Department of Astronomy. 1957/2001

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The stuff of stars: Galaxy has hot corona

Terry Devitt

With the help of a new satellite capable of finding the telltale, superheated gas created by stars that exploded long ago, scientists have confirmed a 40-year-old theory that the Milky Way is swathed in a corona of hot gas.

The discovery is important because it provides strong evidence that supernovas continuously pump extremely hot gas atoms high into the galactic halo, a nebulous region far above the plane of the galaxy. It fleshes out astronomers' ideas of how the material that makes up all the stars in the galaxy is recycled and confirms a hypothesis that the galaxy has a hot corona or halo, an idea first postulated nearly 45 years ago by renowned astronomer Lyman Spitzer.

The new finding was based on data from NASA's new Far Ultraviolet Spectroscopic Explorer (FUSE) satellite and was presented this month at a meeting of the American Astronomical Society by astronomer Blair D. Savage.

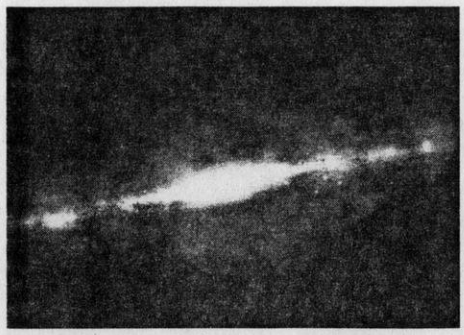
The existence and origin of hot gas in the halo of the Milky Way, says Savage, has been the subject of polite debate among astronomers since Spitzer proposed the idea in a pioneering paper in 1956. Previous observations hinted at the presence of the gas, but convincing evidence has now emerged with observations from FUSE, which show the presence in the corona of an oxygen atom known as oxygen VI.

With FUSE's ability to sample ultraviolet light in a nearly unexplored region of the electromagnetic spectrum, Savage and his collaborators captured light from distant quasars and other energetic extragalactic sources that had passed through the clouds. With this technique, the astronomers were able to infer the presence in the halo of oxygen VI and obtain its diagnostic spectral signature.

"Oxygen VI is a very sensitive probe and almost certainly indicates the existence of gas with temperatures approaching half a million degrees Fahrenheit," says Savage of the ionized oxygen atoms.

Oxygen is ubiquitous in the galaxy, and oxygen VI, says Savage, is an extremely important diagnostic because it can shed light on the violent processes of star death. The atoms observed by FUSE are believed to have been heated by supernova explosions to extremely high temperatures and blasted from the star-rich plane of the galaxy to its halo in a fountain of gas.

"One can gain many clues to how the galaxy works by studying gas like this," says Savage, who notes that atmospheric scientists gain important insights into Earth's climate and weather by studying aspects of the planet's upper atmosphere. Similar insights into the intricate workings of the galaxy can be derived from a better understanding of the nature and composition of the galactic halo.



This image shows the corona of the Milky Way and the irregularly distributed clouds of superhot oxygen. The extremely hot ionized oxygen was probably blasted from the star-rich plane of the galaxy by exploding stars or supernovas. The corona's existence, confirmed by university scientists, helps explain how the galaxy recycles the stuff of stars.
Photo: Courtesy of NASA

The clouds of ionized oxygen appear in almost all directions and extend as much as 5,000 to 10,000 light years away from the plane of the Milky Way, the region of the galaxy where most stars and other objects reside. The astronomers used the ultraviolet light from a dozen distant but very energetic objects — quasars and active galactic nuclei — like flashlights to shine through the gas clouds. Because light is absorbed at certain known wavelengths by elements such as oxygen along a line of sight to a distant light source, astronomers can deduce features that would otherwise be hidden from view.

"We can see the absorption of light by highly ionized oxygen, and what we are seeing tells us there is a lot of it out there and that it is irregular in its distribution," says Savage. "There is more in some directions than others."

Some astronomers had believed that the gas in the halo might be far colder. The fact that the FUSE results confirm that the gas is hot and extends great distances away from the disk, tells astronomers something about how it got there.

"When a star explodes, it heats the gas around it to a high temperature, creating pressure which pushes the gas up beyond the plane of the galaxy," explains Savage.

The gas bursts out of the plane of the galaxy in what astronomers call a "galactic fountain." Over time, the gas cools and flows back toward the plane of the galaxy where it becomes raw material for new stars.

FUSE, launched into Earth orbit in June of 1999, is designed to sample light in the ultraviolet region of the electromagnetic spectrum. Such light is impossible to detect from Earth and must be captured from telescopes launched above the Earth's atmosphere. Instead of taking pictures like telescopes, the satellite looks at spectra, the constituent wavelengths of light.

FUSE was built and is operated by The Johns Hopkins University for NASA in collaboration with the space agencies of Canada and France, and three universities. ■

Astronomers capture star cluster baby pictures

Terry Devitt

Peering deep into a distant galaxy, astronomers have obtained a glimpse of what may be the youngest massive star clusters ever observed.

The discovery, announced at a meeting of the American Astronomical Society by astronomers from UW-Madison and the University of Colorado, is important because it provides astronomers with a look inside stellar nurseries at massive clusters of stars in their infancy.

Estimated to be as young as 500,000 years, the star clusters are in the very earliest stages of development, analogous to the first day of life in human terms, the astronomers say.

"This is exciting because it may reveal the types of environments where globular clusters form," says Henry (Chip) Kobulnicky, a UW-Madison astronomer. "No one has ever seen a star cluster of any type, much less a possible globular cluster, at such a young age."

The discovery was made with the help of the Very Large Array (VLA), a huge, highly sensitive radio telescope located near Socorro, N.M. Using the VLA, Kobulnicky and colleague Kelsey Johnson of the University of Colorado, were able to look deep into a galaxy known as Henize 2-10 and penetrate obscuring clouds of dust and ionized gas surrounding at least five clusters consisting of hundreds of young, massive stars.

Common in galaxies, star clusters are tightly packed groups of hundreds to thousands of stars that are much more luminous and massive than the sun. Their ages are typically estimated to be several million years old. Globular clusters are similar, but older — 8 to 12 billion years — and consist of stars more like the sun.

Free of the obscuring clouds of dust and gas found around stars in the earliest stages of their existence, most star clusters can be seen with conventional optical telescopes. However, stars coming to life within cocoons of dust and gas are hidden from view, but can be detected by the radio waves that pass through the obscuring clouds.

What the Wisconsin-Colorado team observed, says Kobulnicky, were five clusters of stars with an estimated 500 to 1,000 massive stars each in Henize 2-10, a galaxy located 32 million light years from Earth in the constellation Pyxis. Packed into relatively small areas of space — roughly an area the size of the distance between the sun and Alpha Centauri, the star nearest the sun — such dense clusters of massive stars are believed to evolve over billions of years into globular clusters such as the ones that orbit the Milky Way.

Knowing about the first stages of their development, says Kobulnicky, is important because it will provide some insight into how such objects, which appear to be common in all galaxies, come into being. ■

NEWSMAKERS

Here's a small sample of the faculty and staff who each week are spotlighted by the media. For more visit: http://www.news.wisc.edu/inthenews/index.html.

Parasitic wasps: The farmer's friend

Parasitic wasps are handy allies of some farmers, who rely on them to feed on flies in chicken coops and other barn areas. But many wasps don't survive the cold of winter. Insect researchers are now finding the secrets of those that do, discovering that wasps siphon off antifreeze from their hosts, allowing them to survive the deep freeze. It isn't known yet if this is common behavior among parasitic insects. "We don't know if it's the rule or the exception," **Michael Strand**, professor of entomology, tells New Scientist (Jan. 8). But applications could be useful to help farmers breed wasps for year-round insect protection.

Blame the cold weather?

The blame for Robert Falcon Scott's failed 1912 expedition to the South Pole has traditionally been laid on Scott's poor planning. But Science News (Jan. 1) reports that meteorological data are causing scientists to have some new compassion for what Scott faced, which was apparently uncommonly cold weather, even for Antarctica. "They were just absolutely freezing to death," says **Charles Stearns**, a UW-Madison meteorologist, of the team led by Scott, who died trying to return from the polar region. "I think if it had been warmer, they'd have made it back." Work by scientists has confirmed that temperatures at the time stayed below -30 degrees Fahrenheit for more than a month, an exceedingly cold spell during the South Pole's mildest season.

Internet 2: A worldwide classroom

During the fall semester, computer science professor **Lawrence Landweber** used the subject of his lectures — the Internet — to link students in Madison to colleagues at a university in Japan. The course linked the two groups of students over high-speed lines across the new Internet 2, a network being developed for research and education. "We could communicate as if we were in the same classroom," Landweber tells the New York Times (Dec. 30). Students had to be flexible to make the joint course, co-taught by a Japanese professor, a reality — American students showed up at 7:30 p.m. for a morning lecture in Japan, and Japanese students tuned in late at night for Madison lecture times. But Landweber considers the experiment an important step. "To me the Internet is not just about going and getting files from web servers," he says. "I want to get students talking to each other."

Government: Not all bad

A study shows that the government doesn't fare nearly as badly in dealing with customers as its reputation might suggest. In fact, most consumers list their interactions with agencies of the federal government as only slightly less favorable than similar interactions with private companies, reports the Washington Post (Dec. 14). Still, professors asked to respond to the survey cautioned against reading too much into the data, partly because agencies selected the customer segments they wished to hear from, rather than surveying the public at large. **Donald Kettl**, a professor of political science who has studied government reform, says that regardless of what the survey says, the government should be doing more to improve its relations with the public. "The government has a choice in how it structures relationships with citizens, and other things being equal, these relationships ought to be the easy way, not the hard way," he says.

ADVANCES

Advances gives a glimpse of the many significant research projects at the university. Tell us about your discoveries by e-mailing: wisweek@news.wisc.edu.

Gas clouds seed galaxy

Massive clouds of gas, discovered long ago but only recently identified as being within the margins of the Milky Way, play a key role in the ability of the galaxy to churn out new stars by raining gas onto the plane of the galaxy, astronomer **Bart P. Wakker** and colleagues suggest, chipping away at a three-decade-old mystery. The team has discovered a mechanism by which the galaxy is seeded with the stuff of stars and solved a long-standing question of galactic evolution. "You don't need any other explanations anymore," Watkins says, "because we now know that this gas is raining down onto the plane of the galaxy."

AIDS variability explained

Scientists working with monkeys have taken another step toward developing a vaccine for AIDS: They have discovered new evidence explaining why retroviruses such as HIV in people and SIV in rhesus monkeys are so variable and difficult for the body's immune system to target and kill. A key finding: Killer cells called cytotoxic T lymphocyte cells (CTLs) likely play a greater role than previously thought in controlling infection in both humans and monkeys, says **David I. Watkins**, professor of pathology and laboratory medicine. The finding is another step toward the development of effective vaccines to prevent AIDS.

Path to dairying takes detour

Compared with established dairy farmers, new dairy farmers in Wisconsin are much less likely to be taking over the farm from their parents, and they're more likely to use off-farm income to supplement their farm income, according to researchers with the Program on Agricultural Technology Studies. The findings contradict long-held assumptions about Wisconsin's dairy farmers, and how farms pass from generation to generation, says researcher **Douglas Jackson-Smith**. Only 18 percent of new entrants farmed land that was part of their parents' farms, versus 62 percent of established farmers. New entrants were more likely than established farmers to run single-family or individual operations (85 percent versus 72 percent).

Ergonomics gets attention

Workplace ergonomics, in the national spotlight with new standards proposed by the Occupational Safety and Health Administration, are a prominent research focus at the university. **Robert Radwin**, chair of the Department of Biomedical Engineering, is a member of a National Academy of Sciences panel on musculoskeletal disorders and the workplace, and he has done influential studies on carpal tunnel syndrome and other work-related disorders. **Pascale Carayon** and **Michael Smith**, industrial engineering professors, ran projects at the Wisconsin Department of Transportation and Lands' End, respectively, that reorganized office space to produce a better ergonomic fit for employees.

Web-surfer, heal thyself?

Professor **Patricia Brennan** says the Web is driving big changes in the doctor-patient relationship and placing more responsibility with health care consumers. "Patients are now required to be smart — they no longer have a choice," says Brennan, an industrial professor of nursing and engineering. "There is a bigger assumption now that patients are getting more health information online." The long-term trend, Brennan says, is that more health care information will migrate from the hospital to the community.

Governor sees 'biotech revolution' in the making

Brian Mattmiller

Gov. Tommy Thompson's fast-paced tour Nov. 30 through the biotechnology landscape at UW-Madison, from computer-packed genetics labs to nascent startup companies, was a showcase of great expectations.

Perhaps none are greater than Thompson's, who wants Wisconsin to emerge as a national leader in biotechnology development. Throughout the day, Thompson got a look at the intellectual works in progress that could make that expectation a reality.

"The competition is on," Thompson proclaimed early in the day at the university's Biotechnology Center. He told the story of a recent summit of Midwestern governors, in which his counterparts in Iowa, Michigan and Pennsylvania all claimed to be regional leaders in biotechnology.

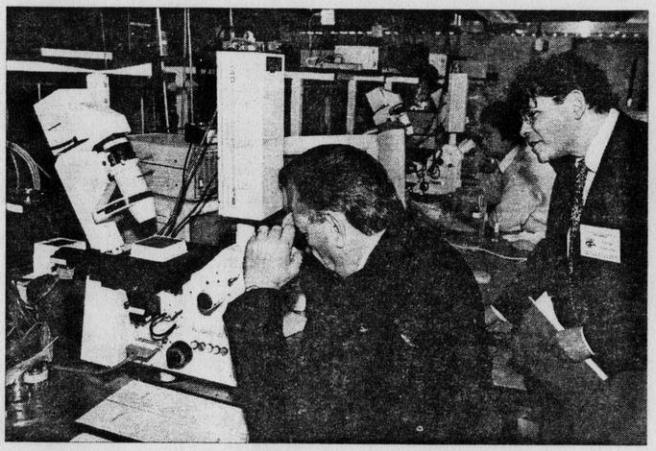
Thompson urged the gathering of scientists and administrators to be aggressive in promoting this field of the future. "Where will Wisconsin's niche be (in biotechnology)?" he asked.

There were clues scattered throughout the visit.

At the Biotechnology Center, Thompson toured the lab of new professor David Schwartz, who developed an "optical mapping" technology that can map whole genomes with remarkable speed. Thompson also viewed a new "gene chip" technology developed here that could make DNA analysis cheaper and more accessible to scientists.

At University Research Park, he heard the stories of three entrepreneurs who turned UW-Madison scientific advances into thriving companies. One of them, called Tetrionics, began a decade ago as a small, high-risk company developing drugs for osteoporosis and cancer. Today, it's poised to enter a new $5 million, 24,000-square-foot building at the park with potential for 65 employees.

Provost John Wiley noted how quickly investments can pay off in this field. The $1.5 million bioscience initiative, spearheaded by Thompson last year, "has paid just staggering dividends in a year's time," he said. The initiative, which allowed for the hiring of eight new faculty, is directly responsible for nearly $30 million in additional research grants and contracts secured by faculty, Wiley said.



At the university's Biotechnology Center, Gov. Tommy Thompson peers into a microscope at the lab of new professor David Schwartz, right, who has developed an "optical mapping" technology that can map whole genomes with remarkable speed. Thompson also viewed a new "gene chip" technology developed here that could make DNA analysis cheaper and more accessible to scientists. Photo: Jeff Miller

The total funding within biotechnology, which includes the Laboratory of Genetics and the new Genomics Center, now totals more than $57 million and is growing rapidly. In the last year alone, research produced 30 faculty-initiated patents.

"This is an expensive venture," said Michael Sussman, director of the Biotechnology Center. "But we have been successful in bringing in the kind of money and talent needed to succeed .... The genomics pot is boiling, and there is a revolution happening in the way we do biology."

Other developments on the horizon include the Waisman Center's Translational Research Facility, expected to be completed in fall 2000. It will be one of the only places in the country capable of producing gene therapy products "clean" enough for use in human clinical trials.

Terrence Dolan, director of the Waisman Center, said this new building will help drive the center's ultimate goal of curing the myriad genetic diseases that affect children. There are anywhere from 6,000 to 7,000 genetic diseases that affect human health, he said.

Thompson also heard about a proposal to create a new master's-level training program in biotechnology. The program would fill a huge gap in the training of highly skilled technicians and create a quality work force that would be a tremendous advantage to Wisconsin industry.

Apparently, excitement over biotechnology is starting to spread. Wiley noted that 30 percent of 1999 UW-Madison freshman intend to major in biology. ■

Hospital to test potential cancer treatment

The Comprehensive Cancer Center expects next week to begin a clinical trial of the first human test of endostatin, a naturally occurring protein and potentially promising cancer treatment that has been shown to cut off the blood supply to tumors in mice.

Chosen as a study site last March by the National Cancer Institute, the center recently received approval to begin the tests. The CCC is one of three locations selected for the trial.

"Participating in this cancer treatment study is an honor and exciting privilege for the UW Comprehensive Cancer Center," says George Wilding, professor of medicine and principal investigator of the Experimental Therapeutics Program.

"Nothing would make us happier than to find a potentially revolutionary form of cancer treatment in humans. At the same time, we cannot overstate how often that humans have failed to respond to treatments that have shown promising results in animals."

Endostatin's potential value as a cancer treatment received considerable attention after a May 1998 New York Times article described early results in mice in the laboratory of Judah Folkman of Harvard Medical School. In these animal studies, endostatin inhibited the growth of existing tumors and caused some to shrink to microscopic lesions. When researchers examined these tiny lesions, they found endostatin had blocked the growth of blood vessels that nourished the tumors.

James Thomas, assistant professor of medicine at the Medical School and chair of the CCC's endostatin study, says that endostatin is one of several potential cancer treatments known as angiogenesis inhibitors — drugs that halt the creation of blood vessels that keep tumors alive.

"If endostatin is effective, it would represent a whole new approach in cancer treatment," Thomas said. "Instead of killing the cancer cells, which we typically do with chemotherapy or radiation, we want to know if cutting off a tumor's blood supply represents a form of treatment that might prevent the spread of cancer without the toxicity associated with existing radiation or chemotheraphy treatments."

Wilding says the scope of this study, known as a phase one clinical trial, is limited to finding a safe dosage for humans, not determining effectiveness as a cancer treatment. Treatment effectiveness would be examined in phase two and phase three trials, if they occur, and would not begin for one to two years.

In concert with standard clinical trial procedures, patients for the university's endostatin study will be selected from cancer patients who have already been treated by or referred to a medical oncologist at the Medical School; have advanced solid tumors (not leukemia or myeloma) for which no known beneficial therapy exists; and have a cancerous tumor that is easily accessible to repeated biopsies.

The identity of the 15 to 30 patients selected to participate in the CCC's endostatin study will be kept confidential.

