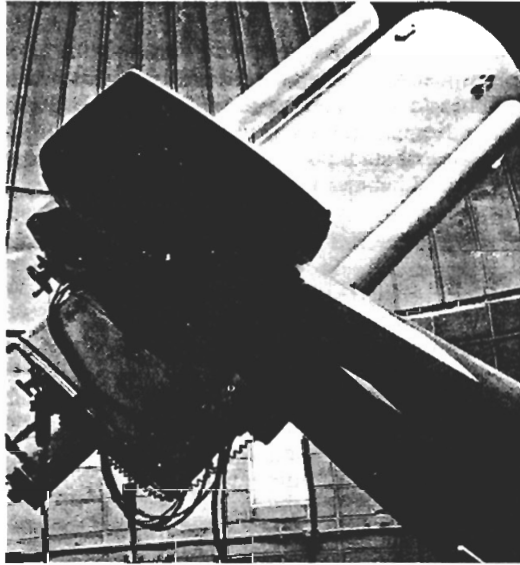


# U SPECTRUM

A Newsletter for Alumni and Friends of the Department of Physics and Astronomy of the University of Nebraska—Lincoln

No. 6 Fall 1985

M. Eugene Rudd, Spectrum Editor



*Behlen 30-inch Cassegrain reflector telescope*

## \$100,000 Obtained to Modernize Behlen Observatory

Behlen Observatory has been operated by the Department of Physics and Astronomy as an astronomical research facility since 1972. The observatory instrument, a 30-inch Cassegrain reflector, is the largest and most modern telescope in any of the Big Eight Universities. Nevertheless, in recent years there have been great advances in both light detectors and computer control systems. In view of these developments Professors Edward Schmidt and Donald Taylor have undertaken a large project to modernize the equipment available at Behlen Observatory. This project includes placing the telescope and auxiliary instrument under complete computer control and constructing new auxiliary instrumentation which exploits the most recent advances in detector technology.

The project for the modernization of Behlen Observatory has recently obtained the needed \$100,000 funding from several sources. Chancellor Massengale provided \$13,400 for the purchase of a MicroVAX I computer. This was supplemented by a \$7,175 grant from the Research Council for a magnetic tape drive. The new computer was necessary to handle the much more demanding control tasks of the new instrumentation as well as to handle the larger volumes of data produced. In order to operate the telescope automatically from a control room, an imaging system is needed to locate objects in the field of the telescope and lock onto guide stars for tracking. The Department of Physics and Astronomy provided \$3,000 from the Kositzky Memorial Equipment Fund donated by Mr. & Mrs. James C. Coe to purchase components for that system. It will utilize a charged-coupled device, or CCD, mounted on a movable probe ahead of the scientific instrument package. This system is currently being designed and will be fabricated in the Department's Machine Shop. The CCD camera system is the most expensive

part of the project. The Astronomical Instrumentation and Development Program of the National Science Foundation has made a grant of \$80,000 to Schmidt and Taylor to cover this cost. The CCD system itself will be purchased as a unit, but other components of the system will be designed and built in the Department. The control and data handling software will also be developed by Schmidt and Taylor.

The new instrumentation will greatly increase the amount and quality of astronomical data gathered at Behlen Observatory. To fully utilize the observatory, it will be made available to astronomers from other institutions. Seven astronomers from universities in Kansas and Missouri collaborated in the proposal to NSF for the CCD camera. Additionally, the University of Kansas in Lawrence is in the process of developing an image processing laboratory which will be used in the reduction of the data obtained from Behlen Observatory. As the project nears completion we expect others to join the project. Thus, Behlen Observatory will become a regional observatory which can support a variety of research activities.

The first large project envisioned for this system is a survey of all the known pulsating variable stars. Light curves will be obtained for about 4,600 stars over a period of several years. Very little is known about many of these stars and this project will give us a comprehensive picture of the various types of variable stars and their prevalence. Studies of star clusters are also planned for the new instrumentation. With this device it will be possible to measure the properties of all the stars in a given cluster and learn considerably more than is possible at present about the way stars in clusters form and evolve.

## The Missing Minnich Lens



*Commander  
Charles B. Minnich*

In December 1984 both Professors Donald Taylor and Joseph Macek received telephone calls from a student on the UN Foundation's telephone committee asking if the Department has yet found the "Minnich Lens." If we had, the Department could expect a significant donation from Commander Charles B. Minnich of Orlando, Florida. Chairman Anthony Starace obtained University Archives records on the matter from Professors Jaecks and Taylor and initiated some new investigations. The story, in brief, is as follows: Astronomy began at Nebraska when Professor G. D. Swezey came here in 1894. He made plans to build a 12" refracting telescope and in 1905 purchased the appropriate glass from Schott and Genossen Glaswerk in Jena, Germany. The glass was ground into a 12" lens by a Palmer, NE, physician, Dr. Arthur Minnich, during the period August 1905 to May 1906. The Engineering Department built the mounting for the lens and in 1917 Professor Swezey designed a suitable observatory to house the 15 ft. telescope. The Board of Regents appropriated \$25,000 for the observatory. Due to cost overruns on another building, however, the Regents cancelled the appropriation for the observatory. Professor Swezey retired after the 1932-33 academic year without any success in getting an observatory built. In 1937 the lens

*Continued on Page 4*

## Chairman's Letter



Anthony F. Starace

Dear Alumni and Friends,

The purpose of this newsletter is to keep you informed of developments in the Department and of the activities and achievements of the people associated with it. Before doing this I would like to place these developments and activities in the perspective of some trends affecting physics and astronomy as well as universities. In particular, the decennial Physics Survey ("Brinkman Report") of the National Research Council has just been published. It provides a wealth of information. Furthermore, as might be imagined, the problems of the farm economy have preoccupied state government in Nebraska recently. I outline some of these general influences on the Department and then report on specific events of the past year.

### Demographic Influences

Overriding everything is the fact that the number of college age youth (i.e., 18-24 year olds) peaked in 1980 and is expected to decrease 25% by 1997. The implications of this are that competition for the best students between various professions and between different universities will increase. This competition will benefit students, who will be offered better advising, more attention, and higher quality programs. It may also stimulate older individuals to return to campus for further education.

Demand for physicists is expected to outstrip supply. Whereas currently there is an approximate balance between supply and demand for physicists in physics fields, in ten years there is predicted to be a significant undersupply (i.e., it is estimated that there will be 113 positions in physics fields for every 100 new physicists seeking jobs in physics fields). Certain subfields of physics, such as condensed matter physics, are already experiencing severe shortages of physicists due to high demand from industry. The implications of these trends are that just when universities will be having many retirements of present faculty, the competition to hire new young faculty will be both intense and expensive.

Currently 35% of all students in U.S. graduate programs in physics are foreign and 40% of first year graduate students are foreign. While the number of U.S. students studying physics has increased by 10% from the lows set in 1978-79, the number of foreign students has increased much faster. Increasingly, then, the U.S. is training future physicists on a worldwide basis. This trend has led many universities, including Nebraska, to require stricter English language proficiency of all foreign teaching assistants.

Women comprise only 2% of all physics and astronomy personnel in the U.S. This is the lowest figure of any science or engineering field. Studies have pinpointed some causes: poor advising of young women concerning the desirability of preparation for a career given the trends of increasing longevity and smaller families; the necessity of early preparation in science and mathematics for a physics career; and the few female role models available in U.S. universities and the profession. Knowledge of some of these causes for women's underrepresentation in physics has focused attention on overcoming them.

### Fiscal Environment

Academic research equipment requires major upgrading. While the Reagan administration has been very supportive of basic research through NSF and the other funding agencies, targeting mainly applied research for cuts, the need for new scientific equipment has dwarfed the funding efforts made so far. For example, the \$30 million first year budget of the new DOD-University Instrumentation Program was oversubscribed twenty-fold: requests totalled \$645 million. This unmet need is the result of nearly twenty years of decreased spending for facilities and equipment for science research and instruction. At

the same time that existing faculty require major upgrading of their equipment, universities have been forced to spend what equipment funds they do have in competing with industry to hire the best young experimental physicists. At a time when a single tunable laser system costs about \$150,000, it is not uncommon for universities to have to provide \$150,000-\$500,000 in equipment set-up funds in order to hire young physics faculty and keep them from going elsewhere.

The fiscal situation is exacerbated in Nebraska by the problems of the farm economy. Despite more than an 11% increase in Nebraska personal income, state government tax revenues have decreased due to the recent Reagan tax cuts. (Nebraska's state income tax is a fixed percentage of federal tax.) Rather than simply adjust Nebraska's tax rates to compensate for federal tax cuts, Nebraska's politicians have focused on the many individual tragedies in small farm communities as justification for cutting the scope of state government. As the largest item in the state budget, the University has been under continual pressure recently to cut back.

