Math Times

University of Illinois at Urbana-Champaign

Spring 1992

Letter from the Chair

Dear Colleague,

It is our pleasure to send you the newsletter which now comes to you under its new title. Many thanks to all of you who suggested names for the newsletter, and especially to Arthur D. Solomon, whose suggestion was the one we decided to follow.

I am sad to bring you the news of the death of two valued colleagues, whom many of you will remember with affection. Emeritus Professors Mahlon Day and E.T. Parker each died suddenly during the past few months and we are still feeling the shock of their loss. They made important contributions to mathematics and to this community, and they will be missed deeply by their families, by their colleagues and friends here in Urbana-Champaign and throughout the world. Obituary notices for Professors Day and Parker are on page 9.

As I wrote earlier, my term as Department Chair comes to an end this semester. After four and a half years in this post, I am very much looking forward to a return to my research and teaching. Following the advice of the Search Committee, Dean Faulkner of our college has appointed Gerald Janusz as my successor, and his term will begin on August 21, 1992.

Jerry Janusz has been a member of the department since 1968, and thus he is a long time friend and colleague. For the last two years he has served as the Executive Editor of the important *Mathematical Reviews*, and has been in Ann Arbor, Michigan. All of us welcome him back to campus and wish him well in his new post.

Janusz received his Ph.D. from the University of Oregon in 1965 and held appointments at the Institute for Advanced Study and the University of Chicago before coming to the University of Illinois. His research is in algebra, especially in repre-sentation theory, finite groups, cyclotomic fields and ring theory. Before going to Math Reviews he served for several years as the managing editor of the *Illinois Journal of Mathematics*.

As is true of universities throughout the United States, the University of Illinois has been affected by the national economic recession. In each of the last two years this department has experienced very tight budgets, including reductions in our basic budget as well as mid-year recisions and 1992-93 will bring more of the same as far as one can currently tell.

By careful management and because of the deep commitment of faculty and students to their work, we are coming through this difficult period in pretty good shape.

It does seem that we will lose several faculty lines and some graduate teaching assistantship positions next year, in addition to several that we lost last year, as a result of budget reductions. We will have to cut back on what we are able to do because of this, in order to maintain the quality of our academic offerings. Our highest priority is to protect and preserve this quality, which is the result of painstaking effort and wise investment over generations. It is a treasure held by us in trust, and we must do our best to maintain it for the benefit of future students and faculty of this university. As always, we seek your help in this endeavor, through your contributions if that is possible, and in all other ways.

We are pleased that this newsletter has apparently interested and pleased many of you. It is especially nice that so many of you have written to bring us up to date on your own activities and plans and to tell us that you enjoy reading about activities of colleagues and former classmates. Please keep writing.

Ward Henson

Ward Henson

Award to Peressini

The Illinois Section of the Mathematics Association of America has announced that Anthony Peressini has been selected for the Excellence of Teaching Award. Peressini was presented with the award at the spring banquet in Naperville in April.

Mathematics has its own standard of beauty and elegance which can vie with the more decorative arts . . . Mathematics may appear on first acquaintance austere and severe. But longer contemplation reveals the classic attributes of simplicity relative to its significance and depth of meaning.

D. E. Littlewood

Grad Fellowships

Among graduate students who have national fellowships this year **Kevin Ford**, **Claudia Miller** and **Mark Walker** hold National Science Foundation Fellowships, **Louis Kerofsky** holds a Department of Defense Fellowship, and **Arthur Woerheide**, who is spending the year in Austria, is supported by a Fulbright. Four international graduate students receive fellowships from their home countries: **Niels Lauritzen** from Denmark, **Gebhard Boeckle** from Germany, and **Jeong-Heon Kim** and **Si-Chang Lee** from the Korean Government.

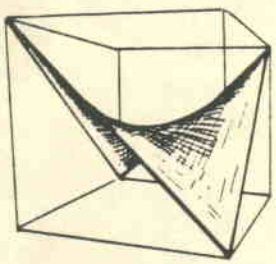
Marcia Black has been awarded a Graduate College Fellowship and **Conley Powell** a fellowship from the State of Illinois. Others who have national fellowships include 15 graduate students who hold Accelerated Doctoral Fellowships funded by the United States Department of Education. **Richard Jerrard**, Director of Graduate Studies, has received word that the DOE is renewing the grant and increasing it to a total of $204,000 a year for the next three years. This increase means that the DOE grant will now support 18 students.