More information about the CCC's endostatin study: 262-8330. ■

MILESTONES

HONORED

Tonya Brito, an assistant professor of law, and **Dionne Espinoza**, assistant professor of women's studies and Chicana/o studies, each have received an $8,000 Minority Faculty Research Award. The UW System Institute on Race and Ethnicity granted the awards, which are designed to release non-tenured faculty to conduct research for one semester. Brito's research is titled "Does Law Matter? A Preliminary Study of Negotiating and Disputing in the Context of Open Adoption." Espinoza's work is titled "Typologies, Topographies, or Trajectories: The Roots (and Routes) of Chicana Feminisms, 1965-1980."

Vanessa Northington Gamble, an associate professor of history of medicine, received a Category A Research Grant of $2,000 from the institute for her research, "Black Women Physicians in Twentieth Century America."

The College of Engineering will honor four outstanding faculty and staff members during the 52nd annual Engineers' Day Friday, Oct. 15. **Raymond J. Fonck**, a professor of engineering physics, will be presented with the Byron Bird Award for Excellence in a Research Publication. **Sindo Kou**, a professor of materials science and engineering, and **Wei-Yin Loh**, a statistics professor, each will receive the Benjamin Smith Reynolds Award for Excellence in Teaching. **Karen A. Walsh**, director of the Engineering Communications Office, will receive the Bollinger Academic Staff Distinguished Achievement Award.

Kristin Kearns, a research assistant in astronomy, and **Mary Lee**, a fellow in plant pathology, each received a 1999 Ruth Dickie Scholarship of $3,000 from the Graduate Women in Science Beta Chapter at UW-Madison. **Cristina Lazaro-Perea**, a research assistant in psychology, and **Monica Remington**, a graduate student in medical microbiology and immunology, each received a $500 Ruth Dickie Grant-in-Aid award.

Larry Rittenberg, professor and chair of the Business School's Department of Accounting and Information Systems, was named vice president-elect/finance of the American Accounting Association.

Stephanie Robert, assistant professor of social work, has been chosen to participate in the Hartford Geriatric Social Work Faculty Scholars Program of The Gerontological Society of America. She is one of 10 scholars nationally to receive a $100,000 grant designed to develop outstanding social work scholars committed to teaching, research and leadership in geriatric care. Robert will examine aspects of "Family Care," Wisconsin's new long-term care redesign program.

Gene Summers, professor emeritus, received the Distinguished Rural Sociologist award during the Rural Sociological Society's 1999 annual meeting. The honor recognizes his career accomplishments in research, teaching, outreach and public policy. **Fred Buttel**, professor and chair of rural sociology, received an Award of Merit from the Society's Natural Resources Research Group for his contributions to the theory of environmental sociology.

PUBLISHED

Cynthia Miller, assistant professor of Hebrew and Semitic studies, recently edited and wrote the introductory chapter to a book of essays by international scholars, entitled "The Verbless Clause in Biblical Hebrew: Linguistic Approaches" (Eisenbrauns, 1999).

Steve Paddock, associate scientist in molecular biology, edited the book "Confocal Microscopy Methods and Protocols" (Humana Press, 1998).

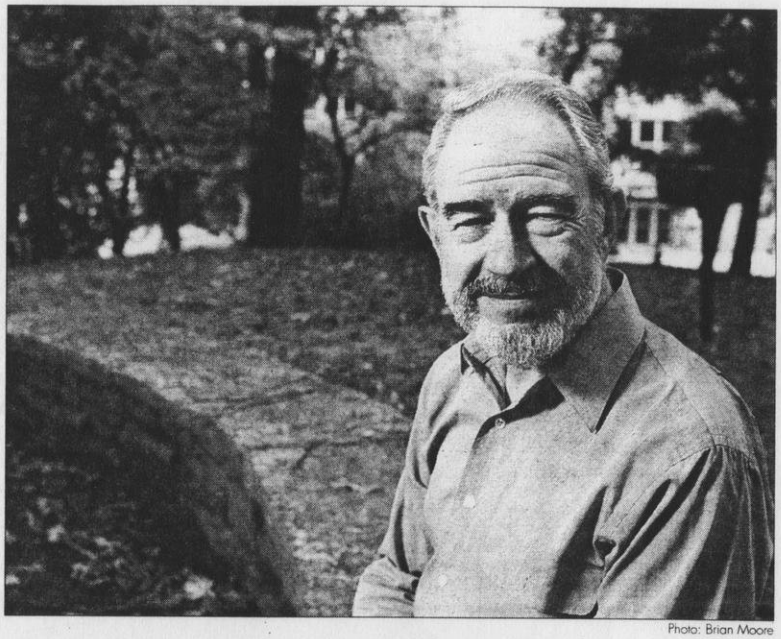


Photo: Brian Moore

Emeritus status gives professor a portal to new worlds

Jeff Iseminger

If the word "emeritus" evokes images of professional fade-out in your mind, then you need a bracing dose of Herbert Lewis, who's showing how magnificently manifold are the possibilities in the Land of Emeritus Living.

Lewis, 65, became an emeritus professor of anthropology in 1996 after serving on the UW-Madison faculty for 33 years. Since then he's managed to unearth a treasure-trove of long-lost documents on Oneida Indian life, write a major journal article that's stirred some controversy, begin work on a new book and attend lectures of all kinds.

What he's not attending is important, too. "I certainly don't miss faculty and committee meetings," says Lewis with a smile. Even more time was freed up when his 38-year teaching career came to a close in December 1998, time he's invested in research, writing and learning.

"I really want to learn," he says, "and I enjoy this feeling that I choose what I do." He has chosen, for instance, to attend a conference on the Iroquois this month in New York state, so he can learn more about the peoples of that ancient confederacy.

His interest in the Iroquois was piqued by his recent adventure involving the Oneida of Wisconsin, a branch of one of the five original Iroquois nations. Lewis uncovered a remarkable body of work written by members of the Oneida Nation in both English and the Oneida language.

A carton he discovered in the Department of Anthropology's storage contained 167 notebooks filled with descriptions of Oneida life from the 1880s to 1940. The accounts were produced by more than a dozen Wisconsin Oneida Indians who wrote them in 1940-41 as part of the Federal Writers Project, funded by the Works Progress Administration of the New Deal.

Lewis believes that the notebooks were forgotten when the anthropologist in charge of them, H. Scudder Mekeel, died suddenly of a heart attack in 1947. Lewis and other UW-Madison representatives presented a copy of all the notebooks to the Oneida Nation last spring, with the originals going to the State Historical Society.

"Because the notebooks were written by the Oneida themselves on so many aspects of their history and culture and involved so many voices, there is no parallel to it in American Indian collections," says Lewis.

Lewis did most of his own fieldwork in Ethiopia and Israel, but that doesn't dull his curiosity about the Oneida. On the contrary, he says, "An anthropologist should know about comparative cultures and be comfortable in moving from one to another."

The allure of other cultures took hold early in Lewis' life. His mother took him one fateful Saturday to a film program for young people at the Museum of Modern Art in New York. There he was entranced by the Robert Flaherty films "Nanook of the North" and "Moana of the South Seas."

"It seemed fascinating to me as a child — and it still seems fascinating — that there are so many different ways of being human," says Lewis. "I began to see not only the variety of cultures, but also the common humanity. People from other cultures were not strange, exotic creatures, but fellow humans with alternative ways of looking at things."

But it wasn't until his junior year at Brandeis University that Lewis discovered there was a discipline that studied comparative cultures. "The minute I opened up my textbook for an introductory course on cultural anthropology, I knew I wanted to become an anthropologist," he says.

He went on to earn his doctorate at Columbia University, a place of portentous intersections for Lewis and modern American anthropology. It was there that Franz Boas taught anthropology from 1896 until his death in 1942. Boas dominated American anthropology for decades through his scholarship and teaching. Among his many doctoral students were Margaret Mead, Ruth Benedict and Edward Sapir.

And Boas still reverberates through Lewis' career. Boas is mentioned frequently in an article by Lewis published in September 1998 by the American Anthropologist, the journal of the American Anthropological Association. Titled "The Misrepresentation of Anthropology," the piece is a reasoned-but-passionate defense of earlier anthropologists such as Boas.

Lewis' broadside — which he plans to expand into a book — was prompted by 30 years of attacks on "traditional" anthropology from several perspectives, especially Marxist and postmodernist. These critics said that anthropologists working before the 1970s "exoticized" other cultures and rendered them timeless by ignoring their histories and considering them in unrealistic isolation from each other.

These charges are not only untrue, says Lewis, they "delegitimize the field and discourage newcomers from benefiting from the many lessons it has to teach about the world."

His current projects include research on the work and personality of Boas, using the archives at the American Philosophical Society in Philadelphia. "I was reading history there," says Lewis. "When I found letters, lectures and unpublished papers by Boas that contradicted received opinion, it was wonderful — it was discovery.

"The greatness of the man is striking. If I were younger, I would try to write his biography."

Lewis has two more papers on Boas in process, plus a review article about dictionaries and encyclopedias of anthropology and cultural and critical studies soon to appear in the American Anthropologist.

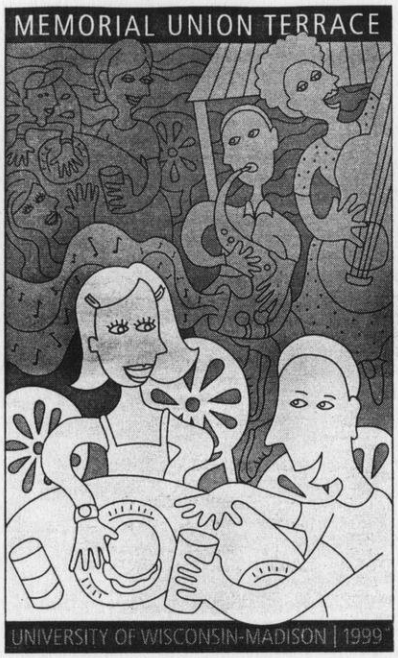
Emeritus status also gives Lewis more time for island-hopping. He and his wife, Marcia Lewis, traveled recently to the U.S. Virgin Islands, where he did fieldwork as a graduate student, and they hope to visit Martinique, another site from his work in the '50s. And they have children to visit: Tamar, a lawyer and fundraiser for WGBH public television in Boston; Paula, a librarian in Silver Spring, Md.; and Josh, a comedian, actor and writer in New York City.

Lewis still sings in the UW-Madison Choral Union, loves the theatre (he's appeared in three University Theatre productions) and would play more racquetball if he could find a partner. He also attends meetings in the United States of expatriate Oromos, the people he studied in Ethiopia.

No matter the setting — Oromo or Oneida or some other way of looking at life — Lewis carries with him an unslakeable anthropological curiosity that still serves him well as an emeritus.

"Wherever I am," he says as he extends his arms palms-up, "I'm interested in the culture of the people who live there." ■

Astronomy



Courtesy Wisconsin Union

New terrace T-shirts available:

Two new Wisconsin Union T-shirts are now on sale. One is a Picasso-esque design depicting summer fun at the Memorial Union Terrace. The other, a turtle with the Terrace chair-back for a shell, is the first Wisconsin Union T-shirt designed for kids.

"We are really excited about the new shirts," said Tricia Ring, Wisconsin Union assistant retail director. "The new designs are more artistic renderings than in the past, but we think they will rival the design of the multi-colored chair-backs as the most popular collectible shirt over the last five years." The new shirts, designed by Janet Trembley of the Wisconsin Union graphics department, cost $16 for adults — in M, L and XL — and $11 for children. Both are available at the Essentials Store in Memorial Union or the Corner Store at Union South. The new shirts, as well as some of the old favorites, will be on sale on various weekends on the Memorial Union Terrace during the summer.

Management program, are polling residents about their usage of and attitudes toward the lake. They also are exploring which management steps would improve Wingra.

Kenneth Potter, a civil and environmental engineer who oversees the project, says Wingra is nothing like what it was a century ago. It used to be primarily spring-fed, but now is fed mostly by surface run off. The change has caused a big increase in sediment and algae blooms. The students will look into new methods to increase groundwater flow and make bank improvements around the lake.

International Studies refines procedures for emergencies

In a crisis, people may hunker down instead of reaching out, a natural act of self-defense. But the best defense may be offense, scanning the landscape to decide whether the danger is real and looking for help if it is.

That's one principle incorporated into new guidelines for managing emergencies involving students in study-abroad programs, if and when they occur.

They were written by Joan Raducha, assistant dean and director of International Academic Programs (IAP) for the Office of International Studies and Programs. Her staff oversees most of the university's study-abroad programs and provides advice on the safety of the people in them.

"Careful planning at the beginning of a study-abroad program and regular review of the sites is the best strategy for success," says Raducha. "But we need to be prepared in the event that emergencies arise, as they can anywhere — in Madison or Manila or Madrid. Now, if an emergency arises, we have standard procedures that my staff and study-abroad program leaders can follow."

IAP programs in about 60 countries support study abroad for around 600 students a year, plus some faculty and staff. The number of IAP participants has roughly doubled every 10 years since 1961, when the first program opened. That growth was one reason Raducha has refined IAP procedures.

The guidelines are not meant to be a straitjacket, but simply a reminder of which questions to ask and where help might lie. They touch on scenarios and questions ranging from a student becoming seriously ill (Does the attending physician speak English?) to one being taken hostage (Who is the contact person and what is the phone number at the U.S. Embassy?).

"We will be able to use this operations manual to stop rumors if the emergency is false," says Raducha, "or to advise students if it's real."

The distinction between real and "perceived" emergencies is key to Raducha's staff. Real ones include political demonstrations, natural disasters, accidents or personal assaults. Perceived emergencies can arise from sensationalized reporting of an event abroad or the distortion of information sent from a student to family back home. For a copy of the procedures, call 262-2852; e-mail: wohlers@mail.bascom.wisc.edu.

RESEARCH

Hubble image selected by four with UW ties

Courtesy NASA

Four scientists with university ties helped select the image of a polar ring galaxy that has become the newest Hubble Heritage image to be released by the Hubble Heritage Project.

The galaxy was chosen by popular vote from among three possibilities posted at the Hubble Heritage web site. The team of scientists who guided the selection of the galaxy, known as NGC 4650A, consists of UW-Madison astronomy professors Linda Sparke and John Gallagher; UW-Madison alumna Lynn Matthews, a native of Green Bay and now of the National Radio Astronomy Observatory; and Lancaster native Anne Kinney, also a UW-Madison alumna and a leader of the Hubble Heritage Project.

NGC 4650A is known as a "polar ring" galaxy because it has two disks, a plane of stars much like our Milky Way and, at nearly right angles, an outer disk configured in a polar orbit. The second, larger disk was probably formed in a galactic collision. Because it extends far above the inner disk, it can serve as a probe of gravitational forces in the outer halo of the galaxy, a neighborhood where scientists think invisible dark matter lurks.

The image of this rare but beautiful type of galaxy can be obtained from the Space Telescope Science Institute at the Hubble Heritage Project Web site at http://heritage.stsci.edu. High-density images of this and other objects photographed through Hubble can be seen at the Space Telescope Science Institute news Web site at http://oposite.stsci.edu/pubinfo/pr.html

The Hubble Heritage Project is an effort by the Baltimore-based Hubble Space Telescope Science Institute to build a bridge to better public understanding of astronomy and astrophysics by inviting the public to help select objects for observation.

ON CAMPUS

Recordings on sale May 19-20

The Friends of the UW-Madison Libraries will sponsor a sale of recorded material in 124 Memorial Library May 19-20 from noon to 7 p.m. each day.

Records, cassettes, CDs and miscellaneous print music materials have been donated for the sale. Some 78 rpm records also will be available.

Proceeds from the sale of the donated music items will go to the friends group, which supports activities at campus libraries.

Information: 265-2505.

NOTABLE

Judith Rose dies at 62

Judith Rose, 62, who was assistant vice chancellor for health sciences at UW-Madison for 11 years, died of cancer Tuesday, May 4.

Rose retired in 1996. She had been director of admissions at University Hospital from 1981 to 1983, and also worked as a social worker and with the Carley Capital Group.

She served on many community organizations. For example, Rose was president and on the board of directors of the Visiting Nurse Service.

Rose is survived by her husband, Jim Stern, two sons, a stepson and a stepdaughter. A memorial service is scheduled Saturday, May 22, at 2:30 p.m. at Christ Presbyterian Church, 944 E. Gorham St.

NEWS MAKERS

SAVING THE LIBERAL ARTS?
Some attendees at the Modern Language Association's national meeting in Madison say the master's degree will become as crucial a degree as the B.A. became after World War II, reports the Chronicle of Higher Education (Monday, April 19)

Chancellor **David Ward** called the master's degree one solution to the preservation of the liberal arts, and urged departments to consider cross-disciplinary programs in which, for example, a business major might get a master's degree in a one-year foreign-language immersion program.

The key for the humanities, Ward says, "is to move beyond critique, move beyond angst and come up with some concrete ways that those of us who want to help can."

BIOTECH'S PROMISE
Appearing on National Public Radio's "Talk of the Nation" (Friday, April 30), biotechnology center director **Michael Sussman** describes how researchers are moving away from the traditional use of plant biotechnology — to produce more, bigger, better crops — to engineer crops that produce specific substances with health or nutritional benefits.

The research could lead to other advances, Sussman says: "Seeds are the ultimate protein factories, and if, for example, we can produce insulin — if we can take the insulin genes and get them expressing insulin in seed, basically make tofu, and you'd have a very important enzyme that people need. That's the dream, and we're just beginning in this area."

FRAGMENTS OF DIFFERENCE
In the spring issue of Dissent, a quarterly magazine of politics and culture, history professor **Linda Gordon** argues that focusing on differences has divided feminism and other social and academic movements. "It is not the articulation of many different axes of oppression that is problematic," she writes, but rather "the solipsism of these identities."

That, she says, isolates a movement's authors from one another and discourages them from identifying broader, more complex historical patterns. In the fragmentation of feminism, Gordon says, many women of color identified more strongly with their race than with their gender, and a new group of differences was born.

Gordon concludes that the emphasis upon difference hampers "the imagining of a larger community without inviting analysis of these social fractures or strategies for how to make them less oppressive," while suggesting that "communication is impossible."

PLANTS: DEERLY DEPARTED?
Botany professor **Donald Waller's** stance on the exploding deer population is drawing international attention from Reuters (Wednesday, April 21) for following in famed naturalist **Aldo Leopold's** footsteps. Both men called for reducing the number of deer to limit the havoc they're wreaking on the Wisconsin environment.

There are about 1.4 million deer in Wisconsin, with density in northern Wisconsin forests between 20 and 30 deer per square mile. The ideal, in terms of their impact on plant life, would be 10 to 12 per square mile. As a result, some native plant species have been eaten — or, to use the zoological term, "browsed" — almost to extinction, Waller says.

