Park Appointed Chancellor of the University of Missouri-Rolla

John T. Park (Ph.D. 1963) was named Chancellor of the University of Missouri-Rolla on March 30th by the University of Missouri System President George A. Russell. Park, 57, received his undergraduate degree from Nebraska Wesleyan University in 1960. In 1963, with Professor Edward Zimmerman as his thesis adviser, he received his Ph.D. in physics from the University of Nebraska. In 1964, after a postdoctoral appointment at University College in London, he went to Rolls as an assistant professor of physics. He was a visiting associate professor at New York University during the 1979-81 academic year and was chairman of the UM-Rolla Physics Department from 1987 to 1988.

At Rolls, Park developed a unique experimental system to measure energy-loss spectra of energetic ions with an unprecedented resolution. This enabled him and his associates to make measurements of various atomic collision processes which were difficult or impossible by any other method. In 1978 Park's group published the first measurement of the total cross sections for the excitation of atomic hydrogen by proton impact and in 1991 they obtained the first differential charge transfer cross sections for proton-atomic hydrogen collisions. A fellow of the American Physical Society, Park has served on numerous national and international committees and panels. He was also the recipient of the Shell Oil Company Outstanding Teacher Award at Rolls.

"John Park's appointment was recommended to me with exceptionally strong support from members of the research committee, faculty, staff and students on the Rolls campus," Russell said. He has served Rolls long and exceedingly well as teacher, scholar, and campus administrative officer. He is a person whom we know and respect and with whom we have great confidence." Prior to his appointment as chancellor, Park has also served as UM-Rolla's Vice Chancellor for Academic Affairs and in 1985-86 and 1991-92 as Interim Chancellor.

Fuller Awarded AAPT Millikan Medal

The Awards Committee of the American Association of Physics Teachers announced in the July 1992 issue of the AAPT Announcer that Professor Robert G. Fuller had been selected to receive the Robert A. Millikan Medal for 1992.

The award recognizes a teacher who has made notable and creative contributions to the teaching of physics. The Millikan Medal recipient presents a lecture at the AAPT summer meeting. A monetary award of $500, an inscribed silver medal, travel expenses to the meeting, and a citation are awarded annually at the AAPT Summer Meeting. Coproduced by Prentice-Hall Publishing Company and AAPT, the award was established in 1964.

Fuller received his undergraduate degree at the University of Missouri-Rolla in 1967 and his M.S. and Ph.D. in physics at the University of Illinois. After four years at the U.S. Naval Research Laboratory where he studied conductivity and ion transport in solids he joined the faculty at UNL in 1969. The focus of his efforts here has been on innovative educational projects. This work has brought him recognition on the national as well as the local scene. For example, he has received two Distinguished Teaching Awards at UNL in 1973 and another in 1986. He was elected President of AAPT in 1988 and has been the editor of their Instructional Materials Center since 1987. In 1986 he was cited by the American Association for Higher Education for his educational leadership. He received the University of Missouri-Rolla Alumni Merit Award in 1988.

Fuller presented his Millikan lecture, "Hypermedia and the Know thy of Phsyics-Standing Upon the Shoulders of Giants," at the AAPT summer meeting on the University of Maine campus in Orono, ME on August 13, 1992 and reported it in an article in the Physics Department newsletter on September 8.
Chairman's Letter

Anthony F. Stasore

While I was on sabatical during the first half of the 1992-93 term, I asked many times by colleagues and acquaintances what it's like being Chair of this Department and simultaneously keeping active in research and teaching. Maybe they were surprised I would take a sabatical, or, rather, that I would take up the Chairmanship upon my return. Anyway, among other things, I would answer that it's like committing oneself to twice as much work as one can reasonably hope to accomplish, to managing regardless of time to get three quarters of it done, and feeling badly about the remaining work that one just couldn't manage. The reward comes primarily from the accomplishments and the positive changes that one has in a hand at fostering. Anyway, this sabatical did for me what it was designed to do—it allowed me much more time to think. I had time to ponder ideas and new research areas for which there is precious little time otherwise.

When I returned to Lincoln at the start of the fall semester, the newspapers were full of news about proposed mid-year budget cuts. In the national context, our University as well as our State are much better off financially than many, many other universities and states. Nevertheless, our State has not escaped the financial problems confronting the Nation. That is why it is heartening that the generosity of you—our alumni and friends—is in certain ways reducing our dependence on State funding to carry out our missions of teaching, research, and service. Burton Mose's cullaboration of an endowed Professorship last year was the very first of its kind for this Department. It honors one of our distinguished former Professors. It adds to the growing number of endowment funds established to benefit the Department in various ways. Thus, as shown in The Record later in this newsletter, our undergraduate and graduate students benefit from a number of endowed scholarships and fellowships honoring other distinguished faculty, alumni, and friends. Certainly, the Roskelly Memorial Equipment Fund established by Mr. & Mrs. James C. Coe has done wonders for our students by providing them with state-of-the-art equipment in our laboratories.

However, these large gifts are not the whole story. Eight years ago the Department established new endowed funds for unrestricted purposes, for visiting high school physics teachers, for research, and with a portion of the donations many of you make to us annually. As of this month these funds' total endowment is close to $80,000. The income from these endowments is used annually to host get-togethers of our faculty with Lincoln and Crete area high school physics teachers, to invite distinguished scientists to present colloquia and interact with our faculty and students, to recruit promising high school students interested in physics or astronomy, and for many other worthwhile purposes. Yearly annual donations are indeed like the proverbial acorn, which grows given sufficient time, care, and patience. While it is always difficult to put aside a significant fraction of our annual donations for the future, especially when our needs every year seem so great, this discipline is producing for us a growing stream of permanently funded income. For this the Department and I thank you and promise to continue striving to earn your confidence in us.