Other Fellowships

Eight students receiv

University fellowships or Bourgin, Schark or Trjitzinsky Fellowships. The latter three are endowed fellowships given by friends of the department. In addition, seventeen graduate students have research assistantships which range up to full support.

There are 143 teaching assistants in the department this semester, some of whom also hold concurrent research assistantships.



Honors Awarded

At the Mathematics Department Award ceremony April 22, **Niels Lauritzen** received the **Irving Reiner** Award. The award is for work in algebra and honors Professor Irving Reiner's contributions to mathematics. Graduate teaching assistants **Catherine E. Cavagnaro, Matthew J. Frueh,** and **Peter J. Jaskowiak** received awards for excellent teaching.

For their work in mathematics, undergraduate students **Howard A. Ding** received the H.R. Brahana Prize and **David P. Nicholls** was awarded the Selma Wanna Memorial Prize.

Bourbaki in Altgeld Hall

In response to an item in the last newsletter about an Altgeld Hall "office" for Bourbaki, **Marvin Knopp** (1958, Bateman) writes it was in the 1950s, not in the 40s, when some department wags filled a platform between the second and third floors of Altgeld Hall with a rickety table, chair, quill pen, candle in chianti bottle, etc. and labelled it "Dr Bourbaki."

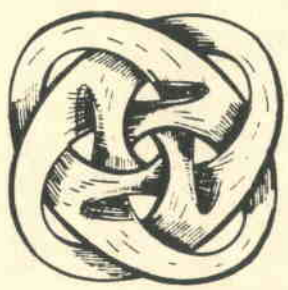
Peter Sarapuka, who was a graduate student then, casts more light. It all started, he says, when a group of graduate students were drinking coffee in the Union one day. This was when the French mathematicians who published under the collective name of Bourbaki in Paris were beginning to have some effect on mathematics in the United States.

One student remarked that after the rebuilding of the south part of Altgeld Hall there was no way to get from a recess where the elevator could be stopped between the second and third floors to anyplace else. A new wall prevented access to the rest of the building.

Inspiration! Three students of Trijitzinsky, **Richard Ballance** (1956), **Aubyn Freed** (1956), and **Frank Hahn** (1959), according to Sarapuka's memory, found three orange crates and carried them into the space which up till then had been a cubbyhole covered with litter and set to work. One orange crate was used for a desk, another for a chair, the third for a bookcase. Next they found an empty wine bottle in which they placed a partially burned candle. Then they made a sign.

As the members of the department rode past in the openwork elevator they could look into this space and see the sign "N. Bourbaki".

Then the local press got word and printed an item about it. The physical plant people immediately descended. This must go. "A fire hazard," they said. So they removed the orange crate desk, the chair, the wine bottle and the sign, and that was the end of Bourbaki in Altgeld Hall.



Soon the old math prof would enter the class and start tormenting [the students] with a blackboard full of numbers.

Milan Kundera *Life is Elsewhere*

Students Excel in Workshop

"They not only survive in this program, but they excel," says visiting teaching associate **Paul McCreary**. He is speaking of some freshmen who come to the UIUC in danger of failing calculus.

For many years minority students from big city high schools and freshmen who come from small rural high schools have been failing calculus at a much higher rate than average. Many attempts were made to remedy this. No matter what was tried the high failure rate for these students continued. Even tutoring didn't seem to help.

