$100,000 Obtained to Modernize Belhaven Observatory

Belhaven 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 Schmid and Donald Taylor have undertaken a large project to modernize the equipment available at Belhaven 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 Belhaven Observatory has recently obtained the needed $100,000 funding from several sources. Chancellor Massengale provided $13,400 for the purchase of a MicroVAX II 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 Kricky Memorial Equipment Fund donated by Mr. & Mrs. James C. Cree to purchase components for this 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 Schmid 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 Schmid and Taylor.

The new instrumentation will greatly increase the amount and quality of astronomical data gathered at Belhaven 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 Belhaven Observatory. As the project nears completion we expect others to join the project. Thus, Belhaven 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

In December 1984 both Professors Donald Taylor and Joseph Macek received telephone calls from a student on the UN Field Days. The student had telephoned the observatory because if the Department has yet found the "Minnich Lens." If we had, the Department should expect a significant donation from Commander Charles B. Minnich of Orlando, Florida. Chairman Anthony Sturges obtained University Archives records on the matter from Professors Jacks and Taylor and initiated some new investigations. The story, in brief, is as follows: Astronomy began at Nebraska when Professor G. D. Swerzy came here in 1894. He made plans to build a 12" refracting telescope and in 1905 purchased the appropriate glass from Schott and Genesee Glassworks 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 Swerzy 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 Swerzy retired after the 1925-26 academic year without any success in getting an observatory built. In 1937 the lens

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Chairman's Letter

Dear Alumni and Friends,

The purpose of this newsletter is to keep you informed of developments in the Department and of the activities and achieve- ments of the people associated with it. Before doing this I would like to place these developments and activities in the perspec- tive of some trends affecting physics and astronomy as well as universities. In partic- ular, the decennial Physics Survey ("Brink- man 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 the latter 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 other individuals to return to campus for further education. Demand for physicists is expected to outstrip supply. Whereas currently there is an appropriate 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 115 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 experi- encing severe shortages of physicists due to high demand from industry. The implications of these trends are that just when universities will be having more revenues of present faculty, the competition for faculty is likely to be both intense and expensive.

Currently 53% 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 low 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 as- sistants.

Women comprise only 3% of all physicists and astronomy per- sonnel. Nebraska is one of the lowest in percentage of any science or engineering field. Studies have pinpointed some causes: poor advising of young women concerning the desirability of prep- aration for the brunt 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. Knowl- edge 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 newly applied research for cuts, the need for new scientific equipment has dwarfed the funding efforts made so far. For example, the University's 1977-78 year budget of the new DOD-University Instrumentation Program was oversubscribed twenty-fold: requests totalled $643 million. This unmet need is the result of nearly twenty years of decreased spending for fa- cilities 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 un- common 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 prob- lems 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 taxes rather than simply adjust Nebraska income taxes to compensate for federal tax cuts. Nebraska's politicians have focused on the many indi- vidual tragedies in small towns 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.

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 to every opportunity to compete for the scientific and teaching equip- ment our programs require and, in several instances, they have been successful. We have provided a large group interactions be- tween 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 efficient and cost savings in our oper- ations 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 Department has...
upgrades (which will give Belen 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 available to astronomical researchers and students. In recognition of this expanded scope of the facility, Professor Edward Schmidt has been named Observatory Director. The experimental con- densed matter group has received strong endorsement from Chancellor Massengale to establish an interdisciplinary Materials Science Center linking the resources and capabilities of the phys- ics, chemistry, electrical engineering, and chemical engineering departments. A number of proposals have been submitted to federal agencies, industry, other corporations, and private founda- tions. 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 “Wildcarn” conference. Theories at both centers have spent the past year drafting and discussing in the national community a pro- posal for a Joint Institute for Theoretical Atomic Physics. It will be submitted to NSF this year.

Service Activities. In connection with Halley’s comet, Belen Observatory plans half a dozen open houses this fall for the gen- eral 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 ele- mentary and secondary school science classes. Vice Chairman Robert Hardy a a Chairman this year of the UNL Research Coun- cil... Professor C. Edward Jones is serving this year on the College of Arts and Sciences Executive Committee. Our fac- ulty continues to be active in various national 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 made available. 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 Kelt and his staff are now gearing up to fabricate our own printed circuit boards. Professor Evelyn Manly and her staff have been busy this year developing an in-house accounting system to keep track of our numerous salary, operating, teaching, and research accounts. There has been a substantial increase in analyzing our operations in search of cost efficiencies and better accounting practices.