### Impact on the Department

This fiscal and demographic pressure has in some ways been beneficial to the Department. A few examples will suffice to show how. Our faculty have responded aggressively at every opportunity to compete for the scientific and teaching equipment our programs require and, in several instances, they have been successful. We have provided increased interactions between our majors and our faculty and provided our majors with more opportunities for teaching and research. The result has been a 25% increase in the number of physics and astronomy majors. A number of efficiencies and cost savings in our operations have been achieved, thereby freeing funds for other needs. In short, our needs have brought forth the appropriate response and this experience gives me confidence for our future.

### The Year in Review

In what follows I review the more significant developments in our Teaching, Research, Service, and Support programs during the past year. In many instances articles on these developments appear elsewhere in this newsletter.

*Teaching Program.* Professor James Samson won a University-wide Distinguished Teaching Award, becoming the 9th out of our 28 faculty to be so honored. . . . We made a major investment in video demonstration equipment for our large enrollment elementary physics courses. With a video camera and large screen projection TV many subtle phenomena can now be easily shown to a large class. . . . Our long-dormant Society for Physics Students (SPS) was reactivated by a large group of enthusiastic physics and astronomy students. . . . Professor Robert Fuller will receive a Distinguished Service Citation from the American Association of Physics Teachers for his contributions to the teaching of physics. . . . Our Colloquium series has been upgraded with additional Department funds in order to bring to campus a greater number of scholars and researchers from outside the central U.S. Efforts have been made also to attract a wider audience to some of these talks and to involve the SPS with the visiting scholars. . . . The University is improving its educational programs in two significant ways which will involve the Department. It is strengthening its general liberal education offerings and it is establishing a strong honors program. Both programs promise to provide lifelong benefits to UNL's graduates. . . . I am happy to report that 9 of our 39 graduate students (23%) are women and that those of our extremely able foreign graduate students who are assigned teaching duties have all passed a rigorous spoken English examination.

*Research Programs.* As documented elsewhere in this newsletter, our faculty wrote 66 research papers in 1984 and were granted \$1.2 million in new and renewal research grants. . . . The astronomy group has just received \$80,000 from NSF which, when combined with \$20,500 in previous support from UNL, will permit the upgrading of the detection and computer equipment at Behlen Observatory to a state-of-the-art level. With these

upgrades (which will give Behlen Observatory's 30" reflector telescope the power that the Palomar 200" reflector had before it was upgraded), the Observatory has a good chance of becoming a Regional Astronomical Facility whose main advantage over larger telescopes is the much greater observing time allowable to astronomical researchers and students. In recognition of this expanded scope of the facility, Professor Edward Schmidt has been named Observatory Director . . . The experimental condensed matter group has received strong endorsement from Chancellor Massengale to establish an interdisciplinary Materials Science Center linking the resources and capabilities of the physics, chemistry, electrical engineering, and chemical engineering departments. A number of proposals have been submitted to federal agencies, industrial corporations, and private foundations. The idea has much merit and will hopefully be realized . . . The atomic and molecular physics groups at UNL and at Kansas State have drawn closer over the past few years, holding an annual atomic physics conference dubbed the "Wildcorn" conference. Theorists at both institutions have spent the past year drafting and discussing in the national community a proposal for a Joint Institute for Theoretical Atomic Physics. It will be submitted to NSF this year.

*Service Activities.* In connection with Halley's comet, Behlen Observatory plans half a dozen open houses this fall for the general public . . . Professor Roger Kirby, Coordinator of the Department's Saturday Science Program, reports that the Spring 1985 Saturday classes for 5th and 6th grade students in the Lincoln Public Schools were oversubscribed two to three times . . . Tours of the Department's experimental laboratories, lecture demonstrations, and physics and astronomy resource rooms continue to be popular with both visiting dignitaries and elementary and secondary school science classes . . . Vice Chairman Robert Hardy is Chairman this year of the UNL Research Council . . . Professor C. Edward Jones is serving this year on the College of Arts and Sciences Executive Committee . . . Our faculty continue to be active on scientific journal editorial boards, organizing committees for scientific conferences, and national professional committees, as detailed elsewhere in this newsletter.

*Support Programs.* Our secretarial staff is producing more work with higher quality now that word processing equipment has been purchased for each one. The increased efficiency has permitted the reallocation of funds released when a half-time secretary resigned . . . The purchase earlier this year of a logic analyzer has increased the efficiency of our electronics shop. Bob Kelty and his staff are now gearing up to fabricate our own printed circuit boards . . . Business Manager Al Evelyn and his staff have been busy this year developing an in-house accounting system to keep track of our numerous salary, operating, teaching, and research accounts. Al has also been instrumental in analyzing our operations in search of cost efficiencies and better accounting procedures . . . Our Demonstrations Manager, Cliff Bettis, has prioritized our lecture demonstration needs and co-authored our successful proposal to obtain video and other teaching equipment. He has designed a number of demonstration apparatuses which are currently being built by our Machine Shop. He is also collaborating with Dean Zollman of Kansas State in creating video discs for a project on "Sports and Physics" . . . Our Machine Shop continues to have a large backlog of orders from our research groups for scientific equipment which either cannot be purchased at all or which can be built less expensively in-house.

*Enhancements.* Certain activities of the Department are not strictly necessary, but are enhancements of our programs which really ought to be done. This newsletter is one example. I would like to inform you of two others, organized by Professor Robert Fuller, Chairman of our Undergraduate Committee.

This fall we will for the second year host a late afternoon and evening get-together of our faculty with Lincoln and Omaha area high school physics teachers. The main purpose is to share our mutual concerns regarding physics education in Nebraska.

Response to last year's meeting was very positive.

Last May we instituted what we hope will be an annual Recognition Luncheon for our 1984-85 physics and astronomy graduates. We invited a distinguished alumnus, Dr. Steve Cunningham, to speak. Faculty, students, and local alumni and friends were invited. There is a need for regular get-togethers between faculty and students such as this and the enthusiasm that Steve Cunningham imparted to our students was an added benefit.

#### **An Acknowledgment and A Request**

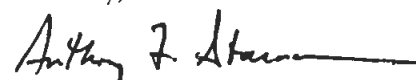
This Department simply could not operate at its current level of activity without the additional, non-state funds provided by our research grants and contracts and by the generous contributions of our alumni and friends. Since most of the state funding for the Department is earmarked for salaries, these additional non-state funds provide much of the flexibility we have to respond to new research opportunities and to improve the way we carry out our many programs. I am pleased to report that last year's appeal to alumni and friends for contributions to our Development Fund, our Scholarship Endowment Fund, and our Lecture Endowment Fund raised \$10,440, of which nearly \$1,000 was contributed by this Department's current faculty. These funds will augment our endowments, assist in the equipment upgrades of our astronomy program, allow us to award a new freshman scholarship to a top high school student next year, and will continue to permit us to support Department-hosted conferences, our Society for Physics Students, and other activities such as the enhancements described above. In addition we continue to receive the substantial benefits provided by the income from the Kositzky Memorial Equipment Endowment Fund, the Joseph L. and Kathryn H. Parker Fellowship Endowment Fund, and the Jerry E. Ruckman Endowment Fund (for unrestricted purposes).

Enclosed with this newsletter is a pledge card and return envelope for tax-deductible contributions to one of our three accounts with the University of Nebraska Foundation. My main goal this coming year is to increase our Lecture Endowment Fund so that we can proceed with the upgrading of our colloquium series as well as support our three seminar series. In addition, contributions to our Development Fund, which is for our unrestricted use, are always welcome as they provide us with maximum flexibility to respond to areas of greatest need. Last year more than \$3,000 of our contributions came in the form of matching gifts provided by U.S. corporations. Please check if your employer will match your contribution.

Finally, I urge you to keep in touch with us. Enclosed is a post card to inform us of your current address and recent activities. If you wish to write more, please send us a letter. We are always glad to visit with you whenever you are in Lincoln, and, given some advance notice, we will be happy to arrange a tour of our facilities. You can also see what a nice city Lincoln is becoming, with a second downtown development program due to get started soon and a new concert hall scheduled to be built. I haven't described how stimulating it is to be working in physics and astronomy nowadays. However I hope most of you are fortunate enough to know that already.

Best wishes until next year.

Sincerely,



Anthony F. Starace  
Professor and Chairman

## The Missing Minnich Lens *continued*

was sent to the Warner and Swasey Co. for evaluation: they reported that there were a number of defects, but that for \$840 they could provide "a fairly fine optical surface." In 1973, Commander Charles B. Minnich, the grandson of Dr. Minnich, wrote the Department inquiring about the lens. Off and on, various individuals have attempted to find it, without success.