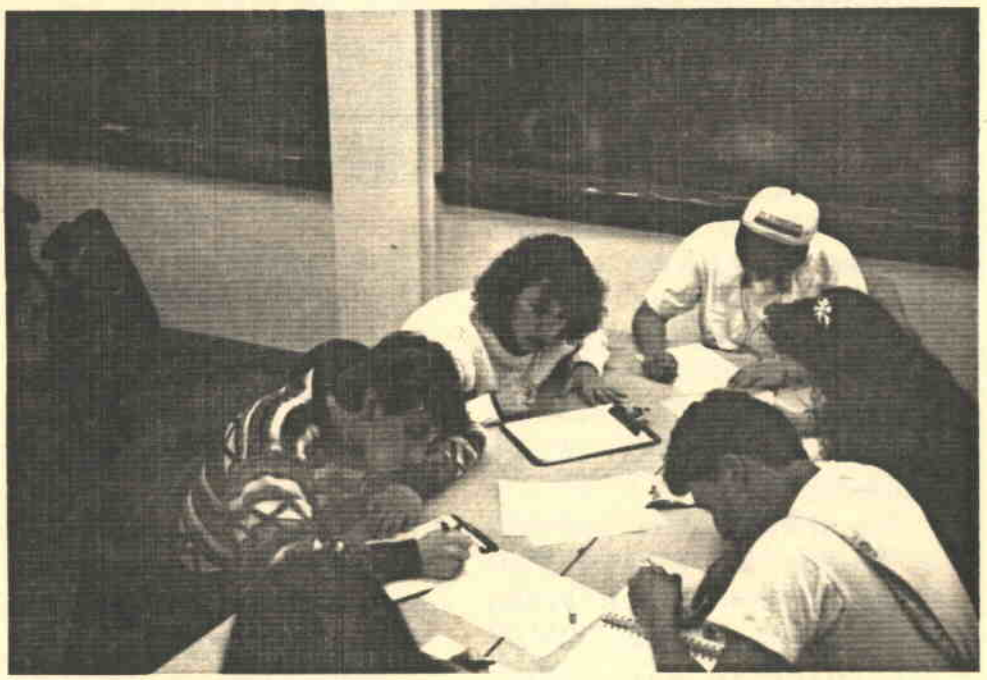
In 1988 McCreary worked with several faculty members in the mathematics department to start a pilot program, following one designed by Professor Uri Treisman, then at the University of California at Berkeley. Soon the program, now called the Merit Workshop, took on a more substantial form, with McCreary as director.

Students Work Hard

It is not a remedial program, stresses McCreary, but a workshop in which the students work hard, much harder than the average calculus student. It has three main components.

1. The problems are difficult and challenging.

Paul McCreary and students



Students learn to work together to solve problems

2. The students work long hours.

3. They work together in groups.

In spring letters are sent to students in the target groups who will be entering freshman in the fall. About 25 percent of those contacted choose to participate in the Merit Workshop. They attend the same classes as all other students, complete the same homework assignments and take the same examinations, but each workshop student does a lot of extra work and spends more time at it.

In addition to the calculu

class, they attend the workshop for a total of six hours a week. There the problems they get are based on the material covered in the lectures but, as they are designed to stretch them, the problems are challenging and more difficult.

This term there are approximately 50 students in the workshops, some of them in their first term, some of them continuing on for a second term while they take a more advanced level calculus.

Discussing math

The students sit in small groups and animatedly discuss the math problems, trying to discover the solution. Often, someone makes an error, but the students learn that is okay, it is all part of the process. As they articulate the problem, and the various group members contribute, in the group give-and-take the errors always get corrected. The TAs walk around the class but do not interfere, and the students soon learn it does no good to ask the TA for an answer. They must find the solutions themselves.

Results Analyzed

When the results have been analyzed, it has been found that these formerly at-risk students performed better than the average UIUC student taking calculus.

In the fall 1990 term 1479 students took Math 120. Of those in the 11:00 lecture 65% of the minority students who participated in the workshop received As and Bs, compared to 54% for all other students and compared to only 19% for all minority students. The low failure rate is also important: only 12% of the minority students in the workshop received Ds and Es versus 24% for the class as a whole and versus 44 % Ds and Es for all minority students.

Two students in workshop enjoy discussing calculus

Math majors

Those students who keep on with these methods as they go on to higher level courses do very well. Many of these young men and women who came here as members of a high risk group get extremely interested in math and a number, says McCreary proudly, have chosen mathematics as their major.

Mathematics is a jungle, the Jungle of the Infinite. Most of us see only broad paths driven through it by pioneers, trampled flat by generations of fellow students. A few go out and hack new paths of their own.

Ian Stewart *New York Review of Books*

Faculty Notes

Michio Suzuki received an honorary doctorate from the Faculty of Mathematics and Natural Science at the University of Kiel, Germany, November 29, 1991.

Esther Portnoy was a local organizer of the 26th Actuarial Research Conference here in Urbana-Champaign last August and was co-guest editor of the conference proceedings which were published in ARCH.