Demolition 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 demonstra- tion 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 Rec- ognition Luncheon for our 1984-85 physics and astronomy graduates. We invited a distinguished group of alums, Dr. Steve Cum- ningham, 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 to the Reception Committee.

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 contri- butions of our alumni and friends. Since most of the state fund- ing for the Department is for salaries, these additional non-state funds provide much of the flexibility we have to re- spond 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 activ- ities such as the enhancements described above. In addition we continue to receive the substantial benefits provided by the in- come from the Kautzky Memorial Equipment Endowment Fund, the Joseph L. and Kathryn H. Parker Fellowship Endowment Fund, and the Jerry E. Ruckman Endowment Fund (for un- restricted 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 year is to increase our Lecture Endowment Fund so that we can proceed with the upgrading of our collo- quium 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 address the needs of greatest need. Last year more than $5,000 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 postcard to inform us of your current address and of any recent ac- tivities. 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,
The Missing Minnich Lens continued

was lent to the Warner and Swasey Co. for evaluation: they reported that there were a number of defects, but that for $493 they could provide "a fairly fine optical surface." In 1973, Com-
mander 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 Olive Collins) mentioned it 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 Com-
mander Minnich and sent him all well 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 U.N.L. 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 you of any you know some-
things, please let us know.

Pending the finding of the Minnich 12" lens, Professor Don-
ald Taylor is using the recently donated Minnich 6" lens to con-
struct 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 Research 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 pass-
ing the astronomy resource room and to the passersby outside the building through the coudé port constructed from the 2nd story window. To support the construction of the "Minnich Solar Telescope" Commander Minnich recently do-
nated $5,000 to the Department and plans to contribute $2,000 more next year.

While we still hope to locate the 12" Minnich lens, the un-
successful search has nevertheless so far resulted in several ben-
efits for the Department. Firstly, the matter has provided an over-
view of the history of Astronomy at U.N.L. since its inception. Secondly, the "Minnich Solar Telescope" will be a distinct plus for our astronomy teaching program. Lastly, we have become friend with Charles B. Minnich.

The young grantee in a U.N.L. 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 Retr 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 astron-
omy. 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 Bur-
row has been the beneficiary of a large donation of apparatus from the IRT Corporation of San Diego, California. The equip-
ment, 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-
ruple mass spectrometer, an electron beam apparatus, and miscellaneous small parts.

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

Astronaut Cunningham Speaks to Graduates

Stephen L. Cunningham (M.S. 1969, Ph.D. 1971) an ac-
tive member of the space shut-
ell astronaut team spoke to the Department's B.S., M.S., and Ph.D. graduates at a recogni-
tion luncheon held in their honor in May 1985. Steve Cun-
ningham received his degree for work in condensed matter physics under Professor John Hardy. After a postdoctoral ap-
poin-ment at Cal Tech, he went to work for Hughes Aircraft Co. in Pasadena, California. He is now assistant manager of a lab-
oratory staffed by 150 re-
searchers 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 under-
gone rigorous training since joining the program and describes his work (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 Cit-
tion for his significant contributions to the teaching of physics. Fuller has been a pioneer in many in-
novative teaching programs such as the Kelller 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 directed the AAPT 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 Access 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 stu-
dents who study physics and has taken workshops for teachers to help them recognize subtle sexism 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.
Paul Byerly Retires

A retirement reception and dinner were held at the Linfield 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 B.A. degree from Washington College in Pennsylvania in 1945 and his Ph.D. degree from the University of Pennsylvania in 1951. He spent eight years as Senior Physicist at the University of California Radiation Laboratories in Berkeley and Lecturer and then 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 1965. His research interests centered on the Moulouaia Effect. He has also been active in developing science, government, and computer animation fields. Both of his former doctoral students, Professor Leonard 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. Neh Bengzon, who was actually a retired geography professor, served as acting chairman from September 1953 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. 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 Lugon, Jr. (MA '50), who suggested that we should ask Emeritus Professor Theodore Jorgensen for information. We spoke to Ted often and that is a good idea. In addition, 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 Cahalan, of the Department of History, who is planning to do research on the early history of the department.