Astronomy

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NEWS

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EMARGOED FOR RELEASE: 9:20 AM CDT, Monday, May 31, 1999

NOTE TO PHOTO EDITORS: High-resolution images of the starburst galaxy can be downloaded at: http://www.news.wisc.edu/newsphotos/ngc7673.html

NEW WIYN TELESCOPE IMAGE DISSECTS A STARBURST GALAXY

CHICAGO -- In the galactic zoo, starburst galaxies are some of the more intriguing types of galaxies because of the furious pace at which they create new stars.

Nearby examples of luminous starbursts often have blue cores and peculiar diffuse outer structures. These may reveal the origins of starbursts - phases of hyperactive star formation -- and shed light on the big picture of galactic evolution.

New images captured by the 3.5 meter WIYN Telescope on Kitt Peak, Ariz., depict the galaxy NGC 7673, including (top) its clumpy core, which contains massive clumps of young stars and more nebulous ripples in its outermost stellar disk. The inset or bottom image shows a view of the same galaxy with the core stripped out to better depict the inner structure of NGC 7673. The galaxy is located in the constellation Pegasus and is some 150 million light years from Earth.

Astronomers do not know precisely what causes starburst galaxies or where the stars in the outer ripples come from, although both phenomena in collisions between galaxies. The stellar ripples may come from stars that have been bumped off course within NGC 7673 or, alternatively, they may come from beyond the galaxy -- perhaps from a much smaller galaxy nearby --pulled in by the galaxy's massive gravitational forces.

The image shows the galaxy long after any collision, and the galaxy will eventually settle down to a more mundane lifestyle with reduced star formation levels, and may one day even resemble a normal spiral galaxy like the Milky Way.

The WIYN Telescope was built and is operated by a consortium that includes the University of Wisconsin-Madison, Indiana University, Yale University and the National Optical Astronomical Observatories, an arm of the National Science Foundation.

The team of astronomers that made this observation of NGC 7673 includes UW-Madison graduate students Nicole Homeier and Chris J. Conselice, and UW-Madison astronomy Professor John S. Gallagher III.

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-- Terry Devitt (608) 262-8282

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FOR IMMEDIATE RELEASE 1/13/92

CONTACT: John P. Finley, (608) 262-9387; Hakki Ogelman, (608) 265-2052

WISCONSIN SCIENTISTS DISCOVER A HOT SPOT ON A PULSAR

ATLANTA -- Scientists from the University of Wisconsin-Madison reported today the discovery of a pulsar with a "hot spot" on its surface, a finding that seems to pinpoint the source of the distinctive pulsations of energy that give pulsars their name.

Using the X-ray satellite ROSAT to measure the surface temperature of a nearby pulsar, astrophysicists John P. Finley and Hakki Ogelman of UW-Madison and Umit Kiziloglu of the Middle East Technical University in Ankara, Turkey, found a hot patch on the star that swept through the satellite's line of sight once every rotation.

Pulsars are the collapsed remains of stars that ended their lives in cataclysmic explosions known as supernovas. Small, dense objects, pulsars spin at a dizzying pace -- sometimes as fast as 600 times per second -- and emit beams of radio waves which are likened by astronomers to lighthouse beacons.

Most pulsars can only be viewed from Earth by powerful radio telescopes, and the pulses are so regular and distinct that when first discovered in 1968 scientists thought they might be listening to the echo of a distant civilization.

But with the discovery of many more sources of celestial radio pulsations -- some 500 to date -- scientists theorized that the signals are produced by narrow beams of radiation emanating from neutron stars and that sweep around the sky as the stars spin.

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Pulsar -- Add 1

The pulsar in question, according to Finley, is an unnamed pulsar situated just 1,500 light years from Earth. Smaller than Manhattan Island, the pulsar, according to the ROSAT observations, has a hot spot on its surface that is about 4 percent hotter than the rest of the surface of the star.

The X-rays emitted by the star, Finley said, are higher in energy at precisely the same time the pulsed X-ray emission is greatest.

"The whole star is glowing with X-rays and when you see this hot spot, your counts go up," he said. "We can't say for certain that the radio beacon is coincident with the hot spot, but it's certainly a reasonable assumption to make."

Astrophysical theory, according to Finley, predicted that pulsars would have such hot spots. They are most likely produced by a strong magnetic field -- something like a huge bar magnet -- that occurs within the star.

The discovery of the hot patches by the Wisconsin scientists was made as a part of a long-range, NASA-funded program headed by Ogelman to study the cooling of neutron stars. By using ROSAT to measure the surface temperature of the star, the UW-Madison scientists hoped to gain a better understanding of the exotic physics of stars that have reached the apex of stellar evolution.

Pulsars are of interest to scientists because they concentrate great masses of material into very small spaces at high temperatures. While the star observed by the Wisconsin scientists is no bigger than Manhattan, it contains one-and-a-half times the mass of the sun.

"These are conditions you can't create in the lab," Finley said. "You can only observe and hope to obtain a better understanding of what's going on."

The Wisconsin team's findings were reported today at a meeting of the American Astronomical Society in Atlanta.

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-- Terry Devitt, (608) 262-8282

Astronomy, Department

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July 11, 1996

TO: **Editors/News Directors**
FROM: **Terry Devitt (608) 262-8282**
RE: **Universe in the Park**

Campers and visitors to Wisconsin's state parks can take in more than the natural beauty of the park this summer — they can tune in to the wonders of the evening sky as University of Wisconsin-Madison astronomers launch "Universe in the Park."

Universe in the Park brings professional astronomers to state parks and nearby schools to talk informally about the latest results from NASA's Hubble Space Telescope, the Astro-2 Space Shuttle mission, and to answer questions about astronomy and the universe. The evening talks are combined with hands-on stargazing sessions (weather permitting) with telescopes and binoculars. Astronomers help park visitors navigate the universe and provide information on the planets, stars and other celestial objects that populate the cosmos. The intent of the program — sponsored by the UW-Madison Space Astronomy Lab, Astronomy Department and Space Place — is to share the excitement of astronomy and the latest discoveries from space.

The program is funded by NASA and is being conducted in cooperation with the Wisconsin Department of Natural Resources. UW-Madison astronomers have already made four Universe if the Park presentations and eight more are scheduled for the summer, although more may be added. Upcoming Universe in the Park sessions and the parks at which they will be held include:

- Mill Bluff State Park, Camp Douglas, July 13
- Governor Dodge State Park, Dodgeville, July 17
- Devil's Lake State Park, Baraboo, July 18
- Willow River State Park, Hudson, July 26
- Interstate State Park, St. Croix Falls, July 27
- MacKenzie Nature Center, Poynette, July 31
- Hartman Creek State Park, Waupaca, Aug. 3
- Yellowstone Lake State Park, Blanchardville, Aug. 10
- Copper Falls State Park, Mellen, Aug. 17

For more information contact Karen S. Bjorkman at (608) 263-4681. Information and schedules are also posted on the World Wide Web at:
http://www.astro.wisc.edu/~karen/uitphome.html

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July 12, 1995

TO: **Editors, news directors**
FROM: **Terry Devitt, (608) 262-8282**
RE: **Galileo Mission to Jupiter**

If all goes according to plan, tomorrow (July 13), a UW-Madison experiment will be one big step closer to the planet Jupiter.

The experiment, embodied in a device know as the Wisconsin Net Flux Radiometer, has been on route to Jupiter since 1989 aboard the $1.4 billion Galileo planetary probe.

Tomorrow, at approximately 12:30 a.m. CDT the Galileo spacecraft will jettison a small entry probe that contains the Net Flux Radiometer and five other experiments. After a 147-day journey, the entry probe will penetrate Jupiter's stormy atmosphere where it will take the first direct measurements of the Jovian atmosphere. Entering the atmosphere just north of Jupiter's equator at a speed of 105,000 miles per hour, the Net Flux Radiometer will descend 372 miles (part of the way by parachute) and transmit data back to the Galileo orbiter for relay back to scientists on Earth.

Among the many scientific objectives of Galileo mission to Jupiter are studies of the chemical composition and physical state of the Jovian atmosphere, and the rate at which radiation is heating and cooling different atmospheric layers and causing atmospheric motions. It is to those studies that the Net Flux Radiometer — designed to sample solar and thermal radiation — will contribute, according to Lawrence A. Sromovsky, a planetary scientist at UW-Madison's Space Science and Engineering Center. To date, scientists have painted a picture of Jupiter as a huge spinning ball of gas and liquid with an atmosphere that consists primarily of hydrogen and helium. It has at least three cloud levels where the clouds consist of different chemical compounds. This brief, 75-minute probe of Jupiter's atmosphere will give scientists their first peek beneath the clouds of the huge planet.

For more information or to arrange an interview, contact Sromovsky at (608) 263-6785.

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EMBARGOED FOR 6 P.M. EST RELEASE WEDNESDAY, MAY 3, 1995

CONTACT: Craig B. Markwardt (608) 262-7555, craigm@astrog.physics.wisc.edu; Hakki B. Ögelman (608) 265-2052, ogelman@astrog.physics.wisc.edu

SCIENTISTS DISCOVER JET-POWERED STAR

MADISON — Using a satellite with a sensitive X-ray telescope, scientists have discovered a pulsar speeding through space and powering a massive jet.

The finding, published in Thursday's (May 4, 1995) issue of the British scientific journal Nature, may provide long-sought answers to the question of how pulsars -- very small, dense, spinning objects — lose energy.

The discovery also lends support to the idea that mysterious bursts of gamma ray energy from beyond the Milky Way may come from speeding pulsars that have escaped the galaxy.

Using the ROSAT X-ray satellite, University of Wisconsin-Madison astrophysicists Craig B. Markwardt and Hakki B. Ögelman observed the powerful jet extending 20 light years into space from the Vela pulsar, an object as massive as the sun but the size of Manhattan. It is about 1,500 light years distant from Earth.

"This is the first clear evidence that it is a long, thin jet," said Markwardt. "It has the right amount of power to be driven by the pulsar."

Previously, pulsars were believed to have been propelled to fantastic speeds — as fast as 600 miles per second — by the force of the supernova explosions that give birth to the rapidly-spinning stars.

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The Vela pulsar, created in a supernova blast 10,000 years ago, spins at about 11 revolutions per second, but like other pulsars it is gradually slowing down.

Because of this gradual slowing, pulsars must be losing energy. But scientists have long debated how or where the energy is released. Radiation, the way most stars such as our sun release energy, accounts for less than 1 percent of the rotational energy loss of pulsars.

"It's an old problem," said Ögelman. "We've always wondered how a pulsar loses its energy."

The favored model was that energy was released in a wind of energized particles spun off the equatorial plane of the whirling pulsar. This idea is supported by the fact that the 1,000-year-old Crab pulsar exhibits a thick torus or donut-shaped cloud of particles.

"The idea we are proposing is that most of the energy loss comes as a jet of material ejected along the rotation axis. In a sense, pulsars carry their own jet engines," Ögelman said.

Previously, scientists saw hints of a jet in ROSAT images of the much younger Crab pulsar, said Ögelman. But the nascent and much smaller plumes from the pulsar were dismissed by astrophysicists as minor features in the symmetry of the torus, he said.

"Now we are looking at something 10 times older and we see all the action in a jet rather than this donut."

Although every object in space seems to move, pulsars are the speedsters of the galaxy. The idea that they are propelled to amazing speeds by their own jet engines suggests a new mechanism for the compact objects to escape into the halo of the galaxy, a nether region that seems to be the source of mysterious gamma ray bursts.

The unknown source of the gamma ray bursts has been the subject of intense scientific debate, a minority view being that the bursts of energy come from neutron stars or pulsars in the huge halo around the Milky Way galaxy.

The discovery of a jet-powered pulsar by the Wisconsin scientists suggests a way by which pulsars can achieve sufficient velocity to escape the massive gravitational pull of the galaxy.

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— Terry Devitt, (608) 262-8282

Astronomy, Dept. 08

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March 16, 1995

TO: **Editors/news directors**
FROM: **Terry Devitt, UW-Madison science editor, (205) 544-6487**
RE: **Deactivation of Astro 2 Observatory/WUPPE Telescope**

Unless weather or other unforeseen circumstances significantly delay the scheduled landing of the Space Shuttle Endeavour at the Kennedy Space Center tomorrow (March 17), NASA's Astro 2 Observatory and the Wisconsin Ultraviolet Photopolarimeter Experiment (WUPPE) will be deactivated at approximately 10 p.m. CST tonight (March 16).

Deactivation of the WUPPE telescope effectively brings to an end the operational life of the unique WUPPE instrument, a Wisconsin-built telescope that has provided astronomers with a wealth of scientific data on objects as nearby as the planets in our solar system to distant galaxies.

The telescope, built at the UW-Madison's Space Astronomy Lab, was delivered to NASA in 1985 and flew once before in December of 1990 as part of the Astro 1 Observatory aboard the Space Shuttle Columbia. No more missions using the Astro telescopes are planned.

The WUPPE telescope operated well throughout the Astro 2 mission, making observations of scores of objects in the solar system, our own Milky Way galaxy, and of objects well beyond our galaxy. WUPPE observations for the Astro 2 mission include: the moon, Mars, Jupiter, Jupiter's moon Io, novae, reflection nebulae, binary star systems, and various classes of stars. The largest WUPPE program was an unprecedented probe of the interstellar medium, pockets of invisible gas and dust between the stars that were once and future stars.

NASA has scheduled the final briefing for the Astro 2 mission for shortly after noon CST today (March 16). The briefing will be telecast by NASA TV.

The WUPPE project leader, Arthur D. Code, a University of Wisconsin-Madison professor of astronomy, will participate. Code will also be featured on NASA's Mission Update at 10 a.m. CST, also featured on NASA TV. Satellite coordinates for NASA TV are: GTE Spacenet 2, transponder 5. The frequency is 3880 MHz with an orbital position of 69 degrees West Longitude, with audio at 6.8 MHz.

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FOR IMMEDIATE RELEASE 3/6/95

CONTACT: Arthur C. Code, (205) 544-6487

ORBITING TELESCOPE MAKES A CELESTIAL BANK SHOT

HUNTSVILLE, Ala. — Using an invisible cloud of subatomic particles like a celestial mirror, a unique telescope aboard the Space Shuttle Endeavour was able to successfully view the obscured core of a distant galaxy, a feat that may help resolve questions about the nature of such galaxies.

Using the Wisconsin Ultraviolet Photo-Polarimeter Experiment (WUPPE), a telescope that takes advantage of polarized ultraviolet starlight reflected off the nebulous and normally invisible matter of interstellar space, scientists last night were able to peer, periscope-like, deep into the heart of a galaxy known to astronomers as NGC 1068.

The galaxy, known generically as a Seyfert galaxy, is believed to be powered by a black hole. But because it is surrounded by a thick torus of dust and gas, it is invisible to most conventional and space telescopes, according to Arthur D. Code, a University of Wisconsin-Madison astronomer directing observations of the WUPPE telescope.

The telescope is one of a battery of three ultraviolet telescopes that make up NASA's Astro 2 Observatory now orbiting the earth aboard the Space Shuttle Endeavour.

Astronomers now sort Seyfert galaxies into two types, Seyfert 1 and Seyfert 2. Some believe they may be one and the same kind, but that they appear to be different because they are oriented differently in space.

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The galaxy viewed last night by the Wisconsin telescope is classed as a Seyfert 2 galaxy because its core, a very active region exhibiting huge amounts of energy and whose bright nucleus is believed to be powered by a black hole, is hidden by a thick donut-shaped torus.

"The idea is that they might all be the same, that the difference depends on the angle at which it is viewed," said Code, who has pioneered the use of telescopes in space. "Here is a pure test."

The team of Wisconsin astronomers was able to observe the core of the enigmatic galaxy by measuring polarized light created when light from the center of the galaxy is scattered off of a vast cloud of electrons that surrounds the core.

"This particular Seyfert is the brightest of the Seyfert 2s," said Code. "It's sort of the Rosetta stone of Seyferts."

Similar observations have been made in visible light from the earth, said Code, but those observations are heavily contaminated by starlight from the galaxy.

"Here, in the ultraviolet, we're looking at almost a pure reflection of this bright nucleus."

The observations by the Wisconsin telescope will complement a similar set of observations made four years ago during the first Astro mission. Together, the observations should help sort out which light is scattered by dust and which is scattered by electrons and thus help resolve the question of whether or not these galaxies are a single species and just viewed from different angles, or two entirely different types of galaxies.

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FOR IMMEDIATE RELEASE 2/23/94

(Note to editors, news directors: The UW-Madison WUPPE science team will be accessible at the Marshall Space Flight Center in Huntsville, Ala., beginning March 2. To contact science team members during the course of the Astro 2 mission, call Office of News and Public Affairs Science Editor Terry Devitt at (205) 544-6487.)

UW-MADISON TELESCOPE TO FLY AGAIN ABOARD SPACE SHUTTLE

MADISON — A novel space shuttle-borne telescope that has already helped astronomers unlock the secrets of interstellar space and star formation is set to fly once more.

If all goes as planned, the University of Wisconsin-Madison-built telescope, known as the Wisconsin Ultraviolet Photo-Polarimeter Experiment or WUPPE for short, will sweep into space early next month aboard the Space Shuttle Endeavour for what planners hope will be a 16-day mission, the longest shuttle flight ever.

WUPPE is an 800-pound telescope that is one of a battery of three telescopes that make up NASA's Astro 2 Observatory. The telescope first flew into space aboard the shuttle Columbia in December of 1990. Astro 2 is scheduled for liftoff from Cape Canaveral in the early morning hours of March 2 aboard the Space Shuttle Endeavour

"WUPPE measures the polarization of light in the ultraviolet, and the thrust of the observations we plan to make is to obtain data that can't be obtained in any other way," said Arthur D. Code, a UW-Madison professor of astronomy and the leader of the WUPPE project.

Once aloft, the Wisconsin telescope will resume critical observations of the swirling

-more-

clouds of gas and dust in interstellar space and other astronomical objects, including the moons of Jupiter, stars a million times brighter than our sun, and the fiery cores of distant galaxies.

The Wisconsin telescope is unique. No other satellite or shuttle-mounted telescope is capable of detecting polarized ultraviolet light. Because the earth's atmosphere blocks ultraviolet light from reaching the surface of the earth, it is necessary to put such telescopes in space where they can observe a type of starlight rich in astronomical information.

"Polarization is very much a new technique in the ultraviolet," said Code, who is recognized internationally as one of the pioneers of space astronomy. "It opens up whole new regions of information and when you open these windows you get surprises."

Prior to the Astro 1 mission in 1990, there were virtually no existing data on polarized ultraviolet light. According to Code, the only data sets available came from crude experiments based on high-altitude balloon flights. Astro 1, with observations of 135 objects in space, added significantly to the study of astronomical objects through the use of polarimetry, said Code.

"We gained new insights into some objects," he said. "We encountered thought-provoking surprises and we confirmed some prevailing ideas."