It is always a pleasure to report the external recognition the Department's faculty receive. This year the Department's teaching excellence has been recognized by the presentation of the American Association of Physics Teachers' 1992 Milken Award to Professor Robert B. Fuller by the College of Arts and Sciences' presentation of a Distinguished Teaching Award to Professor Edward G. Schmidt. At a time when research universities throughout the U.S. are being scrawled for how well they are carrying out their teaching mission, such awards bring added weight to the argument that good research and creative activity go hand in hand with good teaching. Fuller's award in particular recognizes his work on applying advanced technology to developing novel teaching tools such as the interactive videoscoping techniques we are using to show how the world operates. Schmidt's award this year makes him the 15th member of our current faculty to receive this distinction. Fuller and nearly all of these 15 faculty are also active researchers. While the creation of wealth is the primary goal, while we hope that others receive more publicity, you should know that it's conveyance to the next generation of students is also having done in our Department and done well.

At present the Department is suffering the pains of growth. Our graduate student population is currently up to a record 63 students with a few more due to enter in January 1993. Our external research grants and contracts are at a record of $18.9 million annually, which is more than double the $3.3 million we had as recently as 1987-88. The number of bachelors, masters, and doctoral degrees awarded by the Department has roughly doubled in the past 10 years from 66 degrees during the 5-year period 1977-82 to 131 degrees during the most recent 5-year period 1987-92. Our plans to increase the number of experimental faculty in the Department are proceeding rapidly; this academic year we are advertising for experimentalists in atomic physics, condensed matter and materials physics, and in high-energy physics. All of this growth, mind you, is proceeding without any increase whatsoever in the total number of faculty in the Department, which remains at 28 faculty. (Actually the number of faculty has decreased since some of our newer faculty have only partial appointments in the Department.) This growth stems in large part from the attractiveness to students of the research being carried out by our faculty as well as the much larger number of graduate research assistants and postdoctoral researchers who are being supported by our increased external grant funds.

The number one problem the Department faces is that of space—space for new faculty, students and postdoctoral researchers and space for the new laboratories in newer research areas in which we wish to educate our students. These needs are being met just one step ahead of— and in some cases, just one step behind— the arrival of our new faculty members.

You've read in previous issues of Spectrum how our Library was moved from the 2nd floor of Behave Lab to the 1st floor of Beave. Well, by the time you receive this issue of Spectrum, our Departmental offices in Beave will also have moved to the 1st floor of Beave. These moves are enabling us to create four new research laboratories for our new faculty on the 2nd floor of Beave. This spring we plan to write proposals to renovate the attic in Beave, thereby creating 16-18 new faculty/staff office spaces and our new research and teaching labs. That should take care of our needs for at least a few years—we hope.

Finally, I wish to say that the faculty and staff sincerely enjoy having you here. We do care what happens to our graduating senior class. That is why we'll find an information card and return envelopes enclosed with this newsletter. Please use it to inform us of your activities and address changes. Please also look over the list of "missing alumni." We are there to re-establish contact and help you to find any of whom we've lost track. And when your plans involve a return to Lincoln, please stop and see us. With some advance notice we can arrange a brief tour of our "new" Department. Best wishes until next year.

Sincerely,

Anthony F. Stasore

Professor and Chairman

Kelty Receives "Snow and Ice" Research Grant

The Department Electronics Shop is continuing its involvement with the Snow and Ice Research Group (SHRG). As a SHRG co-principal investigator, Electronics Shop Manager John Kelly was recently awarded a $82,778 grant from NASA Earth Sciences and Applications Division to develop and test new measurement equipment that collects the Greenland ice sheet. Wal and Electronics Technician Brian Farleigh plan to be at the South Pole by the end of July and at the North Pole by mid-September.

Kelly returned this past summer from Camp Century in North Greenland, Denmark, where he surveyed the existing borehole there to a depth of 1350 m, about 30 m from the bedrock bottom. A new one-meter-long logging tool uses electronics designed and built in the Physics Department Electronics Shop. Related papers appear this year in the journal Cold Regions Science and Technology.
Looking for the Optical Equivalent of the Transistor

If the next generation of computers is to rely heavily on optics as well as electronics, scientists have to come up with "the optical equivalent of the transistor," says Donald Fuehring. Dr. Fuehring, associate professor of physics and astronomy at UNL, is likely candidate for the job: a photofabricator, a polymer material that Druebach and his colleagues have recently developed. The material, which is made of a polymer and a photoresist, can be patterned by exposure to light. The patterned material can then be developed using a process similar to that used for microelectronics.

Druebach, who joined the UNL faculty a year and a half ago, says the material's potential is "enormous." The team has already demonstrated that the material can be used to fabricate tiny structures on a scale comparable to the size of computer chips. The team is currently working on ways to further improve the material's performance and scalability.

Druebach and his colleagues are working on a "Lego" approach to finding the right materials and processes for these applications. They are also exploring the possibility of using the material to create new types of optical devices, such as optical switches and modulators.

Druebach believes that the material has great potential for a wide range of applications, from data storage and processing to medical imaging and bioanalytics. The team is currently working on several projects, including a collaboration with researchers at the University of California, Los Angeles, to develop new tools and methods for optical imaging.

Druebach and his team are also exploring the possibility of using the material to create new types of sensors and detectors, which could be used in applications ranging from environmental monitoring to national security.

Druebach's work on the polymer material is just one example of the exciting opportunities that exist in the field of photofabrication. With continued investment in research and development, the potential for this technology is vast, and we can look forward to seeing many more applications emerge in the years to come.
**Note from Wayne and Phyllis Lang**

A funny note came in January from Wayne W. Lang (Ph.D. 1964). He and his wife Phyllis are at the University of North Carolina at Asheville, where he is the chairman of an EPCOM Computer Science Department and is the director of the Honors Program. Her work with that program helped UNCA attain 15th place in the ranking of universities in the southern region by U.S. News and World Report. This ranking, Wayne says, brought them twice as many applications for positions as in the previous year.

Wayne's department recently received a $48,000 NSF grant which will give them a new UNIX lab with 13 color Dec 5000/25 workstations. He teaches a lot of physics in his VLSI design course and is also teaching a course on computer graphics and X-windows on their state-wide network. Wayne says to tell anyone who asks that in Ph.D. physicals to physics in UNIX can lead a good life. He also says thanks to his thesis advisor Ted Jorgensen, and to former classmates Brons Anspach, Clint Satter, Eugene Newton, John Park, Chuck Shaw and Jim Bunch. "We remember those days with you all with great affection."