The history 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. Bruce’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. Altook time from a business trip to San Diego to visit IRT, and his planning made things much easier.

Graduate students Ken Sircklett and Tom Stephens under-took the arduous job of creating 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 resurrected the chapter.

Officers of SPS elected in April were David Fox, president; Julie Schubert, vice president, Robert Drucker, secretary, and Kyle Hoffmann, 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 Bahen Observatory, a later light show, and a talk on the rainbow and the achromatic telescop by Prof. Rudd of the Department. Upcoming activities include a volleyball game, a Halloween potluck, 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 at Behlen Laboratory had already exceeded the design limits for floor loading and that we had applied for funds to relocate the library to Brase 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 lbs/sq ft as the floor loading capacity. A measurement by the Physical Plant engineers indicated that the loading was actually about 58 lbs/sq ft, which was a 45% overload. However, the engineers said that calculations using a more modern theory, the “Working Stress Theory” allowed 50 lbs/sq ft. When pressed, they brought out a still more recent theory, the “Ultimate Strength Theory” which said the floor would hold 75 lbs/sq ft. Obviously 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 Bruce 2655 and reduced the amount of shelving in the library. With this move, we have regained some safety factor and, most importantly, have been able to retain physics library intact. Unfortunately, since we must continue to add books and journals, we will probably have to move again, 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-Ra Photometry and the Cepheid luminosity Scale.” Prof. Ed Pearlstein spoke to the Crater, 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 Joseph M. MacKee and Anthony F. Stace was featured in a front page story in the Lincoln Journal last October 5. Professors Norman Simon and Edward Schmidt were featured in an article describing their research on pulsating stars in the Nov. 9, 1994 issue of the Journalist. Professor Siratum Jasswal was awarded a Maud Association Flary Summer Research Fellowship by the Research Council. The Astronomy
Graduates Attracted to Medical Physics

The field of medical physics is one of the fastest growing specialties in physics. Our own graduates appear to be strong contributors to this recent growth. In the past four years the following five physicists graduated in medical physics: Nasser Maleki (M.S. '77, Ph.D. '81; Supervisor: J. Madsen) 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. Simaak Shahabi (M.S. '77, Ph.D. '83; Supervisor: A. P. Starace) was a medical physics fellow at Tulane University and is now an Assistant Professor in the Department of Radiation Oncology at the University of Alabama in Birmingham; Chang-Hwan Park (Ph.D. '84; Supervisor: A. P. Starace) has just taken up a medical physics fellowship position at Yale; and Rebecca Richards-Kortum (B.S. '85) has entered a graduate program in medical physics at M.I.T. One of our earlier graduates, Subhash C. Sharma (M.S. '70, Ph.D. '71; Supervisor: R. Katz) also holds a position in the Department of Therapeutic Radiology at the University of Louisville School of Medicine, says he is now ready to help a number of new UNL graduates at professional meetings that he's thinking of forming a UNT medical physics alumni association.

In order to find out what our medical physics alumni are doing, we wrote to some of them. Leon C. Baird (M.S. '63, 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 insure compliance with specified treatment regimens, write computer programs for common calculation 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 immerse myself away from 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 the 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 physicists, physicians, 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. In addition, 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 implementation of linear accelerators and 'Co units for therapy. Using various dosemeters (mainly ion chambers) the physicist must be able to make an absolute calibration of the output of the machines. This requires frequent verification of this calibration at least weekly, thus a 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 Radiology or a Master's or Doctor's degree in physics plus a post doctoral training in medical physics, radiological physics and one year of full-time experience in a radiotheray facility."

"Several lines of research which are of interest to radiation therapy physicists are new treatment techniques and dosimetry, computerization of the physics, computerization of the radiological physics and one year of full-time experience in a radiotheray facility."

"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 new 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., M.S. 1967, Ph.D. 1970), of the Department of Radiology 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 work well with others. Good communication skills are required for effective completion of most 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 therapy calculations) can literally be fatal or can cause serious injury to a patient, and one must be willing to accept these responsibilities.'
Dunce Jaceks with knife-edge apparatus he will use to measure focal length variations in telescopes.