Professor Starace made some inquiries last December. He located a former astronomy student in Lincoln who told him that in the 1956-57 academic year his instructor (Professor Oliver Collins) mentioned that it was a shame the University never made use of the 12" refractor lens, "which is just lying around." Unfortunately, Professor Collins died in 1980.

Starace reported this minor bit of information to Commander Minnich and sent him as well all University Archives records that we have on the matter. Commander Minnich was very pleased to receive the material and after a visit in May 1985 sent us a 6" lens to demonstrate his gratitude. He also offered \$5,000 if we find the 12" lens and telescope and put it to use. As the UNL heads of Inventory, Physical Plant, Archives, and the Museum know nothing of the lens, it appears the only hope of locating it is to publicize the story in the hope that someone with information will come forward. If any of you know something, please let us know.

Pending the finding of the Minnich 12" lens, Professor Donald Taylor is using the recently donated Minnich 6" lens to construct a "Minnich Solar Telescope." Taylor plans to use the lens as the objective for the Coudé refractor he is designing to mount in the window of our Astronomy Resource Room. This telescope will be used to project an image of the sun so students can see sunspots during the day time and the moon, planets, and stars from within the comfort of that room at night. It is expected to be a focal point for student observing. It will have high visibility and attraction both to the hundreds of students using and passing the astronomy resource room and to the passersby outside the building curious about the long telescope tube protruding from the 2nd story window. To support the construction of the "Minnich Solar Telescope" Commander Minnich recently donated \$3,000 to the Department and plans to contribute \$2,000 more next year.

While we still hope to locate the 12" Minnich lens, the unsuccessful search has nevertheless so far resulted in several benefits for the Department. Firstly, the matter has provided an overview of the history of Astronomy at UNL since its inception. Secondly, the "Minnich Solar Telescope" will be a distinct plus for our astronomy teaching program. Lastly, we have become friends with Charles B. Minnich.

The younger Minnich is a UNL engineering graduate who has worked in electronics, metallurgy, and industrial radiology, mostly for Martin-Marietta's Orlando Aerospace Division. Since the age of 9, when he peered through a telescope constructed by his grandfather, he has had an avid interest in astronomy and celestial navigation. This avocation has led to his becoming a Rear Commander with the U.S. Power Squadron, the civilian equivalent of the U.S. Coast Guard, as well as to his writing several books and numerous articles on navigation and astronomy. Currently he gets to go on Royal Viking Line cruises across the Pacific in return for lectures on the night sky. If only we all could turn our avocations into such a "job"!

## IRT Corporation Donates Equipment

The atomic physics research program of Professor Paul Burrow has been the beneficiary of a large donation of apparatus from the IRT Corporation of San Diego, California. The equipment, which was part of a molecular beam program at IRT which is being phased out, consists of two molecular beam machines which are triply differentially pumped, three diffusion pumps, gate valves and traps, digital electronics, a synchronous detector, oscilloscopes, a microwave generator, power supplies, a quad-

rupole mass spectrometer, an electron beam apparatus, and miscellaneous small parts.

The transfer was arranged by Dr. J. T. Dowell of IRT, an acquaintance of Prof. Burrow from graduate school days, and was made possible through the generosity of Dr. Robert L. Mertz, President of IRT, and Dr. W. Dennis Swift, Vice President of the Electronics Systems Division. We applaud their decision to let the equipment go where it can be utilized.

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## Astronaut Cunningham Speaks to Graduates



*Stephen L. Cunningham*

Stephen L. Cunningham (M.S. 1969, Ph.D. 1971) an active member of the space shuttle astronaut team spoke to the Department's B.S., M.S., and Ph.D. graduates at a recognition luncheon held in their honor in May 1985. Steve Cunningham received his degree for work in condensed matter physics under Professor John Hardy. After a postdoctoral appointment at Cal Tech, he went to work for Hughes Aircraft Co. in Pasadena, California. He is now assistant manager of a laboratory staffed by 130 researchers designing satellites and their payloads. The program "burns money at the rate of \$2.3 million a week," Cunningham said. He expects to be a member of the back-up crew for the December 1985 launch of the Syncom IV satellite. He has undergone extensive training, including flights on a special airplane (which he called the "Vomit Comet") used to simulate zero-gravity conditions.

Cunningham told the audience of new graduates that he enjoyed working in industry and that their education in physics is "the right kind of preparation for a large variety of jobs. There are more opportunities for physicists out there than most people are aware of," he said.

## Fuller To Receive AAPT Citation

At the joint annual meeting of the American Association of Physics Teachers and the American Physical Society to be held in Atlanta on January 27, 1986, one of our staff members will receive a singular honor. Professor Robert G. Fuller will be the recipient of a Distinguished Service Citation for his significant contributions to the teaching of physics.

Fuller has been a pioneer in many innovative teaching programs such as the Keller plan in which students must master one section before moving on to the next. He was one of the first to apply the theories of Jean Piaget, a Swiss psychologist, to teaching. He directs the ADAPT program at Nebraska which he started in 1975 with funding by the Exxon Educational Foundation. This program, the name of which is an acronym for Accent on Developing Abstract Processes of Thought, enrolls about 60 freshmen each year for courses in the humanities, mathematics, and science.

Fuller is concerned about the small number of female students who study physics and has taught workshops for teachers to help them recognize subtle sexist influences. He has been active in the Nebraska Association of Physics Teachers and in 1980 he served as President of the American Association of Physics Teachers.



*Robert G. Fuller*

## Paul Byerly Retires



Paul R. Byerly

A retirement reception and dinner were held at the Lincoln University Club on October 25 to honor Prof. Paul R. Byerly, Jr., who retired last summer and who has been named Associate Professor Emeritus by the Board of Regents. Byerly received his A.B. degree from Washington & Jefferson College in Pennsylvania in 1943 and his Ph.D. from the University of Pennsylvania in 1951. He spent eight years as Senior Physicist at the University of California Radiation Laboratories in Berkeley and Livermore and then five years as Science Research Advisor for the U.S. Agency for International Development. In the latter capacity he served in the Philippines and in Taiwan. He joined the University of Nebraska Physics Department in 1963. His research interests centered on the Mossbauer Effect. He has also been active in computer assisted instruction and computer animated movies. Both of his former doctoral students, Professor Louis J. Caplan (M.S. 1964, Ph.D. 1975) of the Department of Physics at Fort Hays State University and Professor Donald E. Shult (Ph.D. 1976) of the Department of Physics, University of Nebraska-Omaha, were at the dinner.

## Department History

We published an approximate list of the chairmen of this department in the last *Spectrum* and asked for additions and corrections. We heard from Robert L. Chasson, who was chairman himself back in the 50's and 60's. He gave us the following corrections. Nels Bengtson, who was actually a retired geography professor, served as acting chairman from September 1952 to September 1954. Donald C. Moore was acting chairman from September 1954 to December 1955. Chasson took over in February 1956 and was chairman until July 1962. Bob, does that mean we had no chairman in January of 1956?

Chasson also reports that he is now retiring from his professorship at the University of Denver, where he has been since 1962. He says that his experience at Nebraska was one of the best parts of his professional life and he often thinks of it with fondness. Thanks for the information and nice words, Bob. We wish you a happy retirement.

We also heard from Alvin Lugin, Jr. (MA '50), who suggested that we should ask Emeritus Professor Theodore Jorgensen for information. We see Ted often and that is a good idea. However, we have found that the University Archives has catalogs going back to the founding of the university and have embarked on a project to make a list not only of the chairmen of physics, but of all the department faculty. We are doing this in collaboration with Prof. David Cahan, of the Dept. of History, who is planning to do research on the early history of the department.

The historically minded may also be interested to know that Prof. Rudd recently gave a paper at a symposium on the history of scientific instruments sponsored by the American Chemical Society in Chicago with the title "D. B. Brace's Measurement of Double Refraction due to Ether Drift".

## IRT Corporation continued

Al Evelyn, our departmental business manager, was instrumental in arranging all the financial details. Al took time from a business trip to San Diego to visit IRT, and his planning made things much easier.

Graduate students Ken Stricklett and Tom Stephen undertook the arduous job of crating and loading a 22-foot rental truck and driving it back to Lincoln. Their informal company (Ace Atomic Truckers) stands ready to deliver similar donations from other thoughtful corporations.

## Society for Physics Students Reactivated

In January an organizational meeting was held to form a local chapter of the Society of Physics Students (SPS). Some years ago there had been a chapter here, but it became inactive. Now a new group of enthusiastic students has reactivated the chapter.

Officers of SPS elected in April were David Fox, president, Julie Schuldt, vice president, Robert Drucker, secretary, and Kyle Hollman, treasurer. Prof. C. Edward Jones is the faculty advisor.