During nine days in orbit in 1990 the telescope collected a wealth of data that has helped astronomers underpin their ideas of star formation and the hidden constituents of interstellar space. It has also helped refute some long-standing theories, including a 50-year old theory of how a poorly-understood species of star known as a Be star sheds mass into space.

"Observations can be very different from theory," said Code. "From Astro 1, we have a whole new concept of how these types of stars lose mass; a new paradigm replaced a 50-year-old idea of how these stars work."

The Astro 2 telescopes will be operated around-the-clock by teams of scientists based at the Marshall Space Flight Center in Huntsville, Ala. A team of 30 Wisconsin scientists, engineers and technicians will be responsible for the operation of the WUPPE telescope from Huntsville.

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— Terry Devitt (608) 262-8282

UNIVERSITY OF WISCONSIN MADISON

Astronomy, Dept. of

How to Cover Astro 2

For reporters interested in covering UW-Madison involvement in the upcoming Astro 2 mission, there will be a number of opportunities for news and feature coverage:

• For up-to-date news from the WUPPE telescope science team or access to team scientists, contact UW-Madison science editor Terry Devitt at the Marshall Space Flight Center in Huntsville, Ala. He can be reached from March 3-19 at **(205) 544-6487**. Devitt will be producing daily news updates and feature or news stories as warranted by WUPPE science activities.

• UW-Madison's Space Place, 1605 S. Park St., will be sponsoring telescope workshops and other activities related to the Astro 2 mission. School groups will learn about telescopes, ultraviolet astronomy, and will have the opportunity during the mission to interact directly with the WUPPE science team via a World Wide Web page on the Internet. For more information, call (608) 262-4779.

• Wisconsin and Madison television stations may be able to arrange televised interviews with WUPPE science team members over NASA Select TV. Interviews need to be arranged through Terry Devitt. Assignment editors, producers or reporters should allow time for such interviews to be scheduled and arranged with NASA. Contact Devitt at (205) 544-6487.

• The Astro 2 mission will be supported by a number of ground-based observatories worldwide, including the Pine Bluff Observatory 10 miles west of Madison. To arrange on-site interviews with UW-Madison faculty and student observers supporting the Astro 2 mission, contact Ken Nordsieck, professor of astronomy, during the mission. Nordsieck can be reached at (608) 262-1163.

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Astronomy, Dept of

FOR THE RECORD

G5/119 CSC; Jan. 4: 10-11 a.m., 2650 Humanities; Jan. 12: 10-11 a.m., 1361 Chemistry; and Jan. 20: 10-11 a.m., B130 Van Vleck Hall.

■ Gender/race equity reports

Copies of reports submitted to the Board of Regents for the approval of the Category A and B Academic Staff Gender/Race Equity projects are on reserve at the reference desks at the Memorial, Steenbock and Middleton Health Sciences libraries, the reserve desk at the Weston Health Sciences Library, Room 207 at the Wendt Engineering Library and at the Academic Personnel Office, 174 Bascom Hall.

■ Academic Excellence Awards

Applications for the University Book Store Academic Excellence Awards will be accepted by the Office of the Provost for the 1994-95 academic year. A generous grant provided by the University Book Store allows for 20 awards of $1,000 each to undergraduate students who best exemplify the principle that excellence can be achieved through independent study.

Who: UW-Madison undergraduate students who are enrolled in a degree program during the first or second semesters of the 1994-95 academic year. Only one application per student will be accepted for consideration. Previous recipients of the award may not apply for a second scholarship.

What: Awards will be made for independent work in the biological sciences, the humanities (arts, creative writing and general humanities), the physical sciences, and social studies. The nature of the independent work need not be limited to written reports. For example, art, dance, music, and film projects may be submitted.

If two or more persons are considering a single submission, each person's contribution must be clearly stated. If part of a research team, the applicant's role and contribution must be delineated. A published paper may be submitted if the student is the sole author. A separate paper with the published paper attached must be submitted if the student is one of a set of authors.

Field experience, internships and special projects must include a paper with bibliography as well as a log of associated activities. The extent of the independent work must be clearly stated (in contrast to work performed under supervision).

How: One copy of the application materials is required. Application should include application form; an abstract of the project (125 words or less); a full written report or a presentation and a descriptive narrative, which includes a statement of objectives (presentations will be scheduled for art, dance, music, or film projects); an evaluation of the work by the faculty member under whose sponsorship or guidance the independent study was performed. The evaluation should be sent separately from the application to the Office of the Provost, 150 Bascom Hall, before the March 10 deadline.

Where: Application forms and full information including criteria are available at departmental offices, deans' offices, and the Office of the Provost, 150 Bascom Hall. Questions? Call Professor Christopher Kleinhenz, 608 Van Hise Hall, 262-5816.

When: Deliver to Office of the Provost, 150 Bascom hall, 7:45 a.m.-4:30 p.m., Monday-Friday (open over lunch). Deadline: March 10. Notification: week of April 10.

■ Undergraduate/Faculty Research Fellowships

Applications for Hilldale Undergraduate/Faculty Research Fellowships will be accepted by the Office of the Provost for summer 1995 or the 1995-96 academic year. Fellowships provide a grant of $3,000 to each student and $1,000 to each faculty/staff supervisor. The $1,000 award provides for supplies, expenses and any faculty/staff or student travel involved in the project.

Who: UW-Madison faculty or instructional academic staff members and undergraduate students who have declared a major and have at least junior standing at the time of application may apply. Only one application per student will be accepted for consideration. Previous recipients of the fellowship may not apply for a second fellowship.

What: Fellowships will be awarded on the basis of a research proposal jointly developed by an undergraduate student and a faculty or instructional academic staff member. The fellowship will normally be awarded to begin either in summer 1995 or the 1995-96 academic year.

How: Four copies (one original and three photocopies) of the application materials are required. Each copy should include application form; abstract of the proposed research (200 words or less); description of the research project (no more than five double-spaced pages); current UW-Madison transcript (either official or unofficial is acceptable); and recommendation letter by faculty/staff sponsor, including a description of the collaboration between faculty/staff member and the student in planning and conducting the research.

Where: Application forms and full information including criteria are available at departmental offices, deans' offices, and the Office of the Provost, 150 Bascom Hall. Questions? Call the Office of the Provost, 262-1304.

When: Deliver to Office of the Provost, 150 Bascom Hall, 7:45 a.m.-4:30 p.m., Monday-Friday (open over lunch). Deadline: Feb. 3. Notification: Week of March 20.

■ Holstrom Environmental Scholarships

Application forms for the Holstrom Environmental Scholarships will be accepted by the Office of the Provost for summer 1995 or the 1995-96 academic year. Scholarships provide a grant of $3,000 to each student and $1,000 to each faculty/staff supervisor. The $1,000 award provides for supplies, expenses and any faculty/staff or student travel involved in the project. A limited number of scholarships are available for 1995-96.

Who: UW-Madison faculty or instructional academic staff members and undergraduate students who have declared a major and have at least junior standing at the time of application may apply. Only one application per student will be accepted for consideration. Previous recipients of the scholarship may not apply for a second scholarship.

What: Scholarships will be awarded on the basis of a joint environmental research proposal submitted by a faculty or instructional academic staff member and an undergraduate student. The scholarships will normally be awarded to begin either in summer 1995 or the 1995-96 academic year.

How: Applicants who do not receive a Holstrom Scholarship will be automatically considered for a Hilldale Fellowship. Application materials for both competitions should include: application forms (four copies each of Holstrom and Hilldale application) and eight copies of the following: an abstract of the proposed research (200 words or less); a description of the research project (no more than five double-spaced pages); current UW-Madison transcript (either official or unofficial is acceptable); and recommendation letter by faculty/staff sponsor, including a description of the collaboration between faculty/staff member and the student in planning and conducting the research.

Where: Applications and full information including criteria are available at departmental offices, deans' offices, and the Office of the Provost, 150 Bascom Hall. Questions? Call Professor Calvin DeWitt at the Institute for Environmental Studies, 70 Science Hall, 263-1796.

When: Deliver to Office of the Provost, 150 Bascom Hall, 7:45 a.m.-4:30 p.m., Monday-Friday (open over lunch). Deadline: Feb. 3. Notification: Week of March 20.

■ DoIT instructional grants

The Division of Information Technology (DoIT) announces the third round of the Instructional Technology Grant program to help departments and schools improve undergraduate instruction. The grants are sponsored by the chancellor's office and funded by the Hilldale Foundation. The $750,000 program will award more than 25 grants over five years. At least five grants of up to $30,000 each will be awarded each year. Five departments received grants in 1994. Proposals are reviewed and selected by a faculty committee.

Proposal guidelines:

- Proposals may be submitted by any UW-Madison department or school involved in undergraduate instruction. Proposals should not be submitted by individual faculty members. Only one proposal per department.
- The most important considerations are impact on the instructional program, innovation and potential as a model for others.
- Projects selected for this round of funding must be incorporated into the instructional program by the fall semester 1996. Because of the accelerated timeline, successful projects are likely to use currently available instructional technologies.
- The request must not exceed $30,000 in equipment, staffing and supplies.
- Proposal deadline is April 3.

To submit a proposal, request detailed instructions and forms from the DoIT Instructional Technology group, 1210 W. Dayton St., phone 262-5667, or e-mail its@doit.wisc.edu.

■ SPA Achievement Awards

In appreciation and recognition of student services professionals, the Student Personnel Association is accepting nominations for its 1995 Outstanding Achievement Awards. Four awards are made annually to individuals who have demonstrated dedication to students and student services. Nominees may be classified or academic staff. All nomination letters must be submitted by March 13, 1995. The awards luncheon will be April 26. For information on the nomination process or criteria for the awards, contact Ann Zanzig at 263-0369.

■ Administrative associates

Nominations and applications are now being accepted for the position of administrative associate in the UW System Office of the Senior Vice President for Academic Affairs. The position provides UW System faculty and academic staff an opportunity to learn about the operation of the office by participating in its work. The administrative associate will learn System Administration's perspectives on issues in higher education and become familiar with a variety of administrative activities. System Administration benefits by a regular infusion of ideas and points of view from the UW campuses. Three appointments will be made — for fall of 1995 and spring 1996. Specific starting dates will be negotiated.

The Office of Academic Affairs is responsible for all academic policies of the UW System. including review of programs and granting of entitlements for new programs. The office makes program recommendations to the Board of Regents, develops and implements new academic policies with the approval of the Regents, and prepares a variety of reports on all aspects of academic programs and policies. The office communicates with campus administrative and faculty leadership, receiving and transmitting reports, and coordinating the participation of the institutions in the formulation of UW System policies. The office also coordinates student affairs within the UW System.

The administrative associate will be supervised by and work closely with the senior vice president for academic affairs. Through daily contact, the associate will observe the entire range of activities, participate in joint projects of Academic Affairs and other System Administration units, travel to campuses, attend meetings of the Board of Regents and other bodies, assume increasingly responsible project assignments, and work as a peer with other Academic Affairs staff.

A successful applicant must have been in the UW System for at least three years, be a tenured faculty member or an academic staff member, have strong communication skills, and show evidence of potential for increased administrative responsibilities. The administrative associate will be assigned an office and provided clerical support. Regular salary and benefits will continue.

Individuals who wish to apply for the position are asked to send an updated vita, names and telephone numbers of three references, and an essay of two to four pages telling why they want to have this experience to the UW-Madison Office of Human Resources, 166 Bascom Hall, by Jan. 19. The appointees will be named by March 17, 1995.

UW rocket payload plumbs the mysteries of a nebula

In Greek mythology, the Pleiades is the place among the stars where the god Zeus consigned the seven daughters of Atlas.

To modern astronomers, the bright nebula illuminated by the Pleiades star cluster and other nebulae — vast, cloudlike structures in interstellar space — are equally enigmatic and inaccessible.

Now astronomers stand to gain a new understanding of nebulae as a unique telescope built at UW-Madison made a seven-minute journey through space Saturday. The telescope, known as the Wide-Field Imaging Survey Polarimeter or WISP, took an unprecedented look at polarized ultraviolet light shining from the Pleiades Nebula as it was hurled by a sounding rocket for a brief flight above the earth's atmosphere.

The primary objective of the WISP telescope is to provide astronomers with the first three-dimensional map of a nebula, a feat that would answer a number of pressing questions for modern astronomers.

"There is a lot of controversy and confusion now about how dust and gas are distributed between stars," according to Kenneth H. Nordsieck, a UW-Madison astronomer and the chief scientist for the WISP telescope.

"We're pretty good at taking two-dimensional pictures, but with a flat picture it is very difficult to tell where this material is along our line of sight. In most cases, we never know where it is. We're looking at the Pleiades Nebula because it is big and it is bright and it is nearby. In fact, the star cluster within the nebula is easily visible to the naked eye. It is the luminous patch of light above and to the right of Orion."

The novel telescope is able, for the first time, to map three-dimensional structures in space by using several new techniques developed at UW-Madison

Nebulae are of intense interest because many astronomers believe they provide the material for the formation of new stars and galaxies. Moreover, astronomers are not sure why dust and gas particles in interstellar space form into the wispy, cloudlike nebulae instead of being evenly distributed in space.

A three-dimensional map showing whether nebulae form flat, cirrus cloudlike structures or long narrow ropes of dust and gas may help answer that question.

The novel telescope should be able, for the first time, to map three-dimensional structures in space by using several new techniques developed at UW-Madison to collect the polarized or scattered light reflected off of the dust within the nebula.

"If light bounces off a surface at an angle it becomes polarized. With WISP, we can sample the light bounced off of different parts of the nebula and the three-dimensional mapping becomes much like a survey exercise where you determine position by triangulation," Nordsieck said.

The result, according to Nordsieck, will be the first three-dimensional map of a nebula.

The $1.5 million WISP telescope lifted off from the White Sands Missile Range in southern New Mexico just after midnight on Dec. 3.

The 700-pound WISP payload — the telescope, its pointing system and associated electronics — was shot to an operating altitude 124 miles above the earth. It took data and pictures for about seven minutes before falling back to earth by parachute where it was recovered for reuse as many as eight times.

The project is funded by NASA and a future version of WISP may be developed as a free-flying satellite that would enable astronomers to map thousands of other objects in deep space, including perhaps dust in intergalactic space where none is now known to exist.

The WISP telescope must be used above the earth's atmosphere because ultraviolet light from stars and other objects in space is blocked by the atmosphere. Moreover, the ultraviolet sky is much darker than the visible light sky: By looking at objects in the ultraviolet, astronomers can avoid much of the distorting background light that hampers efforts to study diffuse light sources such as nebulae.

— Terry Devitt

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NEWS

UNIVERSITY OF WISCONSIN–MADISON

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Astronomy, Dept.

FOR IMMEDIATE RELEASE 11/30/94

(Note to editors and news directors: Ken Nordsieck can be reached by calling and leaving a message at the White Sands Missile Range, Launch Complex 35. The number is (505) 679-9709. There may be some delay in returning phone calls as Professor Nordsieck cannot take calls directly during countdowns. Subsequent to the launch of the WISP experiment, Nordsieck can be reached in Madison at (608) 263-4622.)

UW ROCKET PAYLOAD TO PLUMB THE MYSTERIES OF A NEBULA

MADISON — In Greek mythology, the Pleiades is the place among the stars where the god Zeus consigned the seven daughters of Atlas.

To modern astronomers, the bright nebula illuminated by the Pleiades star cluster and other nebulae — vast, cloudlike structures in interstellar space — are equally enigmatic and inaccessible.

Now, if all goes according to plan, astronomers stand to gain a new understanding of nebulae as a unique telescope built at the University of Wisconsin-Madison is prepared for a seven-minute journey through space.

The telescope, known as the Wide-Field Imaging Survey Polarimeter or WISP, will take an unprecedented look at polarized ultraviolet light shining from the Pleiades Nebula as it is hurled by a sounding rocket for a brief flight above the earth's atmosphere this Saturday (Dec. 3).

The primary objective of the WISP telescope will be to provide astronomers with the first three-dimensional map of a nebula, a feat that would answer a number of pressing questions for modern astronomers.

-more-

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WISP -- Add 2

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The project is funded by NASA and a future version of WISP may be developed as a free-flying satellite that would enable astronomers to map thousands of other objects in deep space, including perhaps dust in intergalactic space where none is now known to exist.

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— Terry Devitt, (608) 262-8282

Astronomy Dept.

WISCONSIN WEEK

UNIVERSITY OF WISCONSIN–MADISON | FOR FACULTY AND STAFF | OCTOBER 19, 1994

JEFF MILLER

Shawnn Shears speaks during the program's 10th anniversary celebration.

Chancellor's Scholar says pursue program 'with all of your vigor'

By Bill Arnold

If the value of a university program is measured by the interest, love and praise its participants and supporters have for it, then the Chancellor's Scholarship Program (CSP) at UW-Madison is a seemingly priceless, glittering diamond.

Shawnn Shears has seen the program's rich glow from the beginning. In 1984 — the year that the CSP was launched — Shears was a bright-eyed freshman at UW-Madison, studying economics. She says she was quickly taken with her mentor in the program, the late Bryant Kearl, vice chancellor emeritus, and assistant vice chancellor Mercile Lee, the program's director and its energetic driving force.

"Mr. Kearl was a special person — he guided me and offered a nurturing environment. Mercile was like a mother to me. They both took a huge institution like UW-Madison and made it small and personable for me," says Shears, who spoke to about 200 past and present student scholars, donors, supporters and university officials during an Oct. 14 celebration marking the program's 10th anniversary. The reception was sponsored by Chancellor David Ward and the University of Wisconsin Foundation.

An African American native of Washington, D.C., Shears received a bachelor's degree in economics from UW-Madison in 1989 and a master's degree in consumer science in 1992. She plans to be a doctoral candidate in development economics in

New observatory offers astronomers a heavenly view

Astronomers at the UW-Madison have made their first observations of the heavens with a powerful new telescope, an instrument that promises to keep Wisconsin at the forefront of modern ground-based astronomy.

The telescope, situated atop Kitt Peak, Ariz., has obtained its first high-quality images, including pictures of distant galaxies and planetary nebulas. This first look at the sky opens a new chapter in UW-Madison astronomy and a broad new window to the universe for Wisconsin astronomers and their students.

"We're open for business," said Arthur D. Code, a UW-Madison professor of astronomy. "We have a fine new research instrument, one of the most modern and effective telescopes in the world."

The telescope and the buildings that house it are known collectively as the WIYN Observatory. It was built at a cost of $13.5 million by a consortium that includes UW-Madison, Indiana University, Yale University and the National Optical Astronomy Observatories (NOAO), an arm of the National Science Foundation.

At the heart of the WIYN Telescope is a 3.5 meter (11.55 feet) diameter "spin cast" mirror, one of the most perfect astronomical mirrors ever made. It is one of the first of a new generation of lightweight telescope mirrors that promises to greatly improve the power and resolution of modern telescopes.