Jaceks to Measure 100 Antique Telescopes

As some of you know, for many years Professor Dunce Jaceks 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 achromat 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 stray in the glass. He plans to make a chronological photographic atlas showing improvements in glass making procedures and lens quality over the period 1750-1839.

Collaborating with Jaceks in his project will be Dr. G. L. Turner, Assistant Curator at the Museum of the History of Science at the University of Oxford in England who is interna-
tionally 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, Jaceks 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 Award for Outstanding Science Teaching, was invited to present a colloquium last November 8th. After demonstrating the microwave he has used at Omaha’s Northwest H.S. to increase physics enrollments by 50%, he directed the science education crisis. According to Skrocky, efforts should be directed not at retaining 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 five 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 sup-
port that they should.

Discussion of these matters continued over 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. Beattie), our Astronomy Resource Room (shown by E. Schmidt), some of our lecture demonstrations (shown by J. Samuel and E. Farnhein), some of our research labs (shown by D. Barnes and R. Nipdy), and finished with a brief round-table discussion with A. Starace. The event was sponsored by the Undergraduate Committee, organized by Professor Rob-
ert Faust, and arranged by Martha McDowell, and supported fi-
nancially by the Jerry L. Ruckman (B.S. ’62) Fund.

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 demon-
stration equipment for Brace 211, proposed by Robert Fuller and Cliff Beattie. 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 seen, such as the thermal expansion of a rod, the beautiful surfaces of heat energy formed by soap bubbles, etc. Once the staff gets used to having this capability they will probably think of many other ap-
lications. In addition, an interface has been purchased which will allow images on IBM PCs to be projected onto a large screen. This in the future, it will be possible to show a large class any graphical information calculated on the Department’s PCs.

Other items being purchased are a new microscope to be used with the closed circuit TV system; a new Wimhurst electrostatic machine to replace the old, dilapidated machine for-
merly seen by 1000 students each semester; an electron diffraction tube and two power supplies for the 723 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 Wimhurst 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.
1984-85 Degree Recipients

Bachelor of Science

Ulrich Achatz
Michael Engelhardt
Bo Gao
Ying-Yuan Hsu
Kevin Prentore
Thomas Stephen
Kwong-Mow You

1984-85 Honors Fellows
Fullbright Fellow
AAAS Fellow
Departmental Teaching Fellow
Parker Teaching Fellow
Avery Teaching Fellow
Johnson Fellow
Avery Teaching Fellow

Robert J. Bass
David Debrezion
Thomas Filarecki
David H. Fox
Jodi Kereszewski
Robert Kurtenbach
Rebecca Richards
Jonathan B. Smith
Bruce Steele
Joseph Steele
John Stormberg

1984-85 Scholarships
Harkness Scholarship
Harkness Scholarship
Joel Siebhsns Scholarship
John E. Almy Scholarship
Joel Siebhsns Scholarship
John E. Almy Scholarship
U. S. Harkness Scholarship
U. S. Harkness Scholarship
U. S. Harkness Scholarship

1985 Departmental Distinguished Teaching Assistant Awards
Shu-Chung Chu
Paul J. Edwards

1985 Distinguished Teaching Award
James A. R. Samson

1984-85 Society for Physics Students Officers
David Fox, President
Julie Schutte, Vice President
Robert Drucker, Secretary
Kyle Holland, 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:

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 Division.
John R. Hardy: Consultant for Lawrence Livermore Laboratory and the U. S. Naval Research Laboratory.
Robert J. Kast: Editorial Board, Nuclear Tracks; Scientific Committee of 13th International Conference on Solid State Nuclear Track Detectors (Rome 9R80); NIH Site Visit Team for National Cancer Institute, UCRL Berkeley (8R85); Advisory Group on Nuclear and Atomic Data for Radioecology and Radiobiology, IAEA Group Meeting, Rijswijk, The Netherlands.

Joseph Maciej: NRC/NSAC Committee on Atomic and Molecular Scowptories; Editorial Board of Journal of Physics B, Physical Review A, and Zeitschrift fur Physik D.