In January **Paul Weichsel** was the guest of the mathematics department of the University of Puerto Rico at Rio Piedras (San Juan) where he gave some lectures and consulted with a number of faculty members on matters pertaining to combinatorics and symbolic computation.

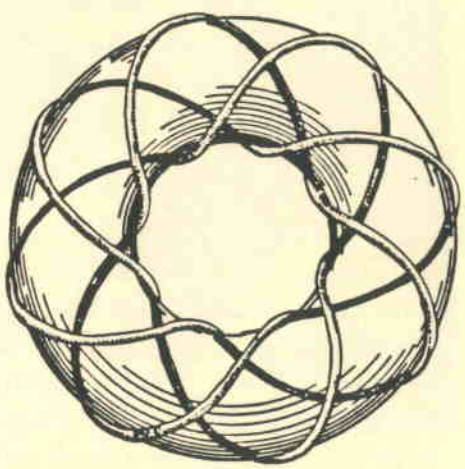
Joseph Rotman was in Israel for three weeks this winter and lectured at the Technion in Haifa, and at Tel Aviv University, as well as at Hebrew University in Jerusalem.

This spring semester **Carl Jockusch** is giving a seminar at George Washington University and a series of talks at the University of Iowa. He will also be a visitor at the University of Chicago in early summer where he will work and give seminar talks.

Philippe Tondeur, who is a member of the Center for Advanced Study this year, recently spent a month in Japan where he gave a series of lectures at Tohuku University, Hokkaido University, Kanazawa University, and at the Global Geometry and Analysis Conference at Keio University in Tokyo.

In early January **Lynn McLinden** gave a talk at the Oberwolfach meeting in Germany on Mathematical Optimization.

Julian Palmore has received a Certificate of Recognition from Sigma Xi for his two year service as a National Lecturer. He gave a presentation at the annual Army Operations Research Symposium at Fort Lee, Va., in November and is giving several more lectures, including two on verification of computer simulation, one in Florida in April and the other in Reno in July.



Peter Loeb, who is a member of the Center for Advanced Study this year, spent a month in Germany this winter where he gave a seminar in Frankfurt and colloquia at Eichstatt and Munich. He recently completed a report as an outside reviewer for a chair of mathematics at the University of Helsinki, Finland. Loeb is on the editorial board of the *Journal of Economic Theory*.

While in Europe on sabbatical leave last semester, **Steve Ullom** gave lectures at Geneva, Cambridge, Manchester and London (King's College).

Paul Newton's research with two physicists, N. Packe[illegible] and A. Hubler, on mathematical computation for complex systems is being supported by equipment grants from the National Science Foundation, the Research Board, and the Beckman Institute for Science and Technology. The money was used to purchase silicon graphics computing equipment. The NSF has also awarded Newton another grant to develop research software.

Professor Francois Apéry, University of Haute-Alsace in France, will visit the department and also the National Center for Supercomputing Applications this June, July, and August. He will work with **George Franci**[illegible]

on creating a real-time, interactive computer animation editor for the visualization of the Morin-Denner cuboctahedral eversion of the sphere. They will also work on realizing deformations of real algebraic surfaces immersed in space.

Joint Meeting

Professor **Robert Fossum**, secretary of the American Mathematical Society, helped to organize the first joint meeting of the American Mathematical and the London Mathematical Societies which will be held at the University of Cambridge, England, June 29 to July 1, 1992.

As one of the six mathematicians on the joint program committee, Fossum helped to select the five speakers who were invited to give hour talks, planned the ten special sessions of selected twenty-minute papers and handled all communications for the committee. Two of the invited addresses will be given by English mathematicians who were selected by Americans, three by Americans chosen by the British members.

On July 2 at Cambridge, the Isaac Newton Institute for Mathematical Sciences will be opened. Anyone attending the meeting is invited to stay for the inaugural ceremonies of the Newton Institute.

Another member of the joint program committee is former faculty member **William Abikoff.**

Center for Advanced Study

Two members of the department, Professors **John Gray** and **Derek Robinson,** have been selected to be Associates at the Center for Advanced Study next year. Associates are selected from distinguished tenured faculty on the UIUC campus and, while they are members of the center, will be able to work full time on their research, free from teaching duties.