Wayne's brother, Dr. Charles Lang, a physics teacher at Onaha Wintalee High School, has been a collaborator with Professor Rebert Keller on several educational projects.
Arons Presents "Some Unpalatable Truths"

Arnold B. Arons, Emeritus Professor of Physics at the University of Washington, presented the annual Blackman Lecture on physics education to Department faculty and students as well as Lincoln and Omaha area high school physics teachers on October 25th. He spoke on the topic "Understanding Versus Coverage—Resisting the Undesirable," in which he described the experience he has gained in how to teach introductory physics. Arons is concluded by suggesting that it cut back on volume of material it helps to have a story line that brings students back again and again to the concepts needed as preparation for succeeding courses. Universities are supposed to teach people to learn by themselves. Toemnon universities—and physics departments in particular—need to have the courage to lose some gaps which the students can fill themselves.

Arons was born in Lincoln in 1916. He received his Ph.D. from Harvard in 1943, whereupon he taught at both Sterns Institute of Technology and Amherst, where he became Professor of Physics in 1969. That same year he took a Professorship at the University of Washington, where he has been Emeritus Professor since 1982. His research has spanned the fields of explosive phenomena, xeromagnetochemistry, and cognitive development. He was awarded a Guggenheim Fellowship in 1957, and received the Graduated Medal of the American Association of Physics Teachers (AAPT) in 1972. He was the President of the AAPT in 1967. Robert Fuller and his staff helped Arons locate the address of his birthplace in Lincoln and took him there for a visit.

Following Arons' lecture, Department faculty met with Lincoln and Omaha area high school physics teachers over dinner at the Nebraska Union. Professor Robert Fuller and Visiting Assistant Professor Frederick Bock Patton gave an overview on "Using Interactive Video to Teach Physics." Patton demonstrated how interactive video such as Fuller's Physics Classics Series is being used in our premedical physics courses. Students in these courses are given assignments which they carry out using interactive video clips in our Physics Learning Center in Science Lab. Assignments involve taking data based on events shown in the films and making predictions and drawing conclusions based on these data.

Pizza Boxes Hold Food for Thought

Whether people who open boxes being sent across the nation and around the world are disappointed or elated depends on what they hunger for—food or knowledge. The boxes are printed with the name of a popular pizza restaurant in Lincoln, but the "classic" inside is not a medium-sized pizza, but a science lesson developed at the University of Nebraska-Lincoln under the direction of Robert Fuller, professor of physics and astronomy.

Fuller produced "Physics Classics Classics" as a special project for the American Association of Physics Teachers (AAPT), which provided funds for the project. That funding was insufficient to cover the cost of producing the videocassettes. No matter, for UNL will not only recover production costs, but stands to make about $250,000 profit on the initial sale of the videocassette, a matter of great concern to Fuller, for the project allows him to collect the profits from the sale of the cassettes, which were advertised earlier this year in special brochures in the official publications of the AAPT.

"I set the price at $595 per set, and hoped we would sell 250 copies," Fuller said. "Instead we received orders for 1,200 copies, from every state in the union, six provinces in Canada, and 69 other countries."

The videocassette library is a collection of the best moments from hundreds of physics films, most produced since 1950. Fuller, director of the AAPT's Instructional Materials Center at UNL, produced the audio-visual videocassette package with a grant from the U.S. Department of Education.

Fuller and his staff, including Dr. Charles Long, a physics teacher at Great Westside High School, previewed more than 1,000 hours of film to choose material for editing and incorporating into new segments with new narration and sound track. The videocassette pre-production work was done by a Nebraska Educational Television Video Design Production.

The library of physics classics will enable teachers to illustrate any one of hundreds of physics principles with an instantaneously accessible selection from the library, which has brought opportunities for class discussion and also allows teachers to develop their own computer-interactive programs.

The pizza boxes were purchased from DaVinci's Restauranteurs, after Fuller noted that the pizzeria's medium pizza box was just the right size to hold the videocassette. "I made inquiries about having the boxes made up specially," Fuller said. "But the reduction to 494 hours would cost $1.25 per box. DaVinci's agreed to sell them for 25 cents each."

The videocassette arrived at Ferguson Hall on May 13 and were packed in the boxes and mailed by a team assembled by Marilyn McDowell.

Christopher Bobb helping insert 1,200 videocassette into pizza boxes for shipping. The boxes were assembled inside-out, so the DaVinci logo was inside the package. (Photo by Mark Summer)
**Aylesworth Finds Young Scientists Network**

Choose the correct statement: "There is a current shortage of physicists in this country which will become worse as the aging generation of academic physicists retires over the next few years." Or, "There is a current surplus of physicists in this country because the pay and prospects for entry-level positions are so good that the number of graduate students in physics is declining." 

Some factors cited as contributing to the drying up of the job market are the recession, the potential loss of a steady stream of federal funding for university research, the increasing number of scientists working in non-academic fields, and the funding of science funds into the construction of large experimental facilities. The need for new funding sources to support physicists in the former Soviet Union, and the trend away from pure research into applied fields, are also contributing factors.

Challenging the gloomy prospects for physicists is Nobel Laureate Leon M. Lederman who is currently president of the American Association for the Advancement of Science. "The opportunities for scientists in general are tremendous," he said. "A physicist may not always find opportunity in his original narrow research specialty, but only 2 or 3 percent of physicists are actually unemployed. The need for scientists is increasing in almost all sectors of the economy, and physicists will also star in the quest for alternative energy sources and other social needs. There's no question that the nation will need more physicists."