'WIYN will be one of the most capable optical observatories in the world and will bring our program to the forefront of ground-based optical astronomy.'

"WIYN will be one of the most capable optical observatories in the world and will bring our program to the forefront of ground-based optical astronomy," said Blair Savage, a UW-Madison professor of astronomy. "It will complement our programs in space astronomy, such as those involving the Hubble Space Telescope and the shuttle-borne Astro Observatory."

The WIYN telescope has been designed to produce high-quality images of stars, galaxies, planets and other astronomical objects over a wide field of view. In addition, the WIYN telescope is equipped with a multi-object spectrograph, a device capable of capturing starlight from as many as 100 objects at once and breaking it down into its constituent wavelengths or spectra.

Those capabilities, according to Savage, will enable WIYN to be used with unprecedented efficiency, even allowing more than one astronomer at a time to use the innovative telescope. Coupled with WIYN's remote observing capabilities *(see related story, page 13)*, the technology associated with the telescope and its scientific instruments will make the new observatory a convenient and powerful tool for exploring the universe.

Already, Wisconsin astronomers are planning a wide array of scientific programs, ranging from studies of the environments of the planets to surveys of the most distant objects in the universe, Savage said.

"The fact that we can gather starlight from many objects at once is especially exciting since we can now study the properties of large numbers of stars in young or old star clusters as well as galaxies in extremely distant clusters of galaxies," he said.

Wisconsin's involvement in the WIYN Observatory was underwritten by the Wisconsin Alumni Research Foundation (WARF). WARF contributed $4.6 million toward the planning and construction costs of the observatory and its innovative telescope.

Observing programs using the WIYN telescope will begin in earnest early next year after the instrument has been fully checked out by astronomers. Early indications of the telescope's performance are very promising, according to Savage. Its performance and image resolution so far indicate the telescope will be among the best in the world.

The total construction cost for the new observatory is approximately $13.5 million. Because the telescope employs an innovative design and is compact, the cost of the new observatory is about one-fourth the cost of a traditional one of the same size, Savage said.

— Terry Devitt

JEFF MILLER

Blair Savage, professor of astronomy, shows the quality of the WIYN telescope's imagery during a "first-light" press conference held on campus last week.

INSIDE

We're on-line!
Wisconsin Week is available on Internet, via WiscINFO, UW-Madison's gopher server

Coming up on campus
Conferences, lectures, special visitors — we've got it all! 8-9

Partnership for improvement
Faculty teams form for cross-campus 'peer review' project 12

'Gene vaccine' may usher new era of virus protection

By Brian Mattmiller

A genetic answer to developing vaccines against potentially deadly viruses is showing great promise in a new UW-Madison study.

By using a single gene clipped from influenza DNA, and a "gene gun" that can inject the DNA into animal cells, the research has created a kind of genetic sleight of hand in test animals: They produce antibodies to attack a virus that isn't there.

As a result, the animals that were then challenged with the actual influenza virus showed a much greater ability to fight off the virus.

Teaming together on the project are an influenza study group in UW-Madison's School of Veterinary Medicine and Agracetus, a Madison biotechnology firm.

Virginia Hinshaw, a UW-Madison professor of veterinary medicine and leader of the school's influenza study, said this development could lead to a breakthrough in the fight against many dangerous viruses in humans — ones which currently have no vaccine.

Typical vaccines, like those used for the flu, use purified strains of the virus itself to induce virus-fighting antibodies in humans, she said. But the DNA-based approach uses only one key gene from the virus, which mimics the actual virus and triggers the same immune response.

That's an important distinction, said Hinshaw, who is also a UW-Madison associate vice chancellor for academic affairs. With viruses such as Hepatitis or HIV, a vaccine made from the actual virus would pose the risk of accidental infection.

The first results of a study with pigs were examined in September, Hinshaw said, and they bode well for further studies of the technique.

Pigs happen to be ideal subjects for this research, Hinshaw said, since they are very susceptible to influenza and can pass the virus to humans. She said they also are very similar anatomically to humans.

"How they respond is very close to how we would respond," she said. "Eventually the goal is for this process to serve as a model for vaccinations against other kinds of human viruses."

UW-Madison is in a unique position to conduct the study. Hinshaw is recognized internationally for her work with the influenza virus, and staff at Agracetus invented the DNA transfer technology (commonly called a "gene gun") that is making the work possible.

JEFF MILLER

Virginia Hinshaw, leader of a UW-Madison study of a 'gene vaccine,' says research findings could lead to a breakthrough in the fight against many dangerous viruses in humans. A study of the vaccines with pigs — which are anatomically very similar to humans — may well lead to clinical trials with humans.

Will Swain, senior scientist at Agracetus, said the gene gun works by shooting a microscopic gold bead coated with DNA into a cell. If the bead is placed in the nucleus of the cell, the genes from that DNA coating can be expressed in the cell. Each treatment shoots about 1 million coated gold beads, which covers about three square centimeters on the pig's skin.

Viruses infect a cell by getting inside them and assembling their own proteins. The research team is injecting the one virus gene which produces an attachment protein called hemagglutinin, which has the ability to "pick the locks" on a cell's surface and get inside. So antibodies to this protein will help block infection.

If the procedure works for influenza, Swain said the same approach can be tried for other viruses such as HIV or Hepatitis B.

"One of the beauties of this technology is it can be generally applied," Swain said. "Our work can switch from one virus to another quite easily."

In the study, Hinshaw said flu antibodies were evident after the initial vaccination. But after the animals were exposed to the virus the antibody counts "skyrocketed," she said. "We saw a very enthusiastic response, which is usually what you need to reduce infection."

Hinshaw noted that typically vaccines don't actually stop infection from a virus. They simply give the body a big head start in fighting them — usually enough to ward off becoming ill from the infection.

Hinshaw said DNA-based vaccines would also be very efficient. Rather than introducing a dead virus, the antibodies target the gene responsible for creating attachment proteins. "This directs your antibody response totally at what you want," she said.

And unlike conventional vaccines, which produce antibodies in the bloodstream, Hinshaw said a DNA-based vaccine can be targeted to a specific part of the body, such as the nose, or wherever the virus shows up.

Clinical trials may not be far away with humans, she said, but there have been some initial concerns about the potential long-term effects of fashioning vaccines from DNA.

Flu viruses mutate from year to year, just enough so that new antibodies have to be created to fight them. Hinshaw said some people have worried that flooding a person with antibodies would lead to more variants of the flu.

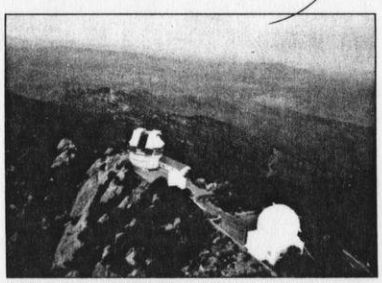
"But I don't think that would be a problem," she said. "The flu vaccines we currently use are 80 to 85 percent effective, and they haven't pushed up the level of change in viruses. We're not doing anything that nature isn't doing by itself."

Telescope in Arizona as near as desktop computer for UW astronomers and students

UW-Madison's new telescope may be on a mountain top 1,500 miles from Madison, but Wisconsin astronomers and their students need look only as far as their desktop computers to use the WIYN Observatory (*see story, page 1*).

Borrowing techniques that allow earth-bound astronomers to operate telescopes in space, Wisconsin astronomers have constructed an innovative remote-control system for the observatory that will enable its routine operation from Madison classrooms, offices and a dedicated control room in UW-Madison's Sterling Hall.

The state-of-the-art system uses computers, the Internet, telephone links, video cameras, and elaborate, custom-designed software to literally bring the telescope and its potential to the doorstep of UW-Madison's astronomy department.



Although the WIYN Observatory's new telescope is on a mountain top 1,500 miles from Madison, Wisconsin astronomers operate it using a specially designed remote control system in Sterling Hall.

In theory, UW astronomers say, the telescope could be operated anywhere there is a computer connected to the Internet.

"There are only a handful of places in the world where you can operate a telescope like this remotely," said Jeffrey W. Percival, the UW-Madison astronomer who developed the intricate software codes that power the WIYN Observatory's control system.

The remote observing powers of WIYN, according to UW-Madison Astronomy Professor Blair D. Savage, greatly expand access to the telescope for Wisconsin students, faculty and staff.

"This will allow graduate and undergraduate students to become important players in astronomical research programs on a large telescope," Savage said. "It will enable them to get direct experience on a world-class instrument."

The control system for the WIYN telescope is the major Wisconsin contribution to the WIYN consortium.

The control system, according to Percival, acts like the brain and central nervous system of the observatory. It directs the telescope's movements as it tracks objects across the sky, and provides astronomers with instant feedback on the state of the telescope, its environment and the battery of interconnected systems that govern its operation.

A unique aspect of the control system is Wisconsin-developed software that will enable high-quality astronomical images to be sent across the country in seconds rather than minutes or hours, Percival said.

The new software compresses the binary information that makes up an astronomical image and sends it streaking across the Internet as a small packet of information. Reprocessed by the computer that receives it, a clear image of a star, galaxy or planet can appear on a computer screen in Madison only moments after it was captured by the telescope 1,500 miles away.

Said Percival: "The pictures are truer than with any other method. I believe it has the potential to change the way astronomers do business."

— Terry Devitt

Faculty & Staff News ...

(Continued from page 10)

This annual award is made to composers of contemporary music who have had a record of significant performances of their music during the year.

Dacher Keltner, assistant professor, psychology, is author of a paper on intergroup perception and conflict that was named best empirical paper at the seventh annual International Conference on Conflict Management.

Mariana Hewson, associate scientist, department of medicine, received an award for outstanding workshop presentation at the Society for General Internal Medicine's Annual Meeting in April.

Honors

Ray Evert, professor, botany, and **Karen Till**, project assistant, geography, have been elected to the board of directors of the Alexander von Humboldt Association. This new association of former Alexander von Humboldt Scholars was established at the UW-Madison on Sept. 4, and plans to intensify scholarly exchanges among all U.S. Humboldtians and to improve the quality of information on the various researcher support instruments of the Alexander von Humboldt Foundation.

Morton Ann Gernsbacher, Bartlett Professor of Psychology, has been elected president of the International Society for Text and Discourse. She also recently organized an international conference on language processing; it was held in Lake Geneva, Wis., and supported with funds from the Wisconsin Alumni Research Foundation.

Publications

Joseph Koykkar, music director for the dance program, has had his orchestral composition "Composite" released on MMC Recordings. The CD is titled *Robert Black Conducts*.

The University of Wisconsin Press published *The University of Wisconsin, A History: Politics, Depression, and War, 1925-45* this month. Written by **E. David Cronon**, emeritus professor of history and former dean of the College of Letters and Sciences, and **John W. Jenkins**, university historian, this is the third in a continuing series of volumes on the history of the University of Wisconsin.

Morton Ann Gernsbacher, Bartlett Professor of Psychology, is editor of the *Handbook of Psycholinguistics*, published by Academic Press.

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NEWS

Astronomy, Dept. 08

UNIVERSITY OF WISCONSIN–MADISON

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FOR IMMEDIATE RELEASE 1/18/94

CONTACT: Heidi Wilde, (608) 262-5524

NASA VIDEO CONFERENCE FREE AND OPEN TO PUBLIC

MADISON — Scientists, astronauts and NASA officials will be panelists for a public video conference on Thursday, Feb. 17, in the University of Wisconsin-Madison's Engineering Hall.

"A New Era of Discovery: Plans for Research on Space Station" is part of NASA's educational outreach efforts and will be hosted locally by the Wisconsin Center for Space Automation and Robotics in the College of Engineering. The panelists, appearing live via satellite, will take questions from viewers across the country.

The two-hour session will explain the objectives of Space Station, the unique research laboratory in space that is planned to be in operation in the latter half of this decade. Panelists will talk about research already accomplished in space and how space research can lead to new insights, products and processes, especially in the fields of health, pharmaceuticals, materials processing, forestry, agriculture, computers, electronic systems and environmental technologies.

The free video conference will begin at 11:45 a.m. Thursday, Feb. 17, in 1610 Engineering Hall, 1415 Johnson Drive. For more information, call Heidi Wilde at (608) 262-5524.

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— Kelly Radloff, (608) 262-2481
Engineering Publications

1992

Astronomy, Dept. of

The Department of Astronomy

University of Wisconsin-Madison

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The origins of the Department of Astronomy at the University of Wisconsin-Madison lie in the founding of Washburn Observatory in 1878. The observatory joined the College of Letters and Sciences in 1948, continuing the tradition of forefront astronomical research and greatly expanding the educational opportunities in astronomy for UW students. Current research includes theoretical and observational studies of star formation, stellar atmospheres, binary star evolution, interstellar matter, stellar dynamics, structure and evolution of galaxies, galaxy clusters and cosmology. The Department of Astronomy also enjoys very strong research and educational ties with the Department of Physics where research programs include γ-ray astronomy, X-ray astronomy, Fabry-Perot optical spectroscopy of the planets and the diffuse ionized interstellar medium, and laboratory astrophysics.

Astrophysical theory at Wisconsin is particularly strong in several broad areas. Stellar astrophysics has long been a strength, with recent work directed toward stellar coronae and winds, the formation and evolution of massive stars, the origin and interpretation of the polarization of starlight, and the evolution of binary systems from formation through their final evolution as cataclysmic variables. Wisconsin is internationally recognized as a center of theoretical studies into the composition and dynamics of the interstellar medium, particularly in regard to the nature of interstellar dust and evolution of supernova remnants and the galactic halo. Stellar dynamical theory is represented in the formation and evolution of young star clusters, the dynamics of galaxy disks, bars and massive galactic halos and studies of interacting galaxies, all subjects of active study by faculty, scientific staff and students.

Astronomical observations at the University of Wisconsin trace their origin to the 15" refractor of Washburn Observatory. Today in Wisconsin the Pine Bluff Observing station (15 miles west of Madison) has 36-inch and 16-inch telescopes, instrumented for spectro-polarimetry and high-speed-photometry respectively, and a Fabry-Perot wide-field spectrometer. These telescopes are dedicated to unique survey programs studying stellar and circumstellar structure, stellar oscillation and the distribution of ionized hydrogen in the Milky Way. The future lies in the WIYN Observatory, a collaborative effort with Indiana, Yale, and the National Optical Astronomical Observatories. This advanced technology 3.5m telescope, located at Kitt Peak, is under construction with first light scheduled for early 1994. The telescope is optimized for wide-field research. For example, one forefront

instrument will be the multi-object spectrograph (MOS) under construction by NOAO; using optical fibers, simultaneous spectroscopy of 100 objects can be done, effectively providing the power of 100 3.5m telescopes.

While telescopes are essential to gather light, ultimately it is high-quality instrumentation and detectors which permit the acquisition of forefront data. Astronomers at Washburn Observatory were the first to use and develop photoelectric techniques. Later, as a pioneering institution in space astronomy, observational work at Wisconsin emphasized extensive coverage of the electromagnetic spectrum through the development of instrumentation for UV and X-ray astronomy. This rich tradition of instrument development remains strong today in both space and ground-based observational programs. Wisconsin plays a central role on several major NASA missions such as the Hubble Space Telescope High-Speed Photometer, the Wisconsin Ultraviolet PhotoPolarimeter (WUPPE), the Diffuse X-ray Spectrometer (DXS) and the future Wisconsin Imaging SpectroPolarimeter (WISP), all being developed on campus.

Much of the instrumentation development has been at the Space Astronomy Laboratory (SAL), founded in 1959. SAL developed one of the two sets of telescopes aboard the Orbiting Astronomical Observatory, the world's first orbiting observatory. Launched in 1968, it successfully operated for four years. More recently, the High Speed Photometer, one of the five focal plane instruments on the Hubble Space Telescope, was the only HST instrument designed and constructed entirely on a university campus. UW astronomers are also members of other HST instrument development teams. For the ASTRO shuttle mission, SAL developed the Wisconsin Ultraviolet Photo-Polarimeter Experiment (WUPPE), one of three telescopes aboard the spacecraft. The acquired data will substantially improve our understanding of the spatial structure of stars (disks, rotationally-driven asymmetries, winds) as well as interstellar grains, diffuse nebulae, magnetic white dwarfs and active galactic nuclei. WISP, an imaging spectropolarimeter, is a natural extension of the WUPPE project providing polarization as a function of wavelength for many objects simultaneously.

Education and outreach are an important endeavor of the department, this meeting being a particularly visible example. The regular academic activities of the department teach astronomy to well over 1000 undergraduate UW students each year, of which approximately 25 are majors. Also the department produces 2-3 Ph.D. astronomers per year. Outreach in the community is equally important; indeed to our knowledge Washburn Observatory has the longest continuous public viewing program in the United States! (The observatory is open on the first and third Wednesday nights of each month, if clear.) The department is also proud of the success of UW Space Place, a hands-on learning center for teachers and general public to discover astronomy and the space sciences. Finally all members of the department regularly contribute their time giving talks to school classes and amateur groups throughout Wisconsin and the United States.

UNIVERSITY OF
WISCONSIN
MADISON

Astronomy, Dept of

June 9, 1992

TO: **Editors, News Directors**
FROM: **Terry Devitt, (608) 262-8282**
RE: **Astromonical Socity of the Pacific Meeting**

The University of Wisconsin-Madison will be the site of the 104th annual meeting of the Astronomical Society of the Pacific (ASP). The June 20-25 meeting will attract astronomers from around the world and will feature numerous scientific symposia as well as a public exposition and fair.

A media workshop has been scheduled for Saturday, June 20, at the Wisconsin Center, 702 Langdon St. The workshop will be conducted much like a news briefing and will feature astronomers who will speak on some of the hottest topics in astronomy today. The workshop will be held from 10:15 to 11:45 a.m. Check the ASP registration desk in the Wisconsin Center lobby for a room number.

Workshop speakers and topics will include:

- Dr. Frank Drake, a pioneer in the scientific search for extraterrestrial intelligence, who will talk about the sophisticated new NASA Search for Extraterrestrial Intelligence program scheduled to begin on Columbus Day this year.

- Dr. Eric Chaisson, Space Telescope Science Institute, who will address the current status of the Hubble Space Telescope and some of the exciting results it is producing despite its flaws.

- Dr. Donald Goldsmith, author of The Astronomers, who will sort fact from fancy about the crashing asteroid believed to have set the stage for the extinction of the dinosaurs some 65 million years ago.

Admittance to the workshop and Universe '92, the first-ever national astronomy exhibition and fair, will be free to media, but advance registration is requested. A list of speakers and topics for ASP's 104th annual meeting is attached. The media workshop and the meeting itself is open to all reporters, editors and producers who wish to come.