In the short period since it was formed, SPS has already sponsored a picnic, a trip to Behlen Observatory, a laser light show, and a talk on the rainbow and the achromatic telescope by Prof. Rudd of the Department. Upcoming activities include a volleyball game, a Halloween party, movies, and a trip to the Observatory to view Halley's comet.

Members of SPS receive a subscription to *Physics Today* and also have access to information about job opportunities and career choices.

## Update: Behlen Lab Is Not Falling Down!

In last year's *Spectrum* we reported that the weight of the books and journals in the library in Behlen Laboratory had already exceeded the design limits for floor loading and that we had applied for funds to relocate the library to Brace Laboratory. The funds have not been forthcoming, but the problem seems to have been solved, at least temporarily.

The architectural firm that designed Behlen Laboratory in 1963 specified 40 lb/sq ft as the floor loading capacity. A measurement by the Physical Plant engineers indicated that the loading was actually about 58 lb/sq ft, which was a 45% overload. However, the engineers said that calculations using a more modern theory, the "Working Stress Theory" allowed 50 lb/sq ft. When pressed, they brought out a still more recent theory, the "Ultimate Strength Theory" which said the floor would hold 75 lb/sq ft! Evidently if you don't like the answer you get from one theory, you try a different one. (A physicist would, of course, never do anything like that.)

Although the new calculation indicated that we were within the load rating, we have moved a substantial number of earlier journals to what is now called the "Library Annex" in Brace 205S and reduced the amount of shelving in the library. With this move, we have regained some safety factor and, most importantly, we have been able to retain our physics library intact. Unfortunately, since we must continue to add books and journals, the solution is only a temporary one, providing us with two more years to solve the problem more permanently. We still hope for funds for a longer-term solution.

## Staff Activities

**Prof. Edward Schmidt** has been invited to give a paper at the General Assembly of the International Astronomical Union in Delhi, India in November. The paper is entitled "H-Beta Photometry and the Cepheid Luminosity Scale." **Prof. Ed Pearlstein** spoke to the Crete, Nebraska Rotary Club on the Strategic Defense Initiative ("Star Wars") last November. **Prof. M. Eugene Rudd** was honored as a "Distinguished Graduate" by his alma mater Concordia College in Moorhead, Minn. in October. He presented two talks in connection with the award. The research of **Professors Joseph Macek and Anthony F. Starace** was featured in a front page story in the Lincoln Journal last October 3. **Professors Norman Simon and Edward Schmidt** were featured in an article describing their research on pulsating stars in the Nov. 9, 1984 issue of the Journalist. **Professor Sitaram Jaswal** was awarded a Maud Hammond Fling Faculty Summer Research Fellowship by the Research Council. **The Astronomy**

Group was featured in an article entitled "The Greatest Show in the Universe" appearing in the January issue of the Nebraska Alumnus. Professor Robert G. Fuller, together with his father and brother, won a 1985 Independent Study Course Award presented by the National University Continuing Education Association for writing **General Physics for the Life Sciences**. Professor C. Edward Jones has been appointed by Chancellor Massengale to the Faculty Advisory Committee for the Lied Performing Arts Center. Professor Emeritus Theodore Jorgensen's experiences on the Manhattan Project were the subject of an article in the July 28 Sunday Journal-Star. Recollections of his famed Chinese dinners were published in Time Magazine's story on the Manhattan Project (7/29/85 issue, page 44). Robert Hardy is chairman of the University of Nebraska-Lincoln Research Council.



Leemon C. Baird (M.S. 1963)

## Graduates Attracted to Medical Physics

The field of medical physics is one of the fastest growing subspecialties in physics. Our own graduates appear to be strong contributors to this recent growth. In the past four years the following five physics graduates entered medical physics: **Nasser Maleki** (M.S. 1977, Ph.D. 1981; Supervisor: J. Macek) was a medical physics fellow at Harvard for two years and is now a medical physicist at Mt. Sinai Medical Center in New York City; **Siamak Shahabi** (M.S. 1977, Ph.D. 1983; Supervisor: A. F. Starace) was a medical physics fellow at Tufts University and is now an Assistant Professor in the Division of Radiation Oncology at the University of Wisconsin-Madison; **Prem Pareek** (M.S. 1980, Ph.D. 1983; Supervisor: J. A. R. Samson) was a medical physics fellow at Allegheny General Hospital in Pittsburgh and is now an Assistant Professor in the Department of Radiation Oncology at the University of Alabama in Birmingham; **Chang-Hwan Park** (Ph.D. 1984; Supervisor: A. F. Starace) has just taken up a medical physics fellowship position at Yale; and **Rebecca Richards-Kortum** (B.S. 1985) has entered a graduate program in medical physics at M.I.T. One of our earlier graduates, **Subhash C. Sharma** (M.S. 1970, Ph.D. 1971; Supervisor: R. Katz), associate professor in the Department of Therapeutic Radiology at the University of Louisville School of Medicine, says he now meets so many new UNL graduates at professional meetings that he's thinking of forming a UNL medical physics alumni association.

In order to find out what our medical physicist alumni are doing, we wrote to some of them. **Leemon C. Baird** (M.S. 1963), medical physicist in the Radiation Oncology Department of Tampa General Hospital, writes: "My work consists of providing broad spectrum technical support for a medical practice which uses radiation to treat cancer patients (about 120 per day.) In particular, I calculate radiation penetration for specific patients, calibrate linacs which produce the radiation, calibrate equipment which measures the radiation, advise medical staff on optimal methods of delivering radiation, review patient files to assure compliance with specified treatment regimens, write computer programs for common calculational tasks we encounter, determine shielding needs for new installations, etc., etc., etc., (I don't do windows!)"

"As for how I happened to enter this field, it was 5-6 years after I received my doctorate. I felt that professional advancement demanded that I reorient myself away from the university teaching to which I had been dedicated. I investigated various alternatives and eventually settled on medical physics as a good opportunity to have a socially meaningful, personally rewarding career. I then carefully investigated the various training avenues and selected a certain prominent university as the absolute best place to go. I easily secured an unremunerated two year post doctorate position, which led to my current status.

"My advice to aspiring medical physicists is: 1) Earn an MS or Ph.D. in a traditional area of physics; 2) Do a post doctorate at a prestigious medical physics institution; 3) Get a couple of years experience as a 'second' medical physicist in a clinical setting."

**Siamak Shahabi**, one of the more recent graduates, writes: "Radiation therapy involves a wide variety of personnel and equipment. Planning of more complicated cases requires close cooperation between physicians, physicists, technologists, and the nursing staff. Some of this planning must be carried out before any procedures involving the patient have started. Treatment plans may have to be run on a computer, etc.

"The physicist is called upon to assist with difficulties in patient simulation once the radiation treatment area is defined. Following this, new computerized dose plans may have to be run to determine the actual doses to critical organs. Finally, various doses may have to be documented by placing small dosimeters on the patient during treatment . . .

"A medical physics department has a wide variety of equipment. The physicist has responsibility for the quality assurance program for this equipment. Most important is the calibration of linear accelerators and  $^{60}\text{Co}$  units for therapy. Using various dosimeters (mainly ion-chambers) the physicist must be able to make an absolute calibration of the output of the machines to within  $\pm 3\%$  and frequently check, usually weekly, that no significant change in calibration has occurred. A physicist has to be a qualified expert to carry out this procedure. This involves either certification by the American Board of Radiology in Therapeutic Radiologic Physics or a Master's or Doctor's degree in physics plus one year of full-time training in therapeutic radiological physics and one year of full-time experience in a radiotherapy facility . . .

"Several lines of research which are of interest to radiation therapy physicists are new treatment techniques and dosimetry, computer modelling of dose distributions, microdosimetry, use of atomic and nuclear models to understand better the interaction of ionizing particles with matter, etc.

"Medical physicists have the responsibility for teaching faculty, residents, technicians/technologists, and nurses the basic physics of radiation safety, radiation therapy, and diagnostic physics . . .

"Diagnostic physicists are engaged in improvement of image quality, which has a direct effect on cancer detection. Various interesting researches are currently being conducted using nuclear magnetic resonance and computerized tomography imaging devices . . .

"Finally, I would be more than happy to communicate via telephone or letter with physics students interested in this field."

**Robert K. Cacak** (B.S. 1965, M.S. 1967, Ph.D. 1970), of the Department of Radiation Oncology at St. Paul Medical Center in Dallas, Texas, has written a detailed letter which elaborates on the above points. We will gladly send a copy of it to anyone interested. Bob makes the additional point that "medical physics requires an individual with a unique personality . . . he/she must be able to interact well with other people . . . [and] good communication skills are required for effective completion of many tasks. Finally, most clinical medical physicists . . . must be able to work well under stress. The schedule is demanding, and a good deal of dedication is required. Mistakes in some areas (e.g., radiation dosage calculations) can literally be fatal or can cause serious injury to a patient, and one must be willing to accept these responsibilities."