Gray will pursue studies in algebra and the theory of 2-categories, investigating structures that are useful in providing models of programming language constructs.

Robinson's work will be in group algebra. In collaboration with Eli Aljadeff from the Technion-Haifa, he is working on understanding when a skew group algebra can be twisted to make it semisimple.

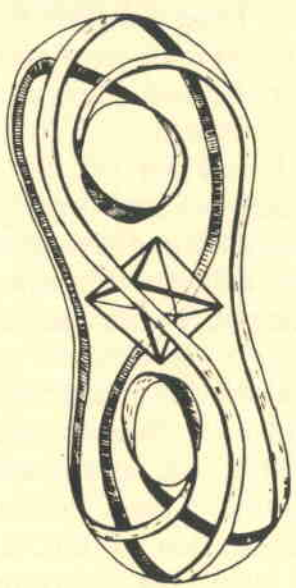
Maarten Bergvelt will be a Fellow in the Center for Advanced Study for one semester during 1992-1993. Fellows are selected from among the promising untenured faculty members and are nominated by the executive officer of a department. Bergvelt will conduct research in the geometry of integrable systems

They join the three mathematicians who are permanent Center for Advanced Study Professors: **Donald Burkholder, Wolfgang Haken,** and **Michio Suzuki**. Emeritus Professor **Joe Doob** was also a Center for Advanced Study Professor.

Appointment to a professorship in the center is the highest recognition that the campus can bestow upon the faculty members who are chosen for their outstanding scholarship.

Correction:

Jay I. Miller who received his Ph..D. in 1977 was a student of **Paul Weichsel.** This was incorrectly stated in the last newsletter.



Cairns Lecture

Professor **John Morgan** of Columbia University delivered the **Stewart S. Cairns** Memorial Lectures March 17, 18, and 19 in Altgeld Hall on the topic "Gauge Theory and the Topology of 4-Manifolds." Professor Morgan, a topologist who has been working on algebraic varieties, focused in his lectures on smooth 4 dimensional manifolds and the applications of gauge theory (i.e. the study of self-dual connections on principal bundles).

After he received his Ph.D. from Rice University in 1969 Professor Morgan was an instructor and lecturer at Princeton and an assistant professor at MIT, then spent two years at IHES. In 1974 he went to Columbia where he has been at a professor since 1978. He has been a visitor at MSRI, the Universite de Paris, Sud, and at Harvard. He is chairman of the Board of Trustees at MSRI and an editor of the journal *Inventiones* and gave an invited 45 minute address at the International Congress of Mathematicians in Berkeley, in 1986.

The lecture series honors the memory of Stewart S. Cairns (1904-1982), former head of the department, and Professor of Mathematics at UIUC from 1948 until his retirement in 1972. Professor Cairns' family has given financial support for an annual series of public lectures by outstanding mathematicians.

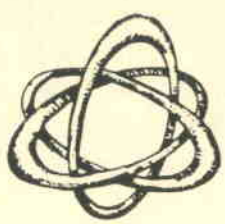
Speakers for 1992-93 named

Two speakers have accepted invitations to give lectures during the 1992-93 academic year.

The Trjitzinsky lectures will be given by Ronald Evans of the University of California at San Diego. He is scheduled to speak September 15, 16, and 17.

The Coble Lecturer will be Robert Steinberg of UCLA who is scheduled to speak November 10, 11, and 12.

These named lectures, together with the Cairns lectureship, have been funded by friends, associates and family to honor the contributions made by these distinguished former members of our faculty. It would be very helpful for alumni to help us fund these valuable lectures by sending a contribution. Checks may be made to the U of I Foundation / UIUC Mathematics Department.



Job Seeking?

"What advice do you have for new graduates seeking jobs?" was one of the questions **Eva Gray** asked when she wrote to the approximately 70 people who had received master's degrees in math at UIUC in the last five years, telling them not to sign their names.

One former student, who was "delighted" with his job and found work "very, very satisfying," advised students to take half theoretical courses in order to understand mathematics and half applied courses to be marketable. This respondent, whose annual salary is almost $50,000, wrote that the theoretical courses were very valuable in understanding applications and guiding intuition but warned "don't trap yourself out of the job market."