Part of the answer to the job problem, some say, is the utilization of physicists in areas that, while not closely related to physics, can use their quantitative problem-solving abilities in other ways. Alan Chynoweth, head of research at Bellcore, says that what is needed is flexibility. "Some physicists have moved enthusiastically into new areas," he says, "the big ones being software, systems, and services. There's no shortage of really interesting work to be done if people are willing to be flexible. There is a need for people who can solve problems in data handling, video compression, and speech technology—things of immediate use to the company." Aylesworth has evidently heard that advice and has recently taken a job working on issues in science and public policy with the law firm of Lawrence Tribe in Cambridge, MA.
No Known Address:
Please let us know any information you may have on these "missing alumni:"

Malcolm M. Alley (M.S. 1962)
Harvey L. Brandt (M.S. 1967)
Rohlin L. Collins (B.S. 1970)
James W. Cooper (B.S. 1963, Ph.D. 1967)
Barrett F. Cottrell (M.S. 1960)
Alfred J. Crowe (Ph.D. 1974)
Stephen L. Cunnington (M.S. 1960, Ph.D. 1971)
Richard E. Daves (B.S. 1960, M.S. 1961)
Charence M. DeYoung (B.S. 1958)
James F. Dore (B.S. 1966)
Harrell O. French (B.S. 1963)
William Lee (Ph.D. 1962)
George W. Garb (B.S. 1963)
George G. Gerst (Ph.D. 1965)
Mohil E. Heppenheinzer (M.S. 1971, Ph.D. 1971)
Charles R. Henniker (B.S. 1971, Ph.D. 1983)

Department Offices to be Moved

Because of continued budget problems in the State of Nebraska and at the University, it does not seem likely that a new building can be constructed very soon to solve the space problems in the Department. Therefore, we are doing our best to utilize the present space most efficiently by remodelling and rearranging functions. With the recent and planned increase in the number of experimental faculty, additional research laboratory space is needed. It was decided that space in Bebelin Laboratory presently used for the Department office could be better utilized as an aquarium laboratory than as a room in the older Bebelin Laboratory since the newer building has the needed services more readily.

The move into the teaching laboratories took place in September and October and the transfer of the offices is scheduled for December 1. Then the vacated space on the second floor of Bebelin will be made into research laboratories and faculty offices.

The Department building committee, whose members are Professors David Depette, Edgar Pearlstein, and Engene Rude and Business Manager Allen Sporch, have been heavily involved in planning and overseeing the project, but the main impetus for the move came from Department Chairman Anthony Starace, who not only had the original idea, but was successful in obtaining University funding for it. The new offices will be located in the old aquarium laboratories and in the old art laboratories.

No further information is available, but space utilization will continue to be a problem in the near future.

Robert A. Wurzel (M.A. 1949 Math/Physics)
Albert O. Yee-Eng (B.A. 1975)
Ackerman, Charles B. (M.A. 1959, Ph.D. 1964) 6720 E. Blumbird Lane, Paradise Valley, AZ 85253. Retired from Morrison in 1986 after 32 years. "The missing telescope objective lens was in a crate in the basement of Bruce Lab in 1953. Say ‘Hi!’ to Ted Jorgensens. Keep up the good work! Times are tough. I appreciate the annual newsletter.”

Chou, Shi-Chung (Ph. D. 1989) Transcript International IMC, 1440 Buckingham Drive, Lincoln, NE 68506.

David, Michael A. (Ph. D. 1963) Department of Physics, Lebanon Valley College, Annville, PA 17003. Left Theological College in Greenville, Pennsylvania and went to Lebanon Valley College in Annville, Pennsylvania as an Associate Professor in 1987. Was awarded tenure in 1989. In 1990 he received a Whittaker Foundation Grant for the Research Corporation for his research, which he continues to do in collaboration with Professor Robert J. Hardy.


Du, Xing-Yi (Former Postdoctoral Research Associate) 3144 John R. Road, Apt. 206, Troy, MI 48083. Is beginning a Medical Physics Postdoctoral appointment at William Beaumont Hospital in Royal Oak, MI.

DaBois, Robert D. B.S. 1970, M.S. 1972, Ph.D. 1977 7211 West 130, Kennewick, WA 99337. Is a senior scientist at Battelle Memorial Institute, Pacific Northwest Labs. “My compliments on the articles in the SPECTRUM. I especially enjoyed reading about ‘Newton’s Apple Tree. It’s also nice to hear about the latest research activities and awards. Keep up the good work.”

Edahati, Mai Faghi (Former Research Associate). Has returned to the Physics Department at Faisalabad University in Man- bad, Iran.

Gao, Bo (M.S. 1998, Ph.D. 1999) 2414 John K. Road, Apt. 206, Troy, MI 48082. Is beginning a Medical Physics Postdoctoral appointment at William Beaumont Hospital in Royal Oak, MI.


Hedwig, Russell D. (M.S. 1964) 97841 Glacial Drive, White- water, WI 53190. Is an Associate Professor in the Department of Physics at the University of Wisconsin-Whitewater.

Homan, Deun M. (B.S. 1991) 368 Lindenhurst Drive, Apt. 104, Lincoln, NE 68504. Is a Teaching Assistant in the Department of Physics at the University of Ken- tucky.

Kim, Ho-II (Visiting Research Associate). Has been appointed the Director of Sobaeksan Astronomical Observatory, Daejon, Korea.

Lee, Yong-San (Visiting Research Associate). Has been ap- pointed the Chairman of the Department of Astronomy and Space Science at Chonbuk National University, Chonju 560-755, Korea.

Lewis, Michael H. 1992, is a graduate fellow in physics at the University of Michigan—Ann Arbor. If you think your graduate school program was tough, consider what Michael recently wrote home: He took a physics exam that started at 6:00 pm and he left at 5:00 am — and he was a graduate student.

Liu, Chih-Ray (M.S. 1985, Ph.D. 1989) 8360 Kings Trail Cove, College Park, MD 20740. Recently joined the faculty of the De- partment of Radiation Oncology at the University of Ten- nessee Medical Group in Memphis.

Nka, Ida-Soong (Visiting Professor). Returned to Yonsei Uni- versity, Seoul 120-749, Korea after spending several months of his sabbatical leave at the University of Nebraska-Lin- coln.


Smith, Andrew Nowell (A.B. 1947) Star Route, Box 33, Eld- ridge, MO 65643-6909. Is a self-employed Engineering Physicist. “Collapse of the USSR has not halted the Navy’s program of expanding and upgrading its ELVF/JPL long haul radio communications systems. I am still doing some of the required design, development, modification and test- ing of the antenna systems as an independent consultant. 13 years after retiring from direct employment at Naval Ocean Systems Center in San Diego.”