University News and Information Service

19 Bascom Hall University of Wisconsin–Madison 500 Lincoln Drive Madison, Wisconsin 53706–1380
608/262–3571 FAX: 608/262–2331

For more information or to register for the workshop, contact:

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University News Service
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THE ASTRONOMICAL SOCIETY
OF THE PACIFIC

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For more information, contact:
Sally Stephens, A.S.P. (415) 337-1100
Kathy Stittleburg, U. of Wisc. (608) 263-4686
Alan Dyer, *Astronomy* (414) 796-8776
April Whitt, Adler Planet. (312) 322-0304

Astronomy Expo and Fair
June 20 & 21
at the University of Wisconsin in Madison

Universe '92, the first-ever national Astronomy Expo and Fair, will be held from 9 am to 6 pm Saturday and Sunday, June 20 & 21, at the Wisconsin Center of the University of Wisconsin in Madison. The program will include nontechnical talks by a "stellar" line-up of noted astronomers, workshops for beginners, a Saturday evening "star party," and several rooms of astronomy exhibits (including books, instruments, software, and much more).

The Expo, part of the 104th Annual Meeting of the Astronomical Society of the Pacific, is hosted by the Department of Astronomy at the University of Wisconsin and cosponsored by *Astronomy* magazine (the world's largest-circulation astronomical publication), as well as by Chicago's Adler Planetarium.

Speakers for the weekend include:

* Dr. Frank Drake (U. of California) discussing the scientific search for life elsewhere in the universe (which he began in 1960)
* Rev. Robert Evans (Australia) who holds the world's record for amateur discoveries of exploding stars
* Dr. Stephen Saunders (JPL) , the scientist in charge of the Magellan spacecraft exploration of Venus
* Dr. Vera Rubin (Carnegie Institution), the scientist who first showed the existence of vast quantities of "dark matter" in the universe
* Dr. Donald Goldsmith (author of *The Astronomers*) speaking on "Crashing Asteroids, Dying Dinosaurs"
* Alan Dyer (*Astronomy* magazine) on how to select the right telescope for an astronomy beginner
* Andrew Fraknoi (A.S.P.) on "What I would Have Said to Nancy Reagan: A Skeptical View of Astrology"

The program is open to the public, discounts are available for students and seniors, and tickets will be available at the door. To receive an advance registration packet for the Expo and the rest of the meeting (June 22-25), call the Astronomical Society of the Pacific in San Francisco at (415) 337-1100.

Speakers and Topics for *Universe '92*

June 20 & 21, 1992
University of Wisconsin, Madison

Necia Apfel, author of astronomy books for children
Astronomy for Kids (Sat. and Sun.)
Richard Berry, former editor of *Astronomy* magazine
Enhancing the Universe: Image Processing for Amateur Astronomers (Sat. and Sun.)
Dr. John C. Brandt, University of Colorado
Comets After Comet Halley and
The Hubble Space Telescope: A User's View (Sat. and Sun.)
John Briggs, Yerkes Observatory
As Low as You Can Go: Astronomy at the South Pole (Sat. and Sun.)
Deborah Byrd, writer for *Star Date* and *Earth and Sky*
Astronomy on the Radio (Sat. and Sun.)
Dr. Eric Chaisson, Space Telescope Science Institute
The Hubble Space Telescope: The Latest Science and Images (Sat. & Sun. morning)
Mark Coco, Celestron International
Stalking the Not-so Elusive Green Flash (Sat. and Sun.)
Dr. David Crawford, Kitt Peak National Observatory
Light Pollution: The Theft of the Night (Sat. and Sun.)
Terence Dickinson, noted amateur and author
Seeking the Holy Grail of Amateur Astronomy (Sat. and Sun.)
Dr. Frank Drake, University of California
The Search for Life Elsewhere: SETI on the Threshhold (Sat. and Sun.)
Alan Dyer, Associate Editor, *Astronomy* magazine
Selecting the Right Telescope For You (Sat. and Sun.)
David Eicher, Associate Editor, *Astronomy* magazine
The Joys of Deep-Sky Observing (Saturday only)
Rev. Robert Evans, the world record holder in supernova discoveries among amateurs
Supernova Hunting (Sat. and Sun.)
Timothy Ferris, University of California
Is the Big Bang Theory in Trouble? (Sunday only)
Andrew Fraknoi, Astronomical Society of the Pacific (Sat. and Sun.)
What I Would Have Said to Nancy Reagan: A Skeptical Look at Astrology
Dr. Louis Friedman, The Planetary Society
Exploring New Worlds (Sat. and Sun.)
Russell Genet, Fairborn Observatory (Sunday only)
Robotic Observatories: Earth and Moon
Dr. Donald Goldsmith, Interstellar Media
Crashing Asteroids, Dying Dinsoaurs: An Overview (Sat. and Sun.)
John Griese, AAVSO, WAA, Stamford & Van Vleck Observatories
Amateur Astronomers and the Extreme Ultraviolet Explorer Satellite (one day only)
Tom Hunt, *Astronomy* magazine
Space Art: Renaissance to the Future (Saturday only)
Dr. Chris Impey, University of Arizona
The History of the Size of the Universe (Saturday only)
Dr. William Kaufmann, San Diego State University
Black Holes and Warped Spacetime (Saturday)
Cosmology and the Creation of the Universe (Sunday)

Dr. Gillian Knapp, Princeton University
One Million and One Redshifts (Sunday only)
Dr. Ed Krupp, Griffith Observatory
Beyond the Blue Horizon: Astronomy of Ancient Civilizations (Sat. and Sun.)
Alan MacRobert, Sky & Telescope magazine
Amateur Observatories: Today and Tomorrow (Saturday only)
Dr. Laurence Marschall, Gettysburg College
Exploding Stars: Supernovae and Supernova 1987A (Sat. and Sun.)
Dr. John Mathis, University of Wisconsin
The Mysterious Gas in the Galaxy (Sunday only)
Jack Newton, Royal Astronomical Society of Canada
Astronomical Photography (Sat. and Sun.)
Dr. Donald Parker, Association of Lunar & Planetary Observers
Advanced Amateur Planetary Observing and Photography and
Observing the Planets for Yourself (Saturday only)
Dr. Vera Rubin, Carnegie Institution of Washington
Galaxies and Dark Matter: Probing the Depths of the Universe (Sunday only)
Dr. Stephen Saunders, *Magellan* Project Scientist, Jet Propulsion Lab
Venus Unveiled: The Magellan Mission Results (Sunday only)
Dennis Schatz, Pacific Science Center
Hands-on Astronomy for Families: Getting to Know and Love the Moon (Sunday only)
Dr. Maarten Schmidt, Caltech
Quasars: A Progress Report on the Most Distant Probes of the Universe (Sunday only)
David Slavsky, Loyola University
The Science of Baseball: How the Game is Played on Earth and Other Planets
Dr. William Waller, NASA Goddard Space Flight Center
The Lives of the Galaxies: Their Evolution and Ecology (Sat. and Sun.)

Panel on Astronomical Photography with CCD's --
Jack Newton, Richard Berry, Donald Parker
Panel on Variable Star Observing - Bob Manske, G. Samolyk, Neil Simmons, & Dave Weier (Madison Astronomical Society/AAVSO)
"Show-And-Tell" Session for Amateurs --
Jane Breun, Madison Astronomical Society

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THE ASTRONOMICAL SOCIETY
OF THE PACIFIC

390 ASHTON AVE. • SAN FRANCISCO, CA 94112 • 415/337-1100 • FAX: 415/337-5205

Astronomical Society of the Pacific
104th Annual Meeting
hosted by the Astronomy Department at the
University of Wisconsin, Madison
June 20-25, 1992

Press Kit and Tip Sheet

You are invited to cover this meeting, which combines a major research symposium on massive stars with nontechnical programs on new developments in astronomy for teachers and the public. On Saturday morning there will also be a special free workshop for members of the media on several exciting topics in astronomy that will warrant coverage in months to come.
The highlights of the meeting are described below in chronological order. The enclosed "tip sheet" makes suggestions for interesting feature stories and people to interview at the meeting. A list of press contacts for the meeeing in Madison, Milwaukee, Chicago, and San Francisco are also attached.

Meeting Overview

June 20 & 21: *Universe '92*: A National Astronomy Exposition and Fair (with review talks by noted astronomers from around the country and the world)
June 20: Saturday morning Media Workshop on Astronomy
June 22: "Behind the Scenes" Tour of Yerkes Observatory (which features the world's largest refractor telescope)
June 23-25: Scientific Symposium - *Massive Stars: Their Lives in the Interstellar Medium*
June 23-24: *The Universe in the Classroom*, a workshop on teaching astronomy in grades 3-12
June 24 (afternoon): Session on the History of Astronomy
June 25: Session on Astronomy Education in the United States (papers and panels)

The Workshop for the Media (Saturday morning 6/20)

Designed for reporters, editors, and producers and not requiring any background in astronomy, this morning briefing will feature three noted astronomers covering three specific topics in astronomical research:

* Dr. Frank Drake (U. of California, Santa Cruz), a pioneer in the Search for Extra-Terrestrial Intelligence (SETI), will talk about the sophisticated search for radio messages from alien civilizations that NASA will begin on Columbus Day 1992.
* Dr. Eric Chaisson (Space Telescope Science Institute) will discuss the current status of the Hubble Space Telescope, the plans to repair it in orbit, and the exciting science that is being done with the instrument despite the mirror flaw
* Dr. Donald Goldsmith (Interstellar Media), the chief writer on the PBS series *The Astronomers*, and the author of *Nemesis: The Death Star and Other Theories of Mass Extinction*, will sort out fact from fancy regarding the asteroids that killed the dinosaurs and comic collisions in general.

There will be time afterwards for questions and discussion and an orientation for the rest of the conference. To reserve space in this workshop, please call Dr. Sally Stephens at the Astronomical Society of the Pacific, 415-337-1100 or fax 415-337-5205.

The Astronomy Exposition and Fair (Saturday & Sunday, 6/20 & 21)

This program, cosponsored by ASTRONOMY Magazine, the Adler Planetarium in Chicago, and eight other national astronomy groups, is the first National Astronomy Exposition in the United States. Speakers and participants are expected from all around the country and from Europe and Australia.

The weekend features a "stellar" line-up of noted astronomical speakers; demonstrations and workshops; several rooms of instruments, observing aids, software, books, and other astronomical materials on display; a "show-and-tell" room for astronomy hobbyists; "meet-the-author" booksignings; and an evening "star party."

In addition to the speakers listed in the media workshop above, those giving nontechnical talks during the weekend will include:

John Brandt (U. of Colorado) on "Comets After Comet Halley"
John Briggs (Yerkes Obs.) on "Doing Astronomy at the South Pole"
Mark Coco (Celestron Telescopes) on "Explaining the Not-so-elusive Green Flash"
David Crawford (Kitt Peak Nat'l Obs.) on "Light Pollution: The Theft of the Night"
Alan Dyer (Associate Editor of *Astronomy* Magazine) on "Selecting the Right Telescope"
Rev. Robert Evans (Australia) on "Hunting for Exploding Stars" [Rev. Evans holds the world's record for such discoveries by an amateur; see the tip sheet]
Timothy Ferris (U. of California, Berkeley) on "Is the Big Bang Theory in Trouble?"
Louis Friedman (Executive Director of the Planetary Society) on "Exploring New Worlds in Our Solar System"
Russell Genet (Fairborn Observatory) on "Robotic Observatories on Earth and in Space"
Andrew Fraknoi (Executive Director of the A.S.P.) on "What I Would Have Said to Nancy Reagan: A Skeptical Look at Astrology"
William Kaufmann (San Diego State U.) on "Black Holes and Warped Spacetime"
Gillian Knapp (Princeton University) on "One Million and One Redshifts: Probing the Depths of the Universe"
Vera Rubin (Carnegie Insti.) on "Galaxies and Dark Matter"
Stephen Saunders (Project Scientist for the Magellan Mission) on "Venus Unveiled"
Maarten Schmidt (Caltech) on "Quasars: The Most Distant Probes of the Cosmos"

Among the dozens of companies who will exhibiting at the meeting are a number of innovative software firms that have programs displaying the cosmos on computer, simulating the motions in our solar system, and offering new ways to process astronomical images to bring out hidden detail and information.

The idea of such an Astronomy Expo and Fair developed from a number of directions:

* The Astronomical Society of the Pacific has been offering nontechnical discussions of new developments in astronomy since its very first meeting in 1889
* There has been a tremendous growth of interest in astronomy as a hobby in the U.S. *Astronomy* Magazine, the largest circulation magazine for hobbyists in the world, now goes to about 160,000 people and there are hundreds of organized astronomy clubs around the U.S. and Canada, with a total membership in the tens of thousands.

* Scientists and educators have become quite annoyed with the growth of "whole life" and "psychic" expositions around the country, purveying astrology, channeling, psychic readings,cosmic visitors, health through "crystal power" and other forms of pseudo-science. It was time to have an Expo that shared our knowledge of the real universe with the public.

The Scientific Symposium on Massive Stars (Tues - Thur, June 23-25)

Entitled "Massive Stars: Their Lives in the Interstellar Medium," this three-day symposium will bring together experts on the birth, evolution, and death of stars with specialists in the physics of raw material from which stars are born, and into which they expel material.

While there are many more low-mass stars than really massive ones, astronomers have come to understand that massive stars (which often end their lives in gargantuan explosions) play a role in the evolution of our Galaxy far out of proportion to their numbers. Of special interest is the strong wind of charged particles that such stars give off, which can have a major effect on the star's cosmic neighborhood. The shock waves and shells of material generated when such stars explode can also have a tremendous influence on their environment.

Among the topics discussed in invited review talks at the symposium will be:
* The birth of massive stars
* The most luminous stars in our galaxy
* Winds from massive stars and their effect on the interstellar medium
* What we learned from Supernova 1987A, a relatively nearby exploding star that has been studied intensely for five years.

The symposium was organized by a national committee of astronomers chaired by Dr. Joseph Cassinelli of the University of Wisconsin. There will be contributed papers in poster format from over 100 astronomers from around the world.

Workshop on Teaching Astronomy (Tue. & Wed., 6/23 & 24)

As part of its mission to help the teaching of astronomy at all levels, the A.S.P. each year offers a credit workshop called *The Universe in the Classroom* for teachers in grades 3-12. The program introduces a wide variety of effective tools and resources to help improve the teaching of astronomy in our schools. Teachers are encouraged to use students' interest in astronomy and space to help them understand the scientific method, skeptical reasoning, and the fascination of science.

Astronomers and mentor teachers from around the country will be leading sessions throughout the two days for between 100 and 200 teachers. Reporters with an interest in education are invited to sit in and watch the proceedings.

History of Astronomy Program (Wed. afternoon, 6/24)

Wednesday afternoon, there will be a pause in the scientific symposium, to hold the traditional A.S.P. session on the history of astronomy. Among the invited talks will be one by Dr. Arthur Code of the University of Wisconsin, one of the leaders of the university's program to develop pioneering instruments for telescopes on the ground and in space. His talk will be entitled "Photocells, Hot Stars, and Spiral Arms." Just added to the history program is a talk by noted Dutch astronomer Adriaan Blaauw, on the development of the European Southern Observatory.

Astronomy Education Program (Thurs, 6/25)

On Thursday, there will be a special session on the state of astronomy education in the U.S., with invited speakers, contributed papers, and panels of practioners. Among the invited speakers will be:

Darrell Hoff (Astronomy Education Projects Manager at the Harvard-Smithsonian Center for Astrophysics) on "Astronomy Teaching at the Pre-College Level (Is It Like Teaching Quantum Mechanics to Pre-schoolers?)

Robert Brown (Space Telescope Science Institute) on "Astronomy's Education Initiative"

Jeffrey Lockwood (Sahuaro High School, Tucson) on " An Astronomy Research Course for High School Students"

Pat Dasch (NASA's Solar System Exploration Div.) on "From Madison to Mars"

There will also be almost two dozen contributed papers given by people in astronomy education, ranging from college professors (and several students) to high school teachers.

TIP SHEET FOR REPORTERS

for the Astronomical Society of the Pacific Meeting
June 20-25, 1992
University of Wisconsin, Madison

1. The NASA Search for Extra-Terrestrial Intelligence

On Oct. 12, 1992, scientists in Puerto Rico and California will throw the switch to begin the most ambitious and sensitive program in history to detect radio signals from possible extra-terrestrial civilizations. Among its many pioneering characteristics, the NASA instrumentation can analyze the signals coming in at 15 million channels (frequencies) at the same time, and alert astronomers if any channel or groups of channels have a signal that seems different from the background noise of the universe.

The scientist who performed the first such search for intelligently coded radio transmissions (in 1960), Dr. Frank Drake, will be a keynote speaker during the weekend. Today he is Professor of Astronomy at the University of California, Santa Cruz, and President of the SETI Institute, which handles the research program for NASA. The beginning of the NASA Microwave Observing Program (M.O.P.) is the realization of his multi-decade dream to search not just a few stars or a few channels, but the whole sky and a broad range of frequencies for intelligent signals. Drake has a knack for explaining the science in everyday language and makes for a terrific interview.

2. Supernova 1987A: An Update

In 1987, the first exploding star (supernova) visible to the naked eye since the 1600's was spotted in the Southern Hemisphere. Seen in its early stages, the self-destruction of this star was followed by instruments on Earth and in space and continues to receive close monitoring by astronomers from around the world.

At the meeting, Dr. Laurence Marschall (author of *The Supernova Story*) will give a nontechnical review during the weekend of what we have learned about the death of stars from this cataclysm At the symposium on massive stars (which are the progenitors of supernovae), Dr. Nino Panagia of the Space Telescope Science Institute will discuss what we have learned from the Hubble Telescope about the outflowing material from this object. Several papers will describe the interaction of the supernova with its host galaxy, including a poster paper entitled "The Supernova 1987A Environment: Nebula Loops and Napoleon's Hat Nebula".

Also, the world's amateur record holder in discovering supernovae will make a rare U.S. appearance at this meeting. The Rev. Robert Evans, of Hazelwood, Australia, has memorized the appearance of hundreds of galaxies of stars to such a degree that he can spot the new point of light corresponding to an exploding star with his binoculars. He will describe how he does this in a popular-level weekend talk.

3 The Contribution of Amateurs to Astronomical Research

Astronomy differs from most sciences in that amateurs can still make contributions without having extensive equipment or a great deal of formal training. New technologies (including computerized -- or robotic -- telescopes, electronic light detectors, and special image processing software) are giving amateurs access to observations and instruments that only a few decades ago would have tantalized most professionals.

At this meeting there will be several weekend talks on the research work amateurs are doing, including a talk by Russell Genet, Vice-president of the Astronomical Society of the Pacific, and a pioneer in the development of robotic observatories, which can do observations automatically while their owner sleeps. Other speakers will discuss the tremendous potential of CCD's (electronic light detectors) whose falling prices now put them in reach of many serious amateurs. At the Wednesday evening banquet, the Society will give its 1992 Amateur Achievement Award to Richard and Helen Lines, a husband and wife team from Arizona who have made valuable observations of a host of variable stars -- stars that change their light output in sometimes predictable and sometimes unpredictable ways.