Another, now working in industry, whose salary is in the mid 40 thousands, wrote that there are good opportunities for mathematically sound graduates who have a good background in business, can communicate clearly in speech and writing and who can "think about problems in a fresh way, exactly what mathematics trains you for."

A third recent graduate stressed that computer literacy is a "must" if you are looking for a job.

Notices

Mahlon M. Day

Mahlon M. Day

Professor Emeritus Mahlon Marsh Day died March 18,1992. He had been a faculty member from 1940 until his retirement in 1983, served as department head from 1958 to 1965 and was the editor of the *Illinois Journal of Mathematics* from 1980 to 1986.

Professor Day did pioneering work on the geometry of Banach spaces and amenability. The author of the classic *Normed Linear Spaces*, which has become a standard reference throughout the world, he made fundamental contributions to the theory of convexity of Banach spaces, renormings of Banach spaces, bases in Banach spaces, and amenability in semigroups.

He was a native of Rockford, Illinois, and received his bachelor's degree from Oregon State College in 1935 and his Ph.D. from Brown University in 1939. He is survived by his wife Frances, two daughters, Dorothy Day and Susan Dreifus, two sons, Donald Day and George Day, a step daughter, Jean Giardinelli, twelve grandchildren, and a sister, Dorothy Beall.

E. T. Parker

Professor Emeritus **E. T. Parker** died on December 31, 1991, after suffering a heart attack. A graduate of Northwestern University who received his Ph.D. from Ohio State University in 1957 he joined the department in 1964 and retired in 1987.

In 1959 Professor Parker, who did research in finite mathematics, constructed a pair of orthogonal Graeco-Latin squares of order 10, refuting a conjecture of Euler who in 1783 had written that such squares could not exist.

Professor Parker's other interests included finite groups, finite graphs, elementary number theory and computer programming for finite mathematics. He served with the U.S. Navy in World War II. He was a member of the AMS, and a Fellow of the Institute of Combinatorics and its Applications.

E.T. Parker

He is survived by his wife Helen and a son Phillip, as well as a brother and sister.

Most striking ... this appearance of a sudden illumination, a manifest sign of long unconscious prior work. The role of this unconscious work in mathematical invention appears to me incontestable.

Henri Poincaré

News from Mathematics Alumni

Hobum Kim (1990, Tondeur) sends greetings from Yansei University in Korea where he is an assistant professor in the Mathematics Department.

Charles Hadlock (1970, Kokotovic) writes to say that after he received his degree in applied math, he worked for the consulting firm of Arthur D. Little in Cambridge, where his work included using mathematical modeling to attack environmental problems. He writes, "the quantitative tools were only a small (although essential) part of the solution. This work involved a number of notable cases, such as the Love Canal clean-up, the Bhopal investigation, nuclear power safety and others. Over the years the work became very international, involving essentially every continent, as well as outer space."

Environmental work

In 1990 Hadlock decided to return to academia when he was offered the chairmanship of the mathematics department at Bentley College, a business school with strong international and environmental themes. His environmental work continues, as this year he is going to Estonia to start a survey of the environmental needs there, "but now," he writes, "I also have the chance to try to work it into a math and general education curriculum."

He continues, "I know I shouldn't try to proselytize, but I do believe that if more mathematicians were to get involved in applied areas in an interdisciplinary and problem-oriented way, rather than limiting themselves to problems where the mathematical theme is central or particularly elegant, they would have a lot of fun and also make important contributions to solving societal problems."

Hadlock's book *Field Theory and Its Classical Problems* is a winner of the MAA Book Prize.

Everett L. Welker who received his A.B. at the University of Illinois in 1930, his A.M. in Math in 1931, and his Ph.D. in 1938 with Crathorne is now living in Northport, Alabama.

Ninety percent proved is zero percent proved.
Solomon Lefschetz

Geometry is the real life.
Oscar Zariskie

Computer Science

George Purdy (1972, Bateman) is now the F.A. and J.E. Geier Professor of Computer Science at the University of Cincinnati. After getting his degree he spent three years as a post-doc at the Center for Advanced Computation here at Illinois. During this time his focus changed from combinatorial geometry to computer science, though he continues to write papers with Paul Erdos (their first joint paper was written before George got his degree). Before moving to Cincinnati he spent some time at Texas A & M.