Tender, Steve, 221 Satellite Lane NE, Apt. 3, Fridley, MN 55432.

Wiltjer, Robert K. 7777 Antares Court, Springfield, VA 22152. Executive Officer in the U.S. Navy.

Woolen, John W. (Ph. D. 1972) 105 Crestview Lane, Oak Ridge, TN 37830. Coordinator for Education and Technology at the Oak Ridge National Laboratory, “I’m having fun setting up educational wide-area networks for schools in the Oak Ridge area. Contact me at wea@ornl.gov.”

Yang, Jing, Yaon-Yang, Jin-Chan, Yunnam Research Institute of Chemical Industry, Kunming, 650091, People’s Republic of China.

Order Your Own Newton’s Apple Tree!

Two reasons of last year’s Spectrum articles on Newton’s apple tree have already placed their orders. You, too, can be the first in your neighborhood to possess this link to the origins of Newtonian physics. As we reported last year, a number of trees are being propagated by UHLS Horticulture Department. These all originate from acorn taken from the first apple tree to be used in America, at the family’s former estate at Woburns Manor in England. Professor Richard Kersten, a professor of physics at York University, has written a lengthy (as yet unpublished) article regarding his researches into locating the original Newton’s apple tree. We will be pleased to send copies to interested persons. Please include with your request a check for $0.00 payable to "UNH Dept. of Physics & Astronomy" to cover our postage and handling costs.

How does one obtain a tree? The cost including shipping will be approximately $5.00 for a 3-foot tall tree. To reserve a tree, one should contact Professor W.A. Gustafson, Jr., 123 Mainwah Hall, The Uni-

versity of Nebraska, P.O. Box 880714, Lincoln, NE 68588-0714, Tel. 402-472-2674. The optimum time for shipment depends on the frost dates for Lincoln and for the recipient’s location. The best time is likely to be in the Spring. Gustafson can advise one of the best times to transplant.
Acknowledgments

The Department is very grateful to the following individuals and corporations for their new and continuing financial contributions during the period 1 November 1984 – 31 October 1985. These contributions have been made in support of major items of capital equipment, an endowed professorship, graduate fellowships, undergraduate scholarships, and invited lectures as well as for unrestricted purposes. Those who have not been contacted by one of the University of Nebraska Foundation’s telephone campaigns or who might be considering an additional tax-deductible gift to us should note that we have the following general accounts at the UN Foundation:

(1) Physics & Astronomy Astronomy Development Fund (for unrestricted gifts) (Account No. 3257.0)
(2) Physics & Astronomy Lecture Endowment Fund (Account No. 3311.0)
(3) Physics & Astronomy Scholarship Endowment Fund (Account No. 3300.0)

Contributions to any of these may be made conveniently using the contribution card and return envelope enclosed with the mailing of this newsletter. Checks should be made payable to the University of Nebraska Foundation and should indicate for which account the money is intended. Those contributors whose employers have a matching gift program should indicate this. Thank you very much!

Terry L. Anderson (M.S. 1971, Ph.D. 1975)
Kevin D. Aylewsworth (M.S. 1986, Ph.D. 1989)
Thomas H. Bedwell (Ph.D. 1986 Secondary Education/Physicis
Bell Communications Research, Inc.
Russell W. Brace
Louis J. Caplan (M.S. 1964, Ph.D. 1975)
CBS Inc.
Mr. and Mrs. James C. Coo
Charles J. Cook (M.A. 1950, Ph.D. 1953)
Daniel E. Dunn (B.S. 1954 Engineering Physics)
Cathy L. Engelhardt (M.S. 1983, Ph.D. 1997)

John W. Fleck (M.S. 1964, Ph.D. 1969)
Robert G. Fuller
C. Fred Gaylen
Bert H. Hartzell (A.B. 1939 Math/Physics)
Alan L. Hoege (B.S. 1957)
Howard L. Heinrich (M.S. 1968, Ph.D. 1972)
David J. Holcomb (B.S. 1970, M.S. 1971)
Hughes Aircraft Corp.
IBM Corp.
Carol K. Ikeda (Ph.D. 1945 Chemistry/Physics)
Robert Katz
George W. Kerby (B.S. 1965, M.S. 1988)
John E. Lakes (B.S. 1964)
William J. Lonan (M.A. 1956)
Alvin L. Langs (M.A. 1950)
Robert L. Mahler (M.S. 1976, Ph.D. 1980)
Ronald W. Mayle (M.S. 1979)
Materials Research Corp.
Charles B. Minnich (B.Sc. EE 1937)
Burton E. Moore
Mr. & Mrs. Joseph L. Parker (Ph.D. 1950 Chemistry/Physics)
Rebecca R. Richards-Kortum (B.S. 1980)
Jerry E. Rockman (B.S. 1963)
M. Eugene Rudd (Ph.D. 1956)
James J. Schubitz (B.S. 1956, M.S. 1957)
Donald P. Schneider (B.S. 1970)
David J. Settlemeyer
Xue Ying Shi (M.S. 1997)
Andrew N. Smith (A.B. 1947 Physics/Math)
Stanley J. Szemek
Anthony F. Stasne
Kenneth L. Stricklett (M.S. 1961, Ph.D. 1967)
Terry J. Tung (Ph.D. 1986)
Tennessee Philatelic Foundation, Inc.
United Technologies
Bruce C. Wagnon (B.S. 1984)
Westinghouse Educational Foundation
William R. Welton (M.S. 1965)
Kwong Hau Yoo (M.S. 1994)

* * * * *

Obtain your copy of the history of the Department using the order form on the reverse of this page!
Department History Book Available

The book Science on the Great Plains: The History of Physics and Astronomy at the University of Nebraska–Lincoln by M. Eugene Rudd was published last summer as No. 71 of the Nebraska Studies series. This 168-page illustrated book describes the early teaching of physics and astronomy when the University of Nebraska had only four professors, the beginning of the research program in physics by DeWitt Bristol Brase, the founding of the two separate departments (Physics and Astronomy) under Brace and Goodwin Swanzy, the decline of the these departments during the wars and the Great Depression, their rapid growth in the 1940s, and their eventual union and further growth in the 1970s and 1980s.