*Duane Jaecks with knife-edge apparatus he will use to measure focal length variations in telescopes.*

## Jaecks to Measure 100 Antique Telescopes

As some of you know, for many years Professor Duane Jaecks has had an interest in antique scientific instruments, especially optical instruments. For six months starting in January he will be poking through dusty storerooms in the great museums of Europe looking for telescopes made during the past 200 years. His particular project, funded in part by a \$20,994 grant from the National Science Foundation, is to make a quantitative study of the optical properties of objective lenses in order to trace the historical development of the achromatic telescope.

The grant funds have enabled him to assemble apparatus with which to measure the chromatic and spherical aberration of these objectives and to make knife-edge photographs showing striae in the glass. He plans to make a chronological photographic atlas showing improvements in glass making procedures and lens quality over the period 1750-1825.

Collaborating with Jaecks in his project will be Dr. G. L.E. Turner, Assistant Curator at the Museum of the History of Science at the University of Oxford in England who is internationally known for his many books and articles on the history of scientific instruments.

While many of the telescopes of interest are in museums in England, Jaecks also plans to make measurements on telescopes in museums in Holland, Germany, and other countries in Europe. He hopes to complete measurements on about 100 telescopes.

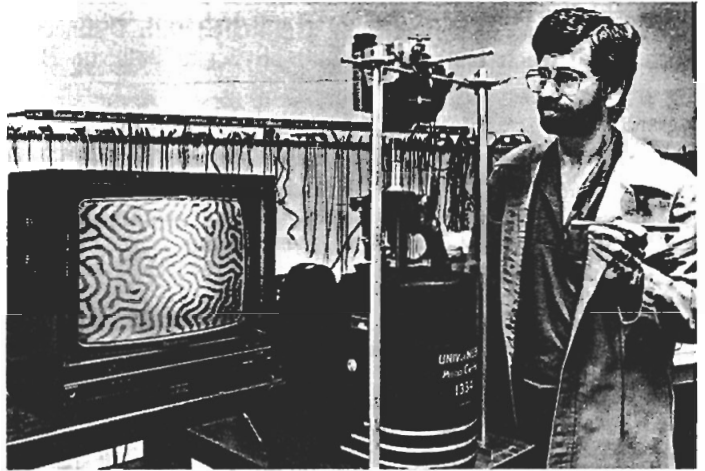
## Skrocky Lecture

In an effort to establish closer relations with Lincoln and Omaha area high school physics teachers, John Skrocky, the 1983 Presidential Awardee for Outstanding Science Teaching, was invited to present a colloquium last November 8th. After demonstrating the minilecture he has used at Omaha's Northwest H.S. to increase physics enrollments by 50%, he discussed the science education crisis. According to Skrocky, efforts should be directed not at retraining mediocre teachers but at retaining good ones. At Omaha Northwest a dozen or more good ones in the science and math area have quit the field in the past six years.

He pointed out that West Germany has a surplus of high school science teachers, which can only be attributed to different societal attitudes and job conditions. Local control of schools in this country makes it difficult to address national needs for more

scientists and engineers. As compared to teachers he has talked with from our economic competitors, Germany and Japan, teachers in Omaha who demand the best from their students (i.e., make students work hard) do not receive the parental support that they should.

Discussion of these matters continued over a dinner for some of our department's faculty and 8 Lincoln and Omaha area high school teachers. After dinner, the teachers toured our teaching laboratories (shown by C. Bettis), our Astronomy Resource Room (shown by E. Schmidt), some of our lecture demonstrations (shown by J. Samson and E. Pearlstein), some of our research labs (shown by D. Burns and R. Kirby), and finished with a brief round-table discussion with A. Starace. The event was sponsored by the Undergraduate Committee, organized by Professor Robert Fuller, arranged by Marilyn McDowell, and supported financially by the Jerry E. Ruckman (B.S. '62) Fund.



*Cliff Bettis using the new video equipment to show magnetic domains.*

## New Equipment for our Lecture Hall

Departmental proposals to the College of Arts and Sciences for instructional equipment were successful in obtaining \$13,975 for a number of items which will greatly enhance our teaching program. Foremost among these is \$6,473 for video demonstration equipment for Brace 211, proposed by Robert Fuller and Cliff Bettis. There are many wonderful demonstrations that in the past could not be effectively shown to a large number of students. With a TV camera and equipment to project the TV image onto a large screen we can now do so. For example, ripple tanks can now be used to show wave behavior with much greater clarity; the TV camera can be used instead of the student's eye to demonstrate optics phenomena; more generally, anything small or of small amplitude can now be shown, such as the thermal expansion of a rod, the beautiful surfaces of least energy formed by soap bubbles, etc. Once the staff gets used to having this capability they will probably think of many other applications. In addition, an interface has been purchased which will allow images on IBM PC's to be projected onto a large screen. Thus in the future, it will be possible to show a large class any graphical information calculated on the Department's PC's.

Other items being purchased are a new microscope to be used with the closed circuit TV system; a new Wimshurst electrostatic machine to replace the old, dilapidated machine formerly seen by 1000 students each semester; an electron diffraction tube and two power supplies for the 223 lab; twelve digital multimeters and temperature probes for the 142/134 labs; and finally a slide storage cabinet to permit easy viewing of and selection from our extensive slide collection.

The Wimshurst machine has been heavily used and is very popular with students as it is pretty and intriguing. On several occasions students have crowded around it after class asking questions about it.

# FOR THE RECORD

## 1984-85 Degree Recipients

### Bachelor of Science

- Otto W. Bruegman** (December 1984). Has enrolled in our graduate program.
- Dwight T. Dumpert** (December 1984).
- David H. Fox** (May 1985). Has enrolled in our graduate program.
- Richard L. Newman** (May 1985). Has enrolled in our graduate program.
- Kent Reinhard** (May 1985). Is studying astronomy at the University of New Hampshire.
- Rebecca Richards** (May 1985). One of only three students in the College of Arts and Sciences to graduate with Highest Distinction. Now studying medical physics at M.I.T.
- Bruce Steele** (May 1985). Has enrolled in our graduate program.
- Robert Bass** (August 1985). Graduated with Distinction. Will teach mathematics and physics at Bellevue High School.

### Master of Science

- Kwong-Mow Yoo** (December 1984). Now studying physics at the City University of New York.
- Young-min Chung** (May 1985). Doctoral research is being supervised by Professor James Samson.
- Eun-Mee Lee** (May 1985). Doctoral research is being supervised by Professor James Samson.
- Zheng Zhen** (May 1985). Doctoral research is being supervised by Professor Joseph Macek.
- Shwu-Jen Gao** (August 1985). Doctoral research is being supervised by Professor John Woollam.

### Doctor of Philosophy

- Chang-Hwan Park** (December 1984; Supervisor: A. F. Starace). After a post doctoral research associateship with Professors Macek and Starace, is now a Fellow in Medical Physics at Yale University.
- James C. Conwell** (May 1985; Supervisor: J. C. Kasher of UNO). Had been working as a part-time instructor at UNO. Now an Assistant Professor in the Department of Physics at Eastern Illinois University in Charleston, Illinois.
- Randy Lee Fagerquist** (August 1985; Supervisor: R. Kirby). Now a Staff Scientist at Diconix Corporation in Kettering, Ohio.

## Visiting Staff Members

**Dr. Michael P. R. Waligorski** (Ph.D. 1976, Jagiellonian, Krakow) from the Institute of Nuclear Physics in Krakow is working with Prof. Katz this year. Joining our staff as Visiting Assistant Professor for one year from Jan. 1985 is astronomer **Xue-Fu Liu** (Ph.D. 1960, Beijing Normal University) from Beijing Normal University. Joining our department as Postdoctoral Research Associates are theoretical atomic physicist **Khachig A. Jerjian** (Ph.D. 1984, Louisiana State University), working with Prof. Macek; theoretical atomic physicist **Tsin-Fu Jiang** (Ph.D. 1983, National Tsing Hua University) from the Institute of Atomic and Molecular Sciences, Taipei, Taiwan, working with Prof. Starace; and astronomer **Hui-Song Tan** (Ph.D. 1966, Beijing Normal University) from Yunnan Observatory, People's Republic of China, working with Prof. Leung. Joining our staff as Visiting Assistant Professor is **Zong-yun Li** (Ph.D. 1964, Nanjing University) from the People's Republic of China. During the summer, **Hidetoshi Suemitsu** (Ph.D. 1976, Kyoto University) was a Postdoctoral Research Associate in experimental atomic physics. **Jian-yoo Zhao** and **Zhongren Zhao** both from China will be Visiting Associate Professors working with Prof. David Sellmyer.