Carla Neaderhouser (1975, Helms) is now an an Associate Professor of Computer Science at the University of Cincinnati. After leaving Illinois she went to Texas where she met and married George Purdy. She had originally intended to get an M.S. in computer science to improve her marketability, but instead ended up with a second Ph. D. which lead to her present position. She arrived in Cincinnati in 1986 and has been the graduate advisor since 1988,

advising students in the M.S. program (they do not as yet have a Ph.D. in computer science). She plans to give up the advising soon, as it keeps her too busy to do mathematics.

John Vasak (1976, Hohn and Brown) is now working for the Mitre Corporation as head of their computer security technical center. This involves computer security not only at Mitre but on a much wider scale, and includes protecting sensitive records and safeguarding data against loss or corruption.

Engineering

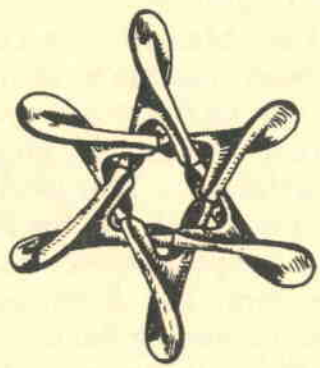
John and his wife **Janet Vasek** (1979, Berndt) were both at the University of Wisconsin, Milwaukee, but moved to the Washington area for better opportunities. Janet, now a vice president of Science Applications International, Inc. is presently the technical director for a large project being done for the E.P.A. Her job involves engineering more than mathematics and entails lots of writing, some travel and the authority to hire employees in her area. She and John have two children.

Janet says that her training at Illinois was very valuable in some respects but did not prepare her for life outside the academic world. She says that Ph.D.s in mathematics have the ability to question, to analyze, and to think clearly when confronted with problems and are better at this than many of the engineers that she works with. On the other hand they are often not prepared to meet the constraints that come with the job, such as the fact that projects must be completed and delivered on time whether or not they are in the best form possible.

Russell Gordon (1987, Uhl) is now an assistant professor at Whitman College, an undergraduate college with 1200 students in Walla Walla, Washington. He teaches calculus and advanced analysis, has published several papers and is now writing a graduate text. He expects a sabbatical for one semester next year. He is married, has two children, and enjoys white water rafting when he's not doing mathematics.

Like a sudden flash of lightning the riddle happened to be solved. I myself cannot say what was the conducting thread which connected what I previously knew with what made my success possible.

C. F. Gauss



The Winner

Congratulations to **Arthur D. Solomon** (1971, Hamstrom), who suggested the the winning name for the newsletter *Math Times* and will receive a book as a prize after he telephones the math department.

Math Times is published twice a year by the Department of Mathematics, University of Illinois, Urbana-Champaign.

Editor	Margot Jerrard
Photographs	Hiram Paley
Calligraphy	Pat Martin
Drawings	George Francis

Mathematicians . . . feel they discover the laws that God himself could not avoid having to follow.

David Mumford

Letter from the Library

Dear Colleague,

The Mathematics Library has been valuable to each of us and may be the most important factor in the scholarly life of the department. Many of you continue to rely on the library long after your careers take you elsewhere. The AMS recently ranked it among the top mathematical libraries in North America. However the State of Illinois's failure to adequately fund the university in the past five years has forced the cancellation of 21 monograph series and 74 journal subscriptions. Unless money is restored, we will have to cancel more journals.

Last year the Ad Hoc Mathematics Library Fund Raising Committee asked each faculty member for contributions. Nearly $10,000 was raised and no journals were cancelled.

This year the situation is more serious. We don't anticipate any new money from either the state or the campus. Yet journal prices are expected to rise by 10%. The projected deficit is $15,000.

While we again ask the faculty to contribute we are also seeking alumni support to help raise $20,000. We hope for an average contribution of $200. Some of you will not be able do this but we hope that others will contribute more. Those of you who make a leadership gift of $350 or more (the average cost of a single journal) will be recognized by a bookplate in the bound volume of a journal of your choice.

If you have any questions please contact Nancy Anderson, librarian, or Felix Albrecht, committee chair. Checks should be made to U of I Foundation/LAS Annual Fund with the Mathematics Library as beneficiary.

Felix Albrecht, Chair
Library Committee

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