4. Women in Astronomy

Astronomy has a longer and richer history of involving women than many other sciences; nevertheless, many problems still remain for women in what continues to be a male-dominated field. The Society has recently published a special expanded issue of *Mercury*, its popular-level magazine, on "women in astronomy," with historical reviews, interviews with noted women astronomers, and analyses of the sociological issues. The co-editor of that issue, Dr. Sally Stephens, the Education Coordinator of the Society, will be at the meeting. In addition, Dr. Vera Rubin of the Carnegie Institution of Washington (one of the leading astronomers in the U.S. and an interview subject for the issue) will give a special invited talk on women in astronomy during the workshop for teachers on Tuesday.

5. The 1992 Bruce Medal to Maarten Schmidt

Given since 1898 for a lifetime of achievement in astronomical research, the Catherine Wolfe Bruce Medal is one of the highest honors an astronomer can receive. The 1992 Bruce Medal will be awarded Wednesday evening to Dr. Maarten Schmidt of Caltech, who first explained the nature of the mysterious cosmic powerhouses that we call quasars. Today he continues a multi-decade research program to discover ever more distant quasars and piece together what they can tell us about the large-scale properties of the universe. Dr. Schmidt will give a nontechnical talk during the weekend and the after-dinner talk at the Wednesday banquet.

6. The Astronomical Society of the Pacific: 103 Years of Serving as a Bridge Between Astronomers and the Public

The A.S.P. itself might be a nice subject for a feature or background story. Founded on the Pacific coast in 1889 (hence the name), the Society today has members in all 50 states and over 60 other countries. One of its primary missions is to disseminate astronomical ideas and discoveries to teachers, students, hobbyists, and the public -- to serve as a bridge between the world of astronomers and those who seek to understand the universe but do not have technical training.

The Society's nonprofit catalog of educational materials goes to over 430,000 people around the world each year, and its newsletter on teaching astronomy in grades 3-12 is received by over 20,000 teachers in the U.S. and translated into six foreign languages. This meeting continues a tradition begun 103 years ago: to bring together professional and amateur astronomers, teachers, and interested laypeople to talk about the exploration of the cosmos.

For other ideas or suggestions for good people to interview, don't hesitate to get in touch with

Andrew Fraknoi or Sally Stephens at the ASP (415-337-1100) or
Robert Mathieu, the Chair of the Local Organizating Committee at the University of Wisconsin (608-262-5679)

Information and Press Contacts for the 104th Annual Meeting of the Astronomical Society of the Pacific
June 20 - 25, 1992
University of Wisconsin, Madison

At the Astronomical Society in San Francisco:

Andrew Fraknoi or Sally Stephens: (415) 337-1100

At the University of Wisconsin in Madison:

Dr. Robert Mathieu, Astronomy Dept. (Chair, Local Organizing Committee) (608) 262-5679
Kathy Stittleburg, Public Information Contact for the Department of Astronomy and the Space Science Lab (608) 263-4686
Terry Devitt, Science Editor for the News and Information Service at the University (608) 262-8282

At *Astronomy* Magazine in Milwaukee:

Alan Dyer, Associate Editor and Co-organizer of *Universe '92*, the Weekend Expo (414) 796-8776 ext. 605

At the Adler Planetarium in Chicago:

April Whitt (312) 322-0304

Astronomy, Dept. of.

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NEWS

UNIVERSITY OF WISCONSIN–MADISON

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FOR IMMEDIATE RELEASE 6/9/92

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NATIONAL ASTRONOMY EXPO AND FAIR TO DEBUT AT UW-MADISON

MADISON — Universe '92, the first-ever national Astronomy Exposition and Fair, will debut at the University of Wisconsin-Madison later this month.

For two days (June 20 and 21), the Wisconsin Center on the UW-Madison campus will be the setting for astronomy workshops, exhibits and non-technical talks by some of the world's top astronomers.

"The idea behind the fair is that exploring the universe is fun," said Robert D. Mathieu, a UW-Madison astronomer. "This is a chance for us to share that fun with everyone."

The expo and fair, part of the 104th annual meeting of the Astronomical Society of the Pacific (ASP), is an important new facet of a meeting traditionally organized with professional astronomers in mind.

"This kind of fair is a unique format for any astronomy or scientific conference that we know of," said Alan Dyer, associate editor of Astronomy magazine. "Traditional conferences and conventions haven't really satisfied the growing public interest in astronomy."

The number of people pursuing astronomy as a hobby has nearly tripled in the last

-more-

10 years, Dyer said. Providing hobbyists and anyone with an interest in astronomy and space exploration with access to the most recent developments in professional astronomy is a principal objective of fair organizers, he said.

The fair will feature some of the world's most prominent astronomers who'll give talks on subjects such as:

- The scientific search for extraterrestrial intelligence.
- Crashing asteroids and the extinction of dinosaurs.
- The Magellan space probe's exploration of Venus.
- Amateur discoveries of exploding stars.
- How to select the right telescope for beginners.
- The latest results from the Hubble Space Telescope.

In addition to general-interest talks, the fair and expo will feature workshops for amateurs and teachers, a "show and tell" room for hobbyists, an exhibition of telescopes and accessories, and computer software demonstrations.

On Saturday (June 20), there will be a "Star Party," beginning at approximately 9 p.m., at the Washburn Observatory, situated on Observatory Drive overlooking Lake Mendota. The party, weather permitting, will allow fairgoers a chance to peer through Washburn's 114-year-old refracting telescope as well as a number of smaller telescopes that will be set up on the lawn around the observatory.

The expo and fair is being hosted by the UW-Madison Astronomy Department, and is co-sponsored by Astronomy magazine, and Chicago's Adler Planetarium.

The fair and expo will be held at the Wisconsin Center, 702 Langdon St., from 9 a.m. to 6 p.m. on both Saturday, June 20; and Sunday, June 21. A day-long pass is $12 for adults, and $6 for students of all ages and seniors. Weekend passes are also available for $20 for adults and $10 for students and seniors. Tickets will be available at the door.

For more information, contact Kathy Stittleburg at the UW-Madison Space Astronomy Laboratory, (608) 263-4686.

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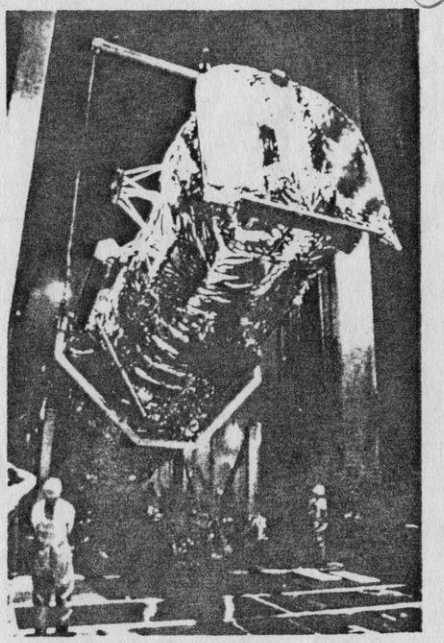
— Terry Devitt (608) 262-8282

WI. Alumni Magazine
March, 1990
Dept of Astronomy



Right: The Andromeda Galaxy is our nearest spiral galaxy, yet it is still two million light years away. With the Hubble Space Telescope, scientists will be able to study stars five or six billion light years away. Above: The 12-ton HST is as big as a boxcar and contains six scientific experiments. At an estimated cost of $2.2 billion, it is the most sensitive—and expensive—space observatory ever constructed.

STAR

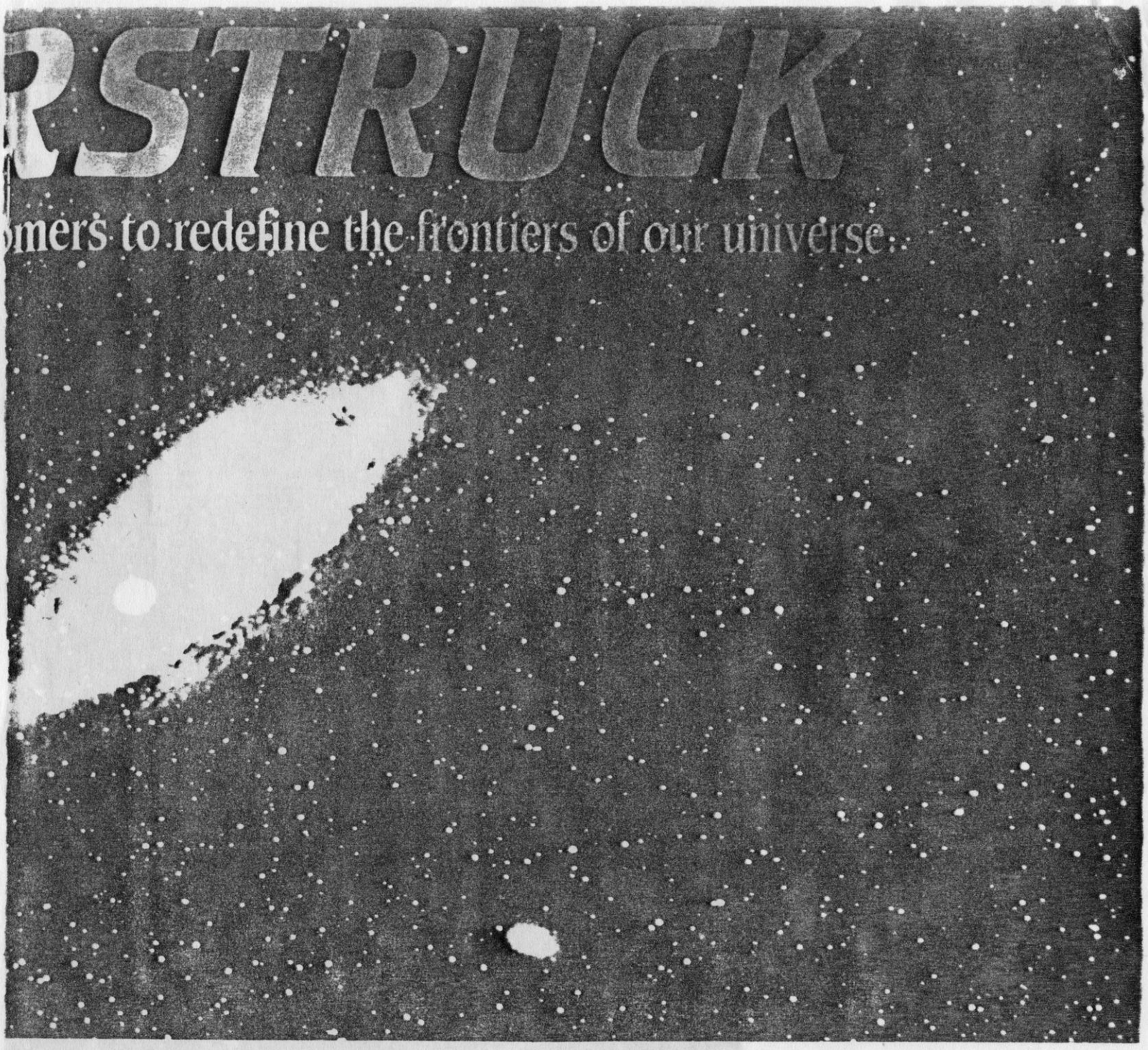
NASA looks to UW astrono

On the seventh day of January, in the present year 1610, at the first hour of the night, when I was viewing the heavenly bodies with a telescope, Jupiter presented itself to me; and because I had prepared a very excellent instrument for myself, I perceived (as I had not before, on account of the weakness of my previous instrument) that beside the planet there were three starlets, small indeed, but very bright . . .''

Galileo Galilei

RSTRUCK

mers to redefine the frontiers of our universe

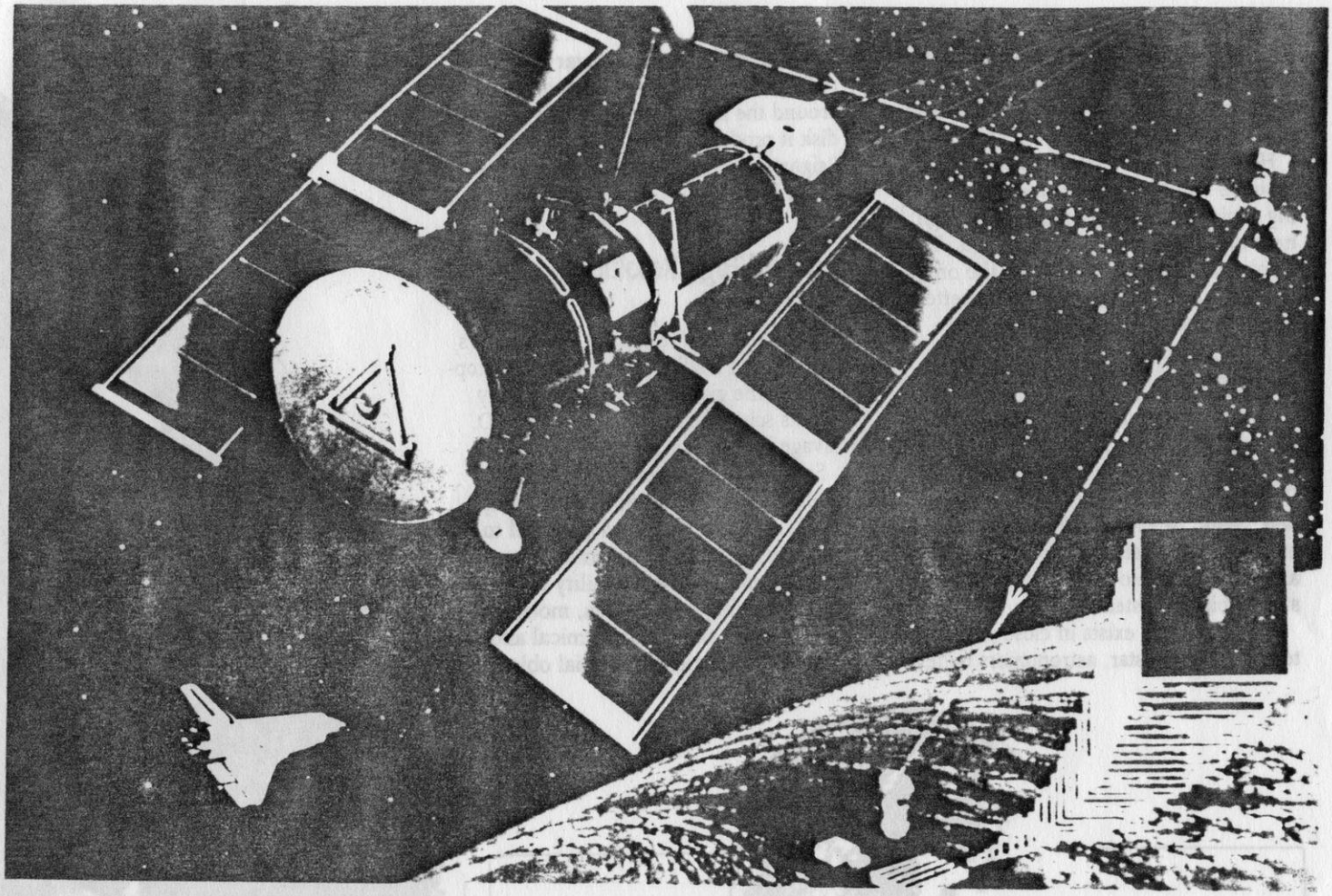


by Terry Devitt '78, '85

Four hundred years ago, when the great Italian scientist Galileo Galilei pointed his new telescope toward the heavens, he destroyed forever the age-old view that the earth was the center of the physical universe. He discovered the moons of Jupiter and the phases of the planet Venus and he could see objects thirty times closer than with the naked eye.

Since then, huge optical telescopes have been developed to look even deeper into the mind-stretching mysteries of the universe. But the ability of astronomers to probe the heavens from the ground has continued to be limited by the earth's atmosphere (see accompanying sidebar). This year, however, our view of the universe should undergo a change as radical as that ushered in by Galileo and his telescope.

In April and May, NASA is scheduled to launch two observatories that promise unparalleled views of the cosmos. One will assume a fifteen-year orbit around the earth—the other will be a space shuttle payload on a series of missions. The projects, which have been inching toward the launch pad for more than a decade, are the Hubble Space Telescope (HST) and the Astro ultraviolet and X-ray observatory. UW astronomers and engineers, working in our pioneering Space Astronomy Laboratory, have played key roles in both projects and will be rewarded with ringside seats for what should be the most intimate views ever of the universe.



Here the HST is shown in orbit receiving light from a distant star. The telescope's mirror directs the light to various onboard instruments that process and record data, then transmit it to a Tracking and Data Relay Satellite (at right). In turn, the data is sent to earth stations at White Sands, New Mexico, and to NASA's Goddard Space Flight Center outside Washington.

HUBBLE SPACE TELESCOPE

According to NASA, HST is the most complex and sensitive space observatory ever constructed. At an estimated cost of $2.2 billion, with six scientific experiments aboard, it is also the most expensive.

When it sweeps into orbit this April, astronomers hope they'll soon be able to see stars and galaxies only dimly seen before. The space shuttle will deploy HST into an orbit 368 miles above the earth, where it will function as a remotely controlled observatory, providing astronomers with data and images into the 21st century.

"If we can see a given object at a distance of, say, a billion light years from the earth, with the space telescope we'll be able to see that same object at a distance of five or six billion light years," says UW astronomer Robert C. Bless. "The volume of the universe that is open to us for exploration will be increased enormously."

High Speed Photometer

Bless is the chief scientist for the High Speed Photometer, one of three scientific instruments aboard the HST that were developed by UW scientists. Like a sophisticated light meter, the photometer is able to detect very rapid fluctuations in the intensity of light from celestial objects. In the time it takes a bullet speeding from the muzzle of a high-powered rifle to travel one inch, the High Speed Photometer can complete three measurements. That's as fast as once every ten-millionth of a second.

These measurements cross a wide range of the spectrum, from ultraviolet light to just beyond visible red, allowing for many unique studies. Such things as black holes, pulsars, binary star systems, and supernovas will be sought out and scrutinized. Moreover, the instrument will probe the mysteries of planetary rings, which are among the most intriguing and puzzling phenomena of our solar system.

Built at the university's Space Science and Engineering Center under the direction of engineer Evan Richards, the photometer is the only part of the giant telescope designed and built by faculty and students at a university. It is also the least expensive of the six instruments comprising the HST scientific payload, and it was the only instrument delivered to NASA on time and under-budget (at $10 million). Our scientists will be seeking to increase their knowledge of:

Pulsars

These rapidly spinning stars act like beacons, pulsing at regular intervals of up to a hundred times per second. So far, only two pulsars have been observed in ordinary light, but the High Speed Photometer may be able to detect many more in ultraviolet light. It will also be able to add to our knowledge about the many pulsars previously identified solely by radio emissions.