In addition, there is available a supplement which lists the professors and staff, all graduate degrees granted, and a list of publications from the Department up to 1950.

To order your copy, use the form below. Make your check payable to the University of Nebraska Foundation and send it with the form to:
Patricia J. Christen, Accounting Clerk,
Department of Physics and Astronomy
Brace Laboratory 118
University of Nebraska
P.O. Box 880111
Lincoln, NE 68588-0111.

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THE RECORD

A Documentary Record of Facts and Figures for the Department of Physics & Astronomy of the University of Nebraska—Lincoln

No. 8 Fall 1992

Anthony F. Starace, Editor

1991-92 DEGREE RECIPIENTS

Bachelor of Arts

Scott P. Amblar (December 1991). Is a Pilot with the Nebraska National Guard and Charter Pilot for Capitol Aviation.


Bachelor of Science

Dean M. Homan (August 1991). Is enrolled in the graduate program in physics at the University of Kentucky.

Brian E. Jones (August 1991). Is enrolled in the graduate program in physics at UNL.


David L. Johnson (May 1992). Following a three-month tour of Turkey and Eastern Europe, joined the Hudson Bay Company in Lincoln, which is a telephone fund-raising outfit. However, he plans to apply to several graduate programs in physics for Fall 93 admission.


Michael K. Lewis (With Highest Distinction, May 1992). Is enrolled in the graduate program in physics at the University of Michigan in Ann Arbor. Is one of the five (out of 40) first year graduate students who were awarded Graduate Fellowships.

Christopher T. Petter (With Highest Distinction, May 1992). Is enrolled in the graduate program in physics at the University of Minnesota.

Scott H. Sinclair (With Distinction, May 1992). Is enrolled in the graduate program in physics at the University of Kansas.

Master of Science


Jean X. Shen (May 1992). Is engaged in doctoral research with Professor Roger Kirby.


Kayvan Aftaboori (May 1992). Is enrolled in the graduate program in physics at UNL.

HONORS

1991-92 Fellows

Kenneth W. McLaughlin — Bukey Memorial Fellowship

Brian W. Moudray — Franklin E. & Oriola M. Johnson Fellowship

Rui Qi — Maud Hammond Flint Fellowship

Daxin Wang — Bukey Memorial Fellowship

Jing Yang — Avery Fellowship

1991-92 Scholarships

Cotrad D. Engel — Joel Stebbins Fund Scholarship

Eric L. Green — Henry H. Marvin Memorial Scholarship

David L. Johnson — Joel Stebbins Fund Scholarship

Michael K. Lewis — John R. Almy Scholarship

Daniel A. Meyer — Henry H. Marvin Memorial Scholarship

Desray J. Petersen — Ed Flask Scholarship

Matthew E. Rammott — Henry H. Marvin Memorial Scholarship

Samuel P. Raskin — Physics & Astronomy Scholarship

Keith N. Scitton — Ed Hirsch Scholarship

Coby C. Young — Henry H. Marvin Memorial Scholarship

Matthew J. Ziemernick — Joel Stebbins Fund Scholarship

1992 Distinguished Teaching Assistant Awards

Sethle Malhotra — Hao Vu

1992 College of Arts and Sciences Distinguished Teaching Award

Edward G. Schmidt

1992 Recognition Award for Contributions to Students

Robert G. Fuller — Roger Kirby

Marylyn T. McDowell — Norman Sime

1982 Honorary Degree, "Doctor of Science, honoris causa" Concordia College, Moorhead, Minnesota

M. Eugene Ruff

1991-92 Society of Physics Students Officers

Eric Green, President — Darvin Reavis, Vice President

Jackie Francis, Secretary — David Bentz, Treasurer
Faculty Professional Activities

In addition to service on Departmental, College and University-wide committees, for 1992-93 a number of the faculty are active in local, national, and international professional activities, as follows:

Clifford L. Buttis: Board of Directors, Lincoln Children's Museum; Physics Instructional Resource Association.


Ella I. Fabrikant: APS Reviewer, Physics Programs in the former Soviet Union.

Robert G. Fuller: Author, "Ask the Medium" column, AAPT Announcer; Editor, AAPT Instructional Materials Center; Member, AAPT Publications Committee; Co-Principal Investigator, Science Supplement of Statewide Nebraska Systemic Initiative; Steering Committee, Physics Academic Software.

John H. Hardy: Consultant, Army Ballistics Research Laboratory, Aberdeen, MD; Consultant, U.S. Naval Research Laboratory.

Duane H. Jaeck: Consultant, Edgerton Museum Project, Plainsman Museum, Aurora, NE; NSF Graduate Fellowship Committee (Chairman), National Academy of Sciences; Local Program Committee, VI International Conference on the Physics of Highly Charged Ions, Kansas State University, September 28-October 3, 1992.

Roger D. Kirby: Consultant to Colorado State University.

Kam-Chung Leung: Chretien Research Grants Committee of the AAS (Chairman); Distinguished Professor, Shaanxi Observatory, Academia Sinica, China; Editorial Board, Chinese Astronomy and Astrophysics (Pergamon Press); Pacific Rim Colloquium on New Directions in Binary Star Research (Co-Editor).

By-Hwang Lou: Editor, Applied Physics Communications.

E. Eugene Rudd: Organizational Committee, Conference on the Application of Accelerators in Research and Industry; Report Committee (Chairman), International Commission on Radiation Units and Measurements; Special Collaborator, Report on Atomic Data for Radiotherapy, International Atomic Energy Agency.


Lee Sartori: Nominating Committee (Chairman), APS Forum on Physics and Society.


Anthony F. Starace: Advisory Board, Institute for Theoretical Atomic and Molecular Physics, Harvard-Smithsonian Center for Astrophysics; APS Task Force to Review Reviews of Modern Physics (Chairman); Editorial Board, Physical Review A; General Committee, International Conference on the Physics of Electronic and Atomic Collisions.

* * * * * *

1992-93 Visiting Staff Members

Visiting Associate Professor this Fall is C. Martin Gaskell (Ph.D. 1981, California-Santa Cruz) from the University of Oklahoma.