## HONORS

### 1984-85 Fellows

- Ulrich Achatz** Fulbright Fellow
- Michael Engelhardt** Alcoa Fellow
- Bo Gao** Departmental Teaching Fellow
- Ying-Yuan Hsu** Parker Teaching Fellow
- Kevin Predmore** Avery Teaching Fellow (Fall 1984)
- Thomas-Stephen Johnson** Johnson Fellow
- Kwong-Mow Yoo** Avery Teaching Fellow

### 1984-85 Scholarships

- Robert J. Bass** U.S. Harkson Scholarship
- David Debrestian** Henry H. Marvin Memorial Scholarship
- Thomas Filarecki** Joel Stebbins Scholarship
- David H. Fox** John E. Almy Scholarship
- Jodi Kessler** Joel Stebbins Scholarship
- Robert Kurtenbach** U.S. Harkson Scholarship
- Rebecca Richards** ICARUS Scholarship
- Jonathan B. Smith** Joel Stebbins Scholarship
- Bruce Steele** John E. Almy Scholarship
- Joseph Steele** U.S. Harkson Scholarship
- John Stormberg** U.S. Harkson Scholarship

### 1985 Departmental Distinguished Teaching Assistant Awards

Shi-Chung Chu Paul J. Edwardson

### 1985 Distinguished Teaching Award

James A. R. Samson

### 1984-85 Society for Physics Students Officers

David Fox, *President* Julie Schuldt, *Vice President*  
Robert Drucker, *Secretary* Kyle Hollman, *Treasurer*

## Faculty Professional Activities

In addition to service on Departmental, College, and University-wide committees, for 1985-86 a number of the faculty are active in national and international professional activities, as follows:

**William B. Campbell:** Co-organizer of the Aspen Workshop on Relativistic Electrons in Atoms, August 1985.

**Robert G. Fuller:** Chairman of the Student Confidence Workshop Committee and the Instructional Media Committee, American Association of Physics Teachers; Consultant, Student-Centered Computer Education Project, Independent Colleges of Nebraska; Editorial Review Board for Physics Courses, Lower Division Engineering Curriculum Project, Control Data Corporation.

**John R. Hardy:** Consultant for Lawrence Livermore Laboratory and the U.S. Naval Research Laboratory.

**Robert J. Hardy:** Consultant for Lawrence Livermore Laboratory.

**Robert Katz:** Editorial Board, Nuclear Tracks; Scientific Committee of 13th International Conference on Solid State Nuclear Track Detectors (Rome 9/85); NIH Site Visit Team for National Cancer Institute, UCRL Berkeley (8/85); Advisory Group on Nuclear and Atomic Data for Radiotherapy and Radiobiology, IAEA (Group Meeting, Rijswijk, The Netherlands, 9/85).

**Kam-Ching Leung:** Organizing Committee, Commission 42 (Close Binary Stars), I.A.U.; Co-Chairman of the U.S.-China International Symposium on Close Binary Systems, Beijing (1985); Editor of Beijing Conference Proceedings.

**Joseph Macek:** NRC/NAS Committee on Atomic and Molecular Sciences; Editorial Boards of Journal of Physics B, Physical Review A, and Zeitschrift für Physik D.

**M. Eugene Rudd:** Fellowship Committee of the A.P.S. Division of Electron and Atomic Physics.



**James A. R. Samson:** AIP Committee on Applications of Physics; Executive Committee and Site Selection Committee of the A.P.S. Division of Electron and Atomic Physics; Past Chairman of the C.E.K. Mees Medal Committee for 1987 and X-Ray and Ultraviolet Techniques Committee, Optical Society of America.

**Leo Sartori:** Past Chairman of the Executive Committee and Chairman of the Committee on Arms Control Studies, APS Forum on Physics and Society; Consultant, Arms Control and Disarmament Agency.

**Anthony F. Starace:** Member of the Program Committee and Chairman of the Committee on Fellowship Programs for Atomic Theory of the A.P.S. Division of Electron and Atomic Physics.

## Acknowledgments

The Department is very grateful to the following individuals and corporations for their new and continuing financial contributions during the period 1 October 1984-30 September 1985. These contributions have been made in support of major items of capital equipment, graduate fellowships, undergraduate scholarships, and invited lectures as well as for unrestricted purposes.

Russell M. Anania (M.S. 1967, Ph.D. 1974)

Thomas H. Bedwell (Ph.D. 1966 Secondary Education/Physics)

Bell Communications Research Inc.

The Boeing Company

Thomas E. Bullock (M.S. 1979)

Mr. & Mrs. James C. Coe

Columbia Broadcasting System

Paul Finkler

Robert G. Fuller

Charles F. Gayton

Richard J. Gleeson (B.S. 1967)

Walter W. Heinze (B.S. 1954, M.S. 1956)

International Business Machines Corporation

Lloyd D. Jacobs (M.S. 1958, Physics/Math)

Duane H. Jaecks

Sitaram S. Jaswal

Mahbub R. Kahn

John F. Katouc

Robert Katz

Joseph Macek

Charles B. Minnich

Joseph L. Parker (Ph.D. 1940 Chemistry/Physics) and Kathryn H. Parker

Edgar Pearlstein

Md. Harunor Rashid (Ph.D. 1983)

Jerry E. Ruckman (B.S. 1962)

M. Eugene Rudd (Ph.D. 1962)

James A. R. Samson

Donald P. Schneider (B.S. 1976)

Anthony F. Starace

## New Research Grants and Contracts

During the period 1 October 1984-30 September 1985 the following new and renewal grants and contracts were received by our faculty.

Principal Investigator(s)	Title (Source of Funds)	Amount (\$ Thousands)
D. Burns/ D. Jaecks/ M. E. Rudd	Inelastic Processes in Atomic Collisions (NSF)	\$270.0
P. D. Burrow	Study of Vibrationally Excited Molecules (NSF)	\$ 35.2
P. D. Burrow	Temporary Anion Formation in Hydrocarbons (NSF)	\$ 82.0
J. R. Hardy	Theoretical Studies of Fundamental Lattice Absorption in Highly Transparent Solids (ONR)	\$119.6
J. R. Hardy/ F. Ullman	Improper Ferroelectricity (ARO)	\$117.7
D. H. Jaecks	Study of the Development of the Refracting Telescope (NSF)	\$ 20.7
C. E. Jones	Studies in Topological Bootstrap Theory (NSF)	\$ 27.0
R. Katz	Theory of Relative Biological Effectiveness (DOE)	\$ 60.0
K. Leung	Studies of Close Binary Systems (NSF)	\$ 86.8
K. C. Leung	U.S.-China Seminar on Critical Observations (NSF)	\$ 27.0
J. Macek	Theory of Atomic Collisions (NSF)	\$ 73.7
J. Macek/ A. F. Starace	Hyperspherical Coordinate Theory of Two-Electron Atomic Processes (DOE)	\$ 68.0
J. A. R. Samson	Photoionization Studies of Atoms (NSF)	\$ 73.5
J. A. R. Samson	Ultraviolet and X-Ray Bombardment of Planetary Atmospheres (NSF)	\$ 60.0
J. A. R. Samson	Interaction of Radiation with Planetary Gases (NASA)	\$ 36.5
D. J. Sellmyer	Structure-Property Relations in Alloys (NSF)	\$ 30.7
D. J. Sellmyer	Physics of Thin Films (Dale Electronics)	\$ 2.0
J. W. Weymouth	Magnetic Data from Mississippian Archaeological Sites (National Park Service)	\$ 4.2
J. W. Weymouth	Magnetometer Survey of Fort Atkinson (Nebraska Game & Parks Commission)	\$ 2.1
TOTAL		\$1,196.7

## 1984 Faculty Publications

### ASTRONOMY AND ASTROPHYSICS

K. C. Leung, R. F. Sistero, D. S. Zhai, H. Grieca, and B. Candelero, "Revised UB<sub>V</sub> photometric solution of the early-type contact system BH Centauri," *Astronomical Journal* **89**, 872-875 (1984).

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E. G. Schmidt and S. B. Parsons, "The chromospheres of classical Cepheids. II. High resolution profiles of the MgII h and k lines," *Astrophysical Journal* **279**, 202 (1984).