Planetary Rings

Photometric studies may provide new insights into how planetary rings are structured. And these clues, in turn, may tell astronomers how the rings evolved, whether they were created at the time of the planet's birth, or whether their origin is more recent.

The giant planets Saturn, Jupiter, Uranus, and Neptune have ring systems that are spectacularly complex and poorly understood. Take, for instance, the 40,000-mile-wide ring system of Saturn. Scientists

believe it may entail hundreds of thousands of ringlets, each composed of ice particles ranging in size from mote-sized grains to particles the size of small trucks.

High Speed Photometer studies of ring systems will be accomplished by recording rapid changes in the apparent brightness of stars seen through the rings. The resolution is expected to be on the order of 1 kilometer, or about 30 times better than the best images taken from the *Voyager* space probe.

Black Holes

These stellar corpses are so massive and compact that even light cannot escape their gravitational pull. The High Speed Photometer will look for black holes—believed to be the remains of stars that have consumed all of their nuclear fuel and collapsed onto themselves—in two-star or binary systems.

If a black hole exists in close proximity to a companion star, astronomers believe material from the nearby star accretes onto the hole, forming a disk of material around the hole. As matter falls onto the disk it produces radiation, and a telltale "signature" of rapidly flickering ultraviolet light.

Goddard High Resolution Spectrograph

Two other UW-Madison astronomers have played leading roles in the development of the giant orbiting observatory and its scientific instruments—Blair D. Savage and Arthur D. Code.

Savage is a co-investigator for the Goddard High Resolution Spectrograph, an HST scientific payload designed to separate light into its constituent spectral components. Such a capability is essential in determining composition, motion, temperature, and other chemical and physical properties of celestial objects.

Why Put Telescopes In Space?

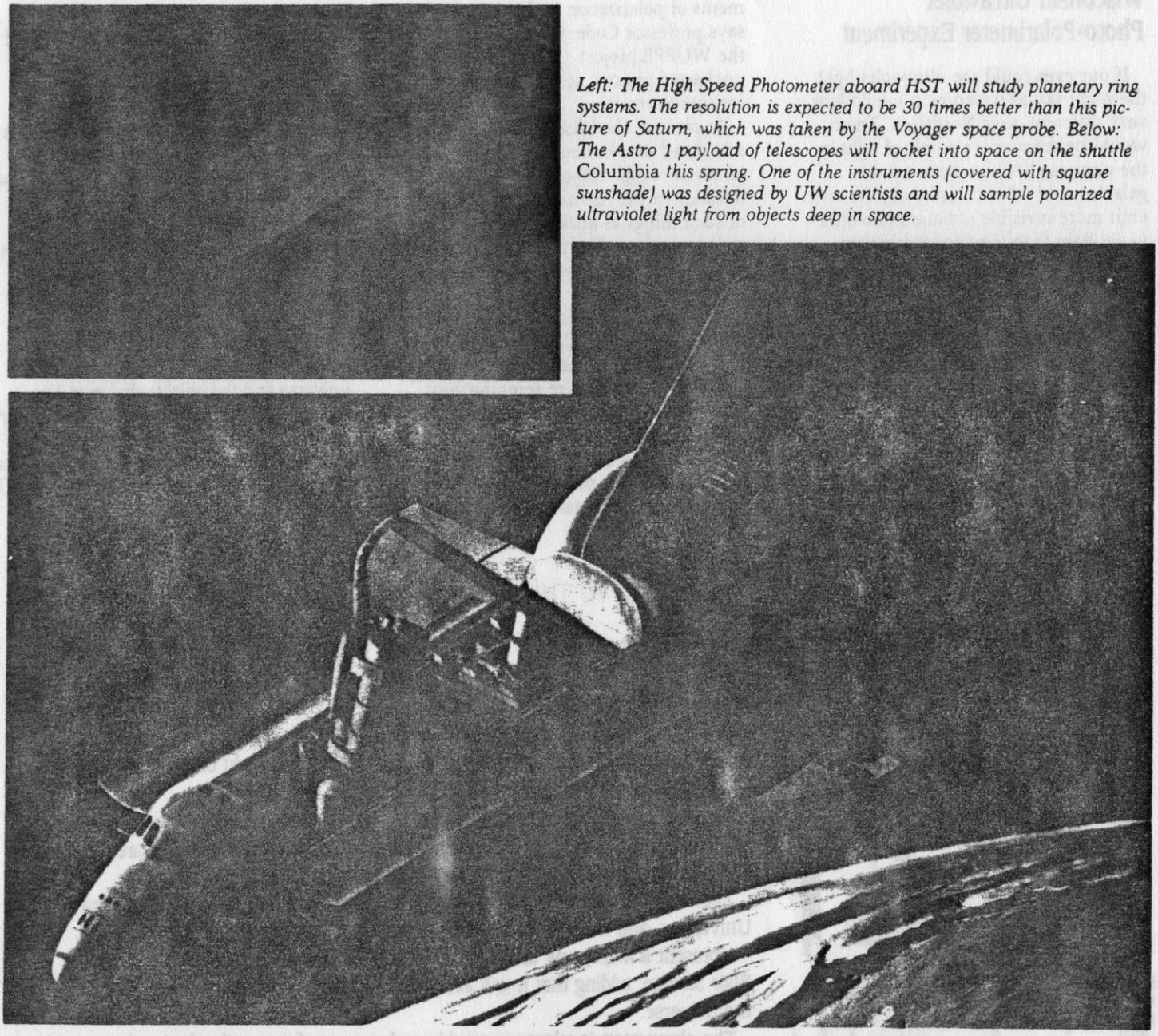
Observing stars from the earth has been likened by astronomers to studying birds from the bottom of a swimming pool. No matter how big or powerful, the view from ground-based telescopes is obscured in two important ways by the hazy veil of the earth's atmosphere.

First, the visible light that does reach the surface of the earth is distorted as it passes through the atmosphere. Turbulence created by masses of hot and cold air makes stars seem to twinkle.

Second, the visible light rays that penetrate the earth's atmosphere are only a small portion of the electromagnetic radiation given off by stars and other celestial objects. X-rays, ultraviolet light, infrared radiation, and other wavelengths of light are mostly absorbed by the atmosphere. But each region of the spectrum tells a different story. Each can give astronomers important insights into the physical and chemical makeup of stars and planets, stellar evolution, and the nature of the universe itself.

By giving telescopes such as the Hubble Space Telescope and the Astro observatory vantage points above the murk of our atmosphere, astronomers will be able to obtain a range and quality of images impossible to get from the ground.

The HST will be able to take high-quality pictures like this one of Mars. The planet's red color is caused by the rusting away of the Martian "soil," which is rich in iron.



Left: The High Speed Photometer aboard HST will study planetary ring systems. The resolution is expected to be 30 times better than this picture of Saturn, which was taken by the Voyager space probe. Below: The Astro 1 payload of telescopes will rocket into space on the shuttle Columbia *this spring. One of the instruments (covered with square sunshade) was designed by UW scientists and will sample polarized ultraviolet light from objects deep in space.*

"It's a versatile instrument," Savage says. "With it we'll look at stars, galaxies, planets, and quasars." For example, scientists will take a detailed look at the coronas of the Milky Way and other galaxies, a subject of special interest to Savage. "The gaseous galactic corona is a very tenuous, very hot gaseous envelope that surrounds the Milky Way," he says. "It's analogous in many respects to the corona that surrounds the sun."

According to Savage, the chief means of analyzing the galaxy's invisible envelope of gas is by looking at how ultraviolet radiation is absorbed by the gas. And because ultraviolet radiation from space is absorbed by the earth's atmosphere, it's necessary to take such measurements from space.

Wide Field and Planetary Camera

Professor of Astronomy Code is a co-investigator for the Wide Field and Planetary Camera, the space telescope's workhorse imaging instrument. Code, considered a world pioneer in space-based astronomy, has played a leading role in the community of scientists that guided overall development of the HST.

He will plumb the mysteries of gas clouds that surround some stars. Called planetary nebulae, they are formed by material thrown off by the stars they envelope and may hide additional stars at their centers.

ASTRO I

Just one month after the Hubble Space Telescope is placed in a near-earth orbit, the shuttle *Columbia* will rocket into space carrying the Astro 1 observatory, a payload of X-ray and ultraviolet telescopes, one of which was built and designed here.

Unlike Hubble, the Astro observatory is not an independent satellite. The battery of Astro telescopes will be deployed in the space shuttle's cargo bay and, at the end of a ten-day mission, will be folded back into the spacecraft for the return trip to earth. After refurbishment, the telescopes may be launched on as many as two more Astro missions, and Professor of Astronomy Kenneth H. Nordsieck may fly on one of them as a payload specialist.

Wisconsin Ultraviolet Photo-Polarimeter Experiment

If our eyes could see ultraviolet light, the night sky as we know it would look very different, says Nordsieck. There would be many more points of light in the universe because stars, comets, galaxies, and other celestial objects often emit more invisible radiation like ultraviolet light than they do visible light.

The Wisconsin Ultraviolet Photo-Polarimeter Experiment, or WUPPE (pronounced "whoopee"), is designed to sample polarized ultraviolet light from objects deep in space. The 800-pound telescope was built entirely by scientists, engineers, and students at our Space Astronomy Laboratory, and it is much like a conventional reflecting telescope except that it will look only at ultraviolet light.

"There have been virtually no measurements of polarization in the ultraviolet," says professor Code, who is overseeing the WUPPE project. "It's completely uncharted ground, so we're going to be in for some surprises."

At present, the Wisconsin telescope is scheduled to take detailed measurements of seven or eight objects a day for the duration of the Astro mission. The secrets of such things as quasars, nebulae, interstellar magnetic fields, and the geometry and physical nature of distant stars may be revealed.

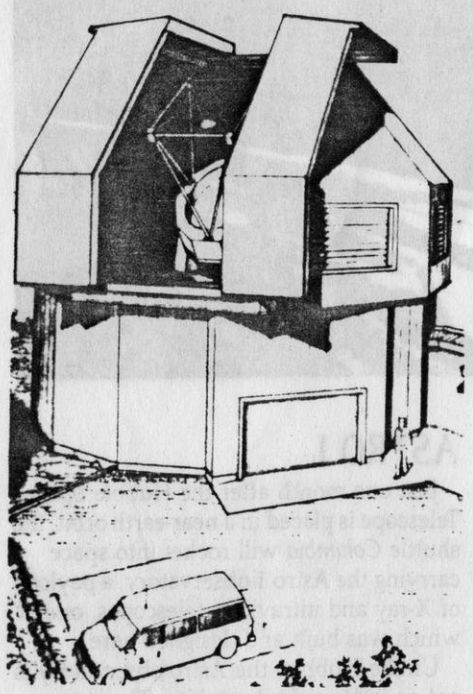
"Polarization allows you to think about the shape of stars," Code says. We tend to think of these celestial objects as being spherical. But if they're spinning very fast, Code says they will be slightly flattened instead.

The twelve-foot-long WUPPE will also help astronomers penetrate the dust shells that obscure some stars. Studies of how light interacts with clouds of interstellar dust will tell astronomers something about the size, shape, and other physical characteristics of the dust grains. "Such knowledge," adds Code, "will lead to new insights about where and how new stars are born because interstellar dust is the material of which stars are made."

It is this quest to learn how the universe was created that puts UW-Madison's space astronomy program at the fore of NASA's research efforts. The deployment this spring of the Astro observatory and the Hubble Space Telescope will usher in a new golden era for astronomy studies here and around the world, providing a better fundamental understanding of the universe and the objects that populate it. And like Galileo's observations some four hundred years ago, these new ways of probing the heavens will undoubtedly tell us something about our own place in them.□

LOOKING TO THE FUTURE:

UW Astronomers Keep One Foot on the Ground



With its multi-object capabilities, the proposed WINN telescope will be akin to having 100 telescopes in one. Through fiber optics, students and astronomers in Sterling Hall will be able to access the observatory 1,500 miles away in Kitt Peak, Arizona.

While UW-Madison astronomers will be flying high in 1990 with two space-based observatories, Wisconsin star gazers haven't lost sight of the value of ground-based astronomy.

To pave the way for future generations of Wisconsin students and researchers, UW-Madison plans to join a consortium and, if sufficient private funds are raised, will develop a major new observatory at Kitt Peak, Arizona.

The observatory will be built and operated in cooperation with Yale, Indiana University, and the National Optical Astronomy Observatories (NOAO). It will "represent a major new astronomical facility for the country," says professor Blair Savage, adding that it will allow us to study objects near the edge of the universe.

The observatory's telescope would employ a set of new technologies that would make it one of a new generation of telescopes, according to astronomy professor Arthur Code.

At the heart of the new telescope would be a "spin cast" mirror, a revolutionary new type of astronomical mirror that will give the telescope a wider field of view than traditional telescopes. Moreover, the telescope will employ a device called a multi-object spectrograph that will enable astronomers to obtain observations of a large number of objects in a single exposure.

"When completed, it will be the largest multi-object instrument of its kind," says Code. "In terms of traditional astronomy, it will be like having one hundred telescopes."

Although the telescope would be located on a mountain peak some 1,500 miles from Madison, astronomers and students here would be able to use it from an observing station planned for Sterling Hall. The cost of the observatory, estimated at $10 million, would be shared by consortium members.

uw news

From the University of Wisconsin-Madison / News Service, Bascom Hall, 500 Lincoln Drive, Madison 53706 / Telephone: 608/262-3571

Astronomy Dept

Release: Immediately 8/22/89

CONTACT: Jeffrey W. Percival (608) 262-8686

A CLOSE ENCOUNTER OF THE NEPTUNE KIND

MADISON--University of Wisconsin-Madison astronomers will be on hand Thursday night (Aug. 24) to do a public play-by-play of the Voyager 2 spacecraft's close encounter with the planet Neptune.

Using NASA select, a cable television channel used to broadcast pictures from space and other NASA news, UW-Madison astronomers Jeffrey Percival and Matthew Nelson will lend astronomers' insight into the pictures sent back to Earth by Voyager 2 as it makes its closest pass to Neptune and its four known moons.

The spacecraft's encounter with the eighth planet, one of the most distant in our solar system, should provide good views of the recently-discovered partial rings of Neptune and some of the surface features of the Neptunian moons.

The Voyager 2 probe's closest approach to Neptune is planned to be about 3,000 miles above the planet's northern hemisphere.

The UW-Madison event will take place from 6:30 to 9:30 p.m. in Room 204 of the UW-Madison Educational Sciences Building, 1025 W. Johnson St.

The event is free and open to the public.

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-- Terry Devitt (608) 262-8282

uw news

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Release: EMBARGOED for Thursday, March 16 3/16/89

NOTE TO EDITORS AND NEWS DIRECTORS: Due to a scheduling conflict, sources cited in this story will be out of town March 16. Astronomers Joespeh P. Cassinelli (608) 262-4909 and Robert D. Mathieu (608) 262-5679 will be able to comment and answer any questions reporters might have about the WIN project.

UW TO PURSUE MAJOR ASTRONOMICAL OBSERVATORY

MADISON--More than a century after building its first large astronomical observatory, the University of Wisconsin-Madison is poised to embark upon a new era of ground-based astronomy.

The university has joined a consortium and, if sufficient private funds are raised, will participate in the building and operation of a major new observatory at Kitt Peak, Ariz.

UW-Madison astronomers announced their intentions today (March 16) as researchers at the University of Arizona unveiled the primary mirror for a telescope of unique design and ability that will be housed in the new observatory.

"When completed, it will be the largest multi-object instrument of its kind," said UW-Madison astronomer Arthur D. Code. "In terms of traditional astronomy, it will be like having 100 telescopes."

Plans call for a research consortium to build and operate the observatory. Indiana University and the National Optical Astronomy Observatories (NOAO), along with UW-Madison make up the consortium, known as WIN.

The cost of the observatory, estimated at $10 million, would be shared by consortium members. It will be constructed at the Kitt Peak National Observatory west of Tucson, Ariz. Through technologies developed here, UW astronomers would be able to operate the telescope from an observing station

-more-

on campus.

The new observatory "represents a major new astronomical facility for the country," said UW-Madison astronomer Blair D. Savage. "It will allow us to tackle an enormous spectrum of astronomical programs ranging from studies of the planets of our own solar system to objects near the edge of the universe."

Wisconsin has long been considered a pioneer in space astronomy -- placing telescopes and other astronomical devices on orbiting platforms in space. But the university has lacked direct access to a major ground-based telescope since early in this century when the now 110-year-old Washburn Observatory was a state-of-the art facility.

"There is a great need to increase our ground-based capability," said Code. "This is a major step in that direction."

The UW-Madison contribution to the WIN project would amount to some $5 million, said Savage. He emphasized that the university's involvement in the consortium is contingent upon its ability to raise money for the project through the UW Foundation.

Consortium members expressed hope that the WIN observatory will be completed and commence operation sometime in 1993.

Although the WIN Telescope will be located on a mountain peak 1,500 miles from Madison, astronomers here would be able to use the telescope from an observing station to be built in Sterling Hall on campus.

The idea of remotely operating the powerful new telescope borrows from Wisconsin expertise and technology used to operate telescopes in space.

The Sterling Hall control room would have banks of television and computer monitors to display images and data from space. It would also have a direct voice link to the telescope's operator at Kitt Peak.

"This remote capability means we can involve more people," said Savage. "Our students, both graduate and undergraduate, would benefit tremendously. They'd have the rare opportunity to get their hands on a unique and powerful

tool."

With a 3.5 meter (11 1/2 foot) diameter "spin cast" mirror (see sidebar), a very wide field of view and electronics capable of digesting and storing information from a large number of celestial objects simultaneously, the WIN Telescope will be one of the first of a new generation of telescopes, said Code.

"Using new technologies we hope to help astronomy go on to larger and better telescopes after years of limitations," he said.

According to Code, the telescope's wide field of view will greatly multiply its power and usefulness.

What will make the WIN Telescope unique, said Code, will be its ability to collect light from many objects at one time and route that light through bundles of fiber-optic cables to an innovative device called a multi-object spectrograph.

A spectrograph is a device that breaks light down into its constituent wavelengths. Astronomers study the different wavelengths of light to determine the chemical composition and physical nature of a star or other celestial object.

"In a single exposure we will be able to obtain the spectra of a huge number of objects," Savage said. "That will save us an enormous amount of observing time."

Such a device and the telescope's wide field of view, said Code, will enable astronomers to map the large-scale structure of the universe. The universe, explained Code, appears to look a lot like Swiss cheese -- with great clusters of stars and galaxies separated by large voids.

"To map that out you have to survey regions of space larger than those structures. You need to get beyond the inside of one hole in the Swiss cheese," he said.

UW-Madison physicists also would employ the WIN Telescope to study wisps of gas around the planets in our own solar system and in interstellar space.