M. Eugene Rudd: Fellowship Committee of the A.F.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
Colombia Broadcasting System
Paul Finkler
Robert C. 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. Jaeck
Sitarus S. Jaeck
Mahbub R. Kabir
John F. Kautz
Robert Katz
Joseph Mack
Charles B. Minnich
Joseph L. Parker (Ph.D. 1940 Chemistry/Physics) and Kath- 
rynn H. Parker
Edgar Pearthree
Md. Harunur Rashid (Ph.D. 1983)
Jerry E. Rottman (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. (Amounts in Thousands)

<table>
<thead>
<tr>
<th>Grant/Contract</th>
<th>Description</th>
<th>Amount</th>
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<tr>
<td>D. Burns</td>
<td>Inelastic Processes in Atomic Collisions (NSF)</td>
<td>$270.0</td>
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<td>D. Jaecke</td>
<td>Study of Vibrationally Excited Molecules (NSF)</td>
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<td>M. E. Rudd</td>
<td>Temporary Astrom Formation in Hydrocarbons (NSF)</td>
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<td>P. D. Burrow</td>
<td>Theoretical Studies of Fundamental Lattice Absorption in Highly Transparent Solids (ONR)</td>
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<td>J. R. Hardy/ F. Ullman</td>
<td>Study of the Development of the Refracting Telescope (NSF)</td>
<td>$20.7</td>
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<td>C. E. Jones</td>
<td>Studies in Topological Bootstrap Theory (NSF)</td>
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<tr>
<td>R. Katz</td>
<td>Theory of Spontaneous Non-equilibrium Flow Processes (DOE)</td>
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<td>K. Leung</td>
<td>Studies of Close Binary Systems (NSF)</td>
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<td>K. C. Leung</td>
<td>U.S.-China Seminar on Critical Observations (NSF)</td>
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<td>J. Macek</td>
<td>Theory of Atomic Collisions (NSF)</td>
<td>$73.7</td>
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<td>J. Macek/ A. F. Starace</td>
<td>Hyperspherical Coordinate Theory of Two-Atomic Electronic Processes (DOE)</td>
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<td>J. A. R. Samson</td>
<td>Photoionization Studies of At- (NSF)</td>
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<td>J. A. R. Samson</td>
<td>Ultraviolet and X-Ray Bombard- (NSF)</td>
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<td>J. A. R. Samson</td>
<td>Interaction of Radiation with (NSA)</td>
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<td>D. J. Sellmyer</td>
<td>Structure-Property Relations in (NSF)</td>
<td>$30.7</td>
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<td>D. J. Sellmyer</td>
<td>Physics of Thin Films (Dale Elec- (NSF)</td>
<td>$4.2</td>
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<td>J. W. Weymouth</td>
<td>Magnetic Data from Mississip- (National Park Service)</td>
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<tr>
<td>J. W. Weymouth</td>
<td>Magnetometer Survey of Fort (Nebraska Game &amp; Parks Commission)</td>
<td>$2.1</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>$1,196.7</td>
</tr>
</tbody>
</table>

1984 Faculty Publications

ASTRONOMY AND ASTROPHYSICS


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


WIRSC, Joan 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 tale?" (Editor’s Note: Yes, please write further.)

WITTEN, Dr. Maurice H. (M.A. 1969) 101 West 33rd Street, Hays, KS 67650. Is Professor and Chairman of Physics at Fort Hays State University. Will be receiving his 25th year of service medal at the end of this year. Has been Chairman for last 15 years. Received his Ph.D. from the University of Iowa in 1967.

ZIEGLER, James (Ph.D. 1977) 1859 La Colina Rd., San Diego, CA 92115. 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. 1936, M.A. 1939, Ph.D. 1946) died December 24, 1984 at age 49 in Colorado Springs, CO. He was a space scientist for Martin Marietta Aerospace Corp. in Denver.


JENSEN, Herbert (Ph.D. 1959-1969) "Died January 18, 1983 peacefully on the train in West Germany with physics on his mind and doing "a peace conference." Mrs. Selchow-Jehle also said she was "a good person and very kind."" Also died in Spring 1985.

OBERRECK, 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. Bale (B.S. 1949, M.A. 1951, Ph.D. 1954)
Walter F. Gorenboe, Jr. (B.S. 1956, M.A. 1960)
William C. Keller (B.S. 1981)
Dr. Franco Serricci
Victor C. Smitth (Ph.D. 1977)

UNL Graduate to Work on Space Telescope

Dr. Donald F. Schneider (B.S. 1970) 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 at 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.