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## ATOMIC AND MOLECULAR PHYSICS

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- K. D. Jordan and P. D. Burrow, "Temporary negative ion states in hydrocarbons and their derivatives," in *Resonances in Electron-Molecular Scattering, van der Waals Complexes, and Reactive Chemical Dynamics*, American Chemical Society Symposium Series, Volume 263, Edited by D. G. Truhlar, (Washington, D.C. 1984).
- D. H. Jaacks, "Molecules in nonadiabatic collisions," in *Electronic and Atomic Collisions*, Edited by J. Eichler, I. V. Hertel, and N. Stolterfoht (Elsevier, Amsterdam, 1984), pp. 663-665.
- A. L. Goldberger, D. H. Jaacks, M. Natarajan, and L. Fornari, "Isotope effects in inelastic 1.5 keV He<sup>+</sup>-(H<sub>2</sub>, D<sub>2</sub>) collisions," *Physical Review A* **29**, 77 (1984).
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- D. J. Sellmyer, C. G. Robbins, and M. J. O'Shea, "Magnetism and hydrogen absorption in rare-earth glasses," *Journal of Non-Crystalline Solids* **61**, 6551 (1984).
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- R. Hight, C. Plough, and D. J. Sellmyer, "Temperature dependent resistivity of highly disordered Ni-Cr-Al alloys," *Physical Review B* **29**, 5920 (1984).
- S. G. Cornelison and D. J. Sellmyer, "Rare earth-gallium-iron glasses I. Magnetic ordering and hysteresis in alloys based on Gd, Tb and Er," *Physical Review B* **30**, 2845 (1984).
- S. G. Cornelison, J. G. Zhao and D. J. Sellmyer, "Rare earth-gallium-iron glasses. II. Anomalous magnetic hysteresis in alloys based on Pr, Nd, and Sm," *Physical Review B* **30**, 2857 (1984).
- J. G. Zhao and D. J. Sellmyer, "Magnetic properties and chemical short-range order in Fe-Pd based metallic glasses," *Physical Review B* **30**, 2913 (1984).

## INTERDISCIPLINARY PHYSICS

### (a) Physics Education

- R.G. Fuller, "Videodiscs," in *The Role of Technology in Distance Education*, Edited by A. W. Bates (Croom Helm, London and Canberra, 1984), Chapter 6.
- D. A. Zollman and R. G. Fuller, *Physics and Automobile Collisions, An Interactive Videodisc* (Wiley, New York, 1984).
- R. G. Fuller, "Tacoma Narrows Bridge Videodisc: A Personal History," in *The Videodisc Book*, Edited by R. Daynes and B. Butler (Wiley, New York, 1984).

### (b) Track Physics

- R. Katz and W. Hofmann, "Some comments on dose and dose equivalent health physics," *Health Physics* **47**, 603-611 (1984).
- R. Katz, "Formation of etchable tracks in plastics," *Nuclear Tracks and Radiation Measurements* **8**, 1-8 (1984).

### (c) Arms Control

- L. Sartori and D. Rapkin, "Overcoming the obstacles to arms control," in *American Foreign Policy in a Multipolar World*, Edited by David P. Forsythe (University of Nebraska Press, Lincoln, 1984).
- L. Sartori, "Defense against ballistic missiles: development and theories," in *Review of U.S. Military Research and Development*, Edited by K. Tsipis and P. Janeway, (Pergamon Press, Washington 1984).

### (d) Archaeometry

- J. W. Weymouth and W. I. Woods, "Combined magnetic and chemical surveys of Forts Kaskaskia and de Chartres Number I, Illinois," *Historical Archaeology* **18**, 21-37, (1984).
- P. K. Burns, R. J. Huggins and J. W. Weymouth, "Correlation of magnetic anomalies with subsurface cultural features," *Dolores Archaeological Program: Synthetic Report 1978-1981*, Edited by D. A. Breternitz (U.S. Department of the Interior, Bureau of Reclamation, 1984).

