In a month Walter gained one pound, and I gained two. And so we never settled our quarter. Each time I mentioned it, he would say, 'Ram, where is the quarter?'...

"But then—let us move forward by many years—so it was in '89 when I realized that much of algebraic geometry, in particular Galois theory and fundamental groups, which I have been doing, needs this knowledge of group theory.

"This was brought home to me by Serre, who told me we both ought to learn group theory if we are doing this [Galois theory] problem. For a while he provided me with information, but pretty soon it became clear that I should better go to the real experts.

"Now this famous group theorist, Walter Feit, is my old friend, so I came down to New Haven and was a house guest of the Feits for a week, and in one week he tried to pull me up by the bootstraps.

"He tried to teach me what had happened in group theory in thirty years in one week in a simply charming, friendly manner. And all the time there was a nutcracker in front of us, so I filled myself with nuts and learned about group theory.

"It is so sad to miss him. Well, let me end. Thank you."

Students, Postdocs, and Dedications

Walter's graduate students were Clark Benson and Marcel Herzog at Cornell; then, at Yale: Len Scott, Harvey Blau, Mark Benard, Daniel Fendel, Elizabeth Wall Ralston, Ron Solomon, Martin Pettet, Carl Bumiller, Stephen Doro, Leonard Chastkovsky, Daniel Corro, Ying Cheng, In-Sok Lee, Josephine Shamash, Donald White, Li-qian Liu, Sidney Porter, and John Swallow. Mathematicians who studied with Walter at Yale in a postdoctoral or junior faculty capacity include Don Passman, Bernd Fischer, Larry Dornhoff, Dave Goldschmidt, Len Scott, Richard Lyons, Dave Benson, and Dave Sibley (deceased). Three conferences have been held in Walter's honor: an Oxford conference at the time of his sixtieth birthday, a conference at Ohio State on the occasion of his sixty-fifth birthday, and a conference at Yale on the occasion of Walter's retirement at age seventy-three. Principal organizers included Michael Collins (Oxford, University College); Ron Solomon (Ohio State); and Ron Solomon, Len Scott, and George Seligman (for the Yale conference). At the Oxford conference Walter was presented by Len Scott with a dedicated two-volume issue of the *Journal of Algebra* (a journal for which Walter served as managing editor from 1985 to 2000). After the Ohio State conference, a conference volume, *Representation Theory of Finite Groups* (de Gruyter, 1997), was edited by Ron Solomon, who is now editing a memorial *Journal of Algebra* issue. Walter remained mathematically active in spite of his illness, and was disappointed when his treatment caused him to miss speaking at the Ischia Group Theory 2004 conference, held in honor of the retirement of one of his first students, Marcel Herzog.

As mentioned at the beginning of this article, there was a full memorial service held for Walter in New Haven in October of 2004. Walter's son, Paul, was master of ceremonies. A Yale Web page detailing some of the activities has already been mentioned, and we give the URL for that page here: http://www.math.yale.edu/public_html/WalterFeit/WalterFeit.html.

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