Visiting Assistant Professors this year are physics education researcher Charles R. Lang (Ph.D. 1975, Kansas State); Charles B. Robbelen (Ph.D. 1969, Illinois); physics education researcher Evelyn B. Tunks Patterson (Ph.D. 1990, Delaware); and Yong Zhang (M.S. 1983, Tsinghua, Beijing) on sabbatical from Indiana University, Lawrence, Indiana.

Research Assistant Professors this year are theoretical condensed matter physicist Zhengheng Shan (Ph.D. 1990, Nebraska), working with Professor J. Hardy; theoretical atomic physicist Cheng Pan (Ph.D. 1989, Virginia), working with Professor Strauss; and experimental condensed matter physicist Michelle J. Mason (Ph.D. 1990, Nebraska); and Haifeng Yang (M.S. 1986, N. Cheng Kung Univ.).
1991 Fall Semester Colloquia

September 5: Professor Karl M. Unruh, University of Delaware
"Melling and Freezing in Restricted Geometries"

September 12: Professor Anthony F. Starace, University of Nebraska–Lincoln
"Uncovering Fundamental Physics with Lasers and Negative Ions"

September 19: Professor Howard C. Bryant, The University of New Mexico
"Relativistic Atomic Physics"

September 26: Dr. Gary L. Esley, General Motors Research Laboratories
"Ultrafast Optical Studies of Metals"

October 3: Professor Sumner Barrfield, Arizona State University
"Stellar Explosions from a Novice Point of View"

October 17: The Jerry E. Rankman Lecture: Dr. H. Gordon Berry, Argonne National Laboratory
"The Chicago Academy for Mathematics and Science Teachers"

October 24: The Montgomery Lecture: Norman F. Ramsey, Nobel Laureate (1989) and Higgins Professor of Physics, Harvard University
"Fundamental Symmetries"

November 7: Professor Eugene M. Chudnovsky, The City University of New York
"Quantum Tunneling of Magnetization in Solids"

November 14: Dr. Olle Eriksson, Los Alamos National Laboratory
"Ground State Properties of Crystalline Materials Obtained from First Principles"

November 21: Dr. Randall B. Shirts, Brigham Young University
"Nonlinear Dynamics of Molecular Vibrations: Semiclassical Quantization of Quasiperiodic and Chaotic Motion"

December 5: Professor Sitaram S. Jaswal, University of Nebraska–Lincoln
"How to Make a Good Permanent Magnet"

December 12: Dr. Marvin L. De Jong, College of the Ozarks
"Thoughts on Teaching Calculus-based Physics"

1992 Spring Semester Colloquia

January 28: Professor Gordon A. Gallup, University of Nebraska–Lincoln
"Carbon C60, C70 or Buckyball, Cn...?"

January 30: Professor Douglas K. Finnemore, Iowa State University
"Does BCS Theory Apply to High T, Superconductors?"

February 6: Professor Evelyn B. Tuska, University of Nebraska–Lincoln
"Solar Modulation of Cosmic Ray Electrons"

February 13: Professor Edward G. Schmidt, University of Nebraska–Lincoln
"Paint Variable Stars: Searching for the Odd and Interesting"

February 20: Professor Paul D. Burrow, University of Nebraska–Lincoln
"Float Like a Butterfly, Sting Like a Bee: Low Energy Electron Interactions with Molecules"

February 27: Professor R. Kent Hennecutt, Indiana University
"The Remarkably Varied Variations of Cataclysmic Variable Stars"

March 5: Professor James E. Brau, University of Oregon
"The GEM Project at the SSC: A Probe Into the Fabric of the Universe"

March 12: Professor James L. Erskine, University of Texas
"Thin Film Magnetism"

April 2: Professor Jeremy Bernstein, Stevens Institute of Technology
"What Little I Know About Bose-Einstein Condensation"

April 9: Professor Kenneth Laws, Dickinson College
"The Physics of Dance"

April 16: Professor Peter Carruthers, University of Arizona
"Counts and Correlations of Photons, of Galaxies, and of Hadrons"

April 23: Professor Stuart R. Hantsoff, University of Arizona
"The Role of the Cytoskeleton in Information Storage and Transmission"
1991 Faculty Publications

ASTRONOMY AND ASTROPHYSICS


ATOMIC, MOLECULAR AND OPTICAL PHYSICS


CONDENSED MATTER PHYSICS


New Research Grants and Contracts

During the period 1 November 1991-31 October 1992 the following new and renewal grants and contracts were received by our faculty:

<table>
<thead>
<tr>
<th>Principal Investigator</th>
<th>Title (Brief of Project)</th>
<th>Amount (in thousands)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P.D. Burrow</td>
<td>Electron Scattering Studies of Temporary Anion Formation in Hydrocarbons (NSF)</td>
<td>$77.0</td>
</tr>
<tr>
<td>S. Ducharme</td>
<td>Real Tense Space Materials Degradation Monitor Using Hillocksometers (WC)</td>
<td>$15.5</td>
</tr>
<tr>
<td>S. Ducharme</td>
<td>Experimental Studies of Photorefractive Polymers (NSF)</td>
<td>$11.5</td>
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<tr>
<td>D.W. Duquette</td>
<td>Laser Photoinitiation Studies of Excited Atomic States (NSF)</td>
<td>$49.1</td>
</tr>
<tr>
<td>D.I. Fabricant</td>
<td>Atomic Processes Involving Negative Ions (NSF)</td>
<td>$45.6</td>
</tr>
<tr>
<td>B.G. Fuller</td>
<td>Bridges, Bicycles, and Traffic Thematic Physical Science Lessons (NSF)</td>
<td>$41.6</td>
</tr>
<tr>
<td>B.G. Fuller</td>
<td>Transforming Physical Context Using New Technologies (NSF)</td>
<td>$113.0</td>
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<tr>
<td>B.G. Fuller</td>
<td>Every Physics Teacher's CD-ROM Toolkit (NSF)</td>
<td>$468.5</td>
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<tr>
<td>R.G. Fuller</td>
<td>National Interactive Media Project for Secondary Physical Science (DOE)</td>
<td>$95.5</td>
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<tr>
<td>R.G. Fuller</td>
<td>Using New Technologies to Teach Physics (NSF)</td>
<td>$90.0</td>
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<tr>
<td>R.G. Fuller</td>
<td>Transforming Physics Laboratories Using New Technology (UI)</td>
<td>$20.9</td>
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<tr>
<td>R.G. Fuller</td>
<td>Creating CD-ROMs for Science Education (NSF)</td>
<td>$52.5</td>
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<tr>
<td>R.G. Fuller</td>
<td>Undergraduate Education Initiative (III)</td>
<td>$15.0</td>
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<tr>
<td>J.R. Hardy</td>
<td>Studies of Ionic Molecular Solids (ABO)</td>
<td>$100.0</td>
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<tr>
<td>J.R. Hardy</td>
<td>First Principles Theoretical Studies of Ferroelectric Lattice Instabilities (ONR)</td>
<td>$58.0</td>
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<tr>
<td>J.R. Hardy</td>
<td>Structural Instabilities in Complex Ionic Solids LADO/EPSCOR</td>
<td>$140.8</td>
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<tr>
<td>D.H. Jaacks</td>
<td>Correlation Studies of Three Massive, Coulomb-Interacting Particles (NSF)</td>
<td>$170.2</td>
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<td>S.S. Jaswal</td>
<td>Electronic and Magnetic Properties of Quasicrystalline and Amorphous Alloys (NSF)</td>
<td>$15.0</td>
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<tr>
<td>R. Katz</td>
<td>Theory of Biological Effectiveness (DOE)</td>
<td>$48.0</td>
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<tr>
<td>R. Katz</td>
<td>Therapeutic Evaluation of the Radiation Hazards from Nuclear Space Vehicles (NASA)</td>
<td>$30.0</td>
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<tr>
<td>R.D. Kirby</td>
<td>Magnetic-Optical Properties of Novel Artificially Structured Multilayers and Intermetallic Compounds (DOE)</td>
<td>$20.0</td>
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<td>K.C. Leung</td>
<td>A U.S.-Korea Seminar on Binary Star Astronomy (NSF)</td>
<td>$34.0</td>
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<td>S.H. Lieu</td>
<td>Supercritical Fluids (NSF)</td>
<td>$20.0</td>
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<td>S.H. Lieu</td>
<td>Magnetron Sputtering of High Current Ti-Tetra-Cu-O Films for Use in Electric Power Systems (NSF)</td>
<td>$68.2</td>
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<td>M.E. Rudd</td>
<td>Ionization Processes in Atomic Collisions (NSF)</td>
<td>$102.5</td>
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<td>J.A.R. Samson</td>
<td>Interaction of Radiation with the Plane Gravitational (NSF)</td>
<td>$51.5</td>
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<td>J.A.R. Samson</td>
<td>Photodissociation Studies of Atoms (NSF)</td>
<td>$86.0</td>
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<td>J.A.R. Samson</td>
<td>Ultraviolet and X-ray Bombardment of Planetary Atmospheres (NSF)</td>
<td>$80.0</td>
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<tr>
<td>J.A.R. Samson</td>
<td>A Rare Gas Optics/Free Absolute Photon Flux and Energy Analyzer (USC)</td>
<td>$57.6</td>
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<tr>
<td>E.G. Schmidt</td>
<td>Survey of Poorly Studied Stars (NSF)</td>
<td>$54.5</td>
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<td>D.J. Sellinger</td>
<td>Magnesium and Magnesium-Oxygen of Artificially Structured Materials (NSF)</td>
<td>$55.0</td>
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<tr>
<td>D.J. Sellinger</td>
<td>Fundamental Studies of Strongly Magnetic Rare Earth-Transition Metal Alloys (DOE)</td>
<td>$59.0</td>
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<tr>
<td>D.J. Sellinger</td>
<td>Development of New Permanent-Magnetic Materials for Energy-Related Applications (NSF)</td>
<td>$124.2</td>
</tr>
<tr>
<td>N.R. Simon</td>
<td>A Test of New Radiative Quasars and Their Incorporation into Improved Cepheid Pulsation Models (NASA)</td>
<td>$135.9</td>
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<tr>
<td>A.F. Stansoe</td>
<td>Dynamics of Photon-Atom and Electron-Atom Interactions (NSF)</td>
<td>$54.0</td>
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<tr>
<td>A.F. Stansoe</td>
<td>Dynamics of Collision Processes (DOE)</td>
<td>$69.0</td>
</tr>
<tr>
<td>J.W. Weymouth</td>
<td>Magnetic Survey—Lewis and Clark Lower Fortage Camp Site (WHR)</td>
<td>$7.0</td>
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<tr>
<td>J.W. Weymouth</td>
<td>St. Catherine's Island Survey (AMNH)</td>
<td>$5.0</td>
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<tr>
<td>J.W. Weymouth</td>
<td>Quarry Creek Survey (UK)</td>
<td>$1.8</td>
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<tr>
<td>J.W. Weymouth</td>
<td>Kennard House Magnetic Survey (NSF)</td>
<td>$1.0</td>
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<tr>
<td>J.W. Weymouth</td>
<td>Ft. Ellis Magnetic Survey (MSU)</td>
<td>$1.4</td>
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<tr>
<td>J.W. Weymouth</td>
<td>North Central Kansas Survey (DI)</td>
<td>$3.5</td>
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</tbody>
</table>

**TOTAL: $2,782.2**

**AMNH—American Museum of Natural History**
**AIBO—U.S. Army Research Office**
**AH—U.S. Department of the Interior**
**DOE—U.S. Department of Energy**
**DOAB—U.S. Department of Agriculture**
**EPCOR—Experimental Program to Stimulate Competitive Research**
**HH—Howard Hughes Medical Institute**
**IN—Indiana University**
**MSSU—Montana State University**
**NASA—National Aeronautics and Space Administration**
**NSF—National Science Foundation**
**NEO—Nebraska Energy Office**
**NSHS—Nebraska State Historical Society**
**ONR—Office of Naval Research**
**RC—Research Corporation**
**UAK—University of Kansas**
**UCS—University of Southern California**
**WFL—Woolf Company**
**WHR—Western History Research**