## We Heard From These Alumni:

- ALSTON, Steven G.** (M.S. 1979, Ph.D. 1982) Joint Institute for Laboratory Astrophysics, Boulder, CO 80309. Completed a postdoctoral appointment in Freiburg, West Germany. Now a JILA Fellow in Boulder.
- ANANIA, Russell** (M.S. 1967, Ph.D. 1974) 1033 Hilgard, Apt. 201, Westwood Village, Los Angeles, CA 90024. Was a Staff Scientist at Singer-Link. Now at Aerospace Corporation in El Segundo, CA. Visited UNL last fall. Says, "Keep up the good work."
- BASS, Robert J.** (B.S. 1985) Bellevue High School, Bellevue, NE. Writes "I wish to thank you [Dr. Starace] and the Department for all the help you have provided in preparing me for my career. I have obtained a rather diverse education in physics and I believe the quality of instruction here at UNL is exceptional. You all have allowed me to gain teaching experience well beyond what students in the Teacher's College could ever hope to obtain at this point. Being a small part of this department has truly been an honor. "I intend to pursue a teaching career at the secondary level. Hopefully I'll be able to stir up a sense of excitement toward physics in our youth as well as an awareness of its importance in our world. I really think that if physics is to become a popular major in the future, more young students need to see what it's all about. Physics has gotten a lot of bad press in the past—perhaps I will be able to alter that in some small way in the future. "I thank God for this chance to gain a quality education and I thank you folks for allowing an undergraduate to experience so many facets of this field. "I hope to keep in touch."
- BEDWELL, Thomas H.** (Ph.D. 1966 Secondary Education/Physics) 2903 N. Patterson, Flagstaff, AZ 86001. Is Professor Emeritus at Northern Arizona University in Flagstaff (Campus Box is 6010). Returned to teach basic physics courses while the Physics Department is undergoing a reorganization. Teaches General College Physics for 6 hrs/week.
- BROWN, Robert H.** (M.S. 1942) 12420 Birch St., Yucaipa, CA 92399. Is retired. Works part time as a Senior Research Scientist at the Geoscience Research Institute, Loma Linda University, Loma Linda, CA.
- BULLOCK, Tom** (M.S. 1979) 1260 South 20th St., Lincoln, NE 68502. Is a Data Communications Engineer at Lincoln Telephone Company. Would appreciate receiving information on the life and contributions of DeWitt B. Brace, Dept. Chairman 1888-1905 and original owner of his house.
- BUNCH, James** (M.S. 1963, Ph.D. 1967 Physics/Math) P.O. Box 712, Manitou Springs, CO 80829. Is Senior Process Engineer at United Technologies Mostek.
- BYRNE, Eric** (B.S. 1983) 8030 Spaulding, Omaha, NE 68134. Is a Database Applications Analyst at HDR Systems, Inc. "Normally, I toss the alumni news I get from UNL, but I was pleased to receive this newsletter. Please keep me on the mailing list."
- COOKE, David** (B.S. 1983 Math/Physics) 319 Garfield NE #305, Minneapolis, MN 55413. Is a Graduate student and TA in the Department of Mathematics at the University of Minnesota. Got married June 23, 1984; passed his written exams, Fall, 1984; is trying for a Ph.D. in Mathematical Physics.
- DAVIS, Dr. Robert H.**, Physics Department, Florida State University, Tallahassee, FL 32306. Is now Professor and Chairman.
- GOLDBERGER, Arthur L.** (Postdoc) EG & G, P.O. Box 1912, Mail Stop N-33, Las Vegas, NV 89125. Is a Senior Scientist, Software and Analysis Division at EG & G.
- HARMAN, Mikel W.** (B.S. 1982) 3026 Broken Bough Tr., Abilene, TX 79606. Is a Field Engineer at Schlumberger Well Services.
- JACOBS, Loyd D.** (M.S. 1958 Physics/Math) 2004-128th Ave. SE, Bellevue, WA 98005. Is Principal Engineer with the Boeing Company. Enjoyed the Newsletter. Is currently working on community and interior noise on a proposed propfan airplane.
- KOBETICH, Edward John** (Ph.D. 1968) 930 Oak Hill Rd., Barrington, IL 60010. Is the Director of the Gas Research Institute. Directs the research for the natural gas industry from the well head to the burner tip.
- LARSEN, L. M.** (M.A. 1948 Math/Physics) 3217 1st Avenue, Kearney, NE 68847. Formerly Professor of Math and the Chairman of the Department of Math, Statistics and Computer Science at Kearney State College. Retired in 1982 after 34 years at Kearney State College.
- LEE, Millard A.** (M.A. 1960) 629 Norvin Ave., Idaho Falls, ID 83401. Is a Senior Scientist in the Nuclear Physics Section of EG & G Idaho, Inc., Idaho National Engineering Laboratory.
- LUGN, Alvin L. Jr.** (M.A. 1950 Physics/Math) 2118 South St., Apt. A, Lincoln, NE 68502. Is retired. "I have appreciated very much receiving the Newsletter. This last issue did, indeed, come out in an improved format and printing. I hope you will continue this effort. Re: Dept. History: Why don't you simply ask Dr. Theo. Jorgensen to remove the ? after the dates for H. H. Marvin, Nels Bengston and R. L. Chasson?? Those were his active years in the Dept. and he was still here in Lincoln when last I saw him last October. I feel sure the 1949 is correct for H.H.M. Also, wasn't there a short tenure as chairman for a Dr. Moore in the 1950's? Again ask T.J. The University will have to help you regarding 1882! I hope to come down for a visit one of these times and see for myself what is going on and hopefully get answers to questions raised by the Newsletter. Also to find out just what your plans are for my well-remembered Brace Lab. I hope it doesn't get changed too much. I never could understand why some of the changes were made in the 3rd (& 2nd?) floor student labs where Dr. Marvin conducted some excellent undergraduate physics courses. And to take out that marvelous old pendulum clock—!"
- MAHOWALD, Peter** (B.S. 1978) P.O. Box 6011, Stanford, CA 94305. Is a Graduate Student in Electrical Engineering at Stanford University. Is working on Heterojunctions using photoemission.
- MALEKI, Nasser** (M.S. 1977, Ph.D. 1981) Mount Sinai Medical Center, Department of Radiotherapy, One Gustave L. Levy Place, New York, NY 10029. Is Assistant Professor at Mount Sinai Medical Center. Congratulates Dr. Starace on election as the Chairman of the Department. Is sure the Department will enjoy a very fruitful period under Dr. Starace's guidance. Always enjoys receiving the school's (the department's) Newsletter. "It is good to know that everyone is doing fine."
- McFEE, Ronald W.** (M.A. 1966, Ph.D. 1971) P.O. Box 1078, Los Alamos, NM 87544. Is a Physicist in the Thermonuclear Applications Group of the Applied Theoretical Physics Division at Los Alamos National Laboratory. Thinks the Newsletter is a great idea; that it is good to hear from his colleagues and about their accomplishments. Has had an interesting career since leaving UNL. Hopes to visit here soon.
- MUELLER, Dennis W.** (B.S. 1975, M.S. 1976, Ph.D. 1982) Department of Physics and Astronomy, Louisiana State University, Baton Rouge, LA 70803-4001. Completed a postdoctoral appointment in Bielefeld, West Germany. Is now an Assistant Professor at LSU.
- NEUMANN, Herschel** (Ph.D. 1965) Department of Physics, University of Denver, Denver, CO 80208. Is a professor in the Department of Physics at the University of Denver. Became Chairman of his Department in August 1985. Received the University of Denver Distinguished Teaching Award for 1983-84 in June, 1984. Enjoys the Newsletter very much, with its news about the Department and long-time friends and former instructors.
- REILLY, Kevin D.** (M.S. 1962 Physics/Math) 304 No. Burbank Dr., Bluff Park, AL 35226. Is a Professor of Computer & Information Sciences, and Associate Professor of Biostatistics & Biomath at the University of Alabama in Birmingham. "After leaving Lincoln, I received a Ph.D. in Mathematical Biophysics from the University of Chicago. After 4 years on the West Coast (UCLA) I've been in Alabama 'doing it all' (just about). I've also had the pleasure of visiting the Physics and Astronomy Department a couple of times recently."
- RUCKMAN, Jerry E.** (B.S. 1962) 4320 Carter Trail, Boulder, CO 80301. Is a Staff Engineer at IBM. "This is a very good way for alumni to keep up on what is happening in the Department. Keep it up."
- SALYER, Lynn** (B.S. 1974) 908 W. 10th, McCook, NE 69001. Is an Instructor of Computer Sciences at the McCook Community College.
- SAZAMA, Franklin J.** (M.S. 1962) 7820 Whiterim Terrace, Potomac, MD 20854. Is a Physicist/Principal Scientist at the Naval Surface Weapons Center. Looks forward to visiting the lab and people at the Department in 1985.
- SCHNEIDER, Donald P.** (B.S. 1976) School of Natural Sciences, The Institute for Advanced Study, Princeton, NJ 08540. Received a Ph.D. in astronomy from Caltech in 1982, and for the past three years has been a Research Fellow at Caltech. In June 1985 he began an appointment at the Institute for Advanced Study in Princeton, NJ.
- STEPP, Robert E.** (A.B. 1970) 3104 W. John, Champaign, IL 61821. Is an Assistant Professor of Electrical and Computer Engineering and Assistant Professor of Computer Science at the University of Illinois. Earned his Ph.D. in Computer Science in 1984 from the University of Illinois at Urbana-Champaign. His field of specialization is Artificial Intelligence and Machine Learning.
- STRIEFELER, Fred** (M.S. 1967, Ph.D. 1969) 36 Brentwood Dr., Bloomfield, CT 06002. Is Associate Professor of Physics and Computer Science at the University of Hartford. Is teaching in both Physics and Computer Science and doing research in "Equations of State of Earth Forming Oxides."
- SULLIVAN, Dr. George A.** (Ph.D. 1964) 4204 Kota Avenue, Harrisburg, PA 17110. Is a Statistical Analyst III for the State of Pennsylvania. "Status quo here. I had to switch fields in 1970 when the job crunch hit physics."
- SUMMERS, Donald L.** (B.S. 1955, M.A. 1957) 3713 Moon NE, Albuquerque, NM. Is Senior Research Mathematician at Kaman Sciences Corporation. Does mathematical modeling of physically and optically obtained data.
- TOLMAN, Anna C. (Welch)** (B.S. 1962) 8301 White Bluff Rd., Savannah, GA 31406. Is the Boss's wife, works for him at Savannah International Motors, Inc. "After living on the coast for 18 years, we've decided there's a lot of energy in the tide. Why not harness it? It's very reliable!"
- TVETEN, Alan B.** (M.A. 1959) 3101 Crafford Drive #607, Fort Washington, MD 20744. Is a Research Physicist at the Naval Research Laboratory. "I enjoyed reading the newsletter, and although it has been over 20 years since I have been in Lincoln there were many

names that were familiar to me. The Department certainly has grown. Keep up the good work."

**VENHUIZEN, James R.** (M.A. 1966) 1011 Woodruff, Idaho Falls, ID 83401. Is an Engineering Specialist at EG & G, Idaho.

**WIRSIG, Jean C. (Davis)** (B.S. 1954 Math/Physics) 523 Birchcrest, River Falls, WI 54022. Is Assistant Professor of Computer Science at the University of Wisconsin at River Falls. "Professor Moore was at least Acting Chair in 1953-54. I was T-Squared's 2nd woman pupil and the Department's first woman Major. Want my tales?" [Editor's Note: Yes, please write further.]

**WITTEN, Dr. Maurice H.** (M.A. 1960) 101 West 33rd Street, Hays, KS 67601. Is Professor and Chairman of Physics at Fort Hays State University. Will be receiving his 25th year of service medallion at the end of this year. Has been Chairman for last 15 years. Received his Ph.D. from the University of Iowa in 1967.

**ZEIDLER, James** (Ph.D. 1972) 11829 La Colina Rd., San Diego, CA 92131. Is a Senior Scientist in the Space Systems and Technology Division at the Naval Ocean Systems Center. "We returned to San Diego in the fall of 1984 after completing a one year assignment as technical advisor to the Assistant Secretary of the Navy for Research, Engineering and Systems in the Pentagon. I am now working on the development of new monolithic GaAs microwave devices."

#### IN MEMORIAM

**FRASER, Dr. William A.** (B.S. 1956, M.A. 1959, Ph.D. 1964) died December 24, 1984 at age 49 in Colorado Springs, CO. He was a space scientist for Martin Marietta Aerospace Corp. in Denver.

**HANSEN, Wilber W.** (B.S. 1934, M.S. 1936). Deceased as of March 1985 according to the Alumni Association.

**JEHLE, Herbert** (Professor 1949-1959) "died January 14, 1983 peacefully on the train in West Germany with physics on his mind and going to a peace conference." Mrs. Dieblinde Jehle also said that Physics Today carried a write-up in Spring 1983.

**OBERBECK, Dr. T. E.** (M.A. 1940 Math/Physics) is deceased.

#### NO KNOWN ADDRESS:

We sent the Newsletter to the following people and the letters were returned "Address Unknown". Address information would be appreciated.

**Dr. Stuart Adelman**

**Dr. William L. Bade** (B.S. 1949, M.A. 1951, Ph.D. 1954)

**Walter F. Gutschow, Jr.** (B.S. 1958, M.A. 1960)

**William C. Keller** (B.S. 1981)

**Dr. Franco Selleri**

**Victor C. Sutcliffe** (Ph.D. 1977)

## UNL Graduate to Work on Space Telescope

Dr. Donald P. Schneider (B.S. '76) has been awarded an Exxon fellowship for work at the Institute for Advanced Study at Princeton. Formerly at the California Institute of Technology at Pasadena, he moved to Princeton this past summer. He will have as his prime responsibility the development of a research program to analyze the observations from the space telescope to be launched in a few months. In collaboration with Dr. John Bahcall, he was awarded a research grant of \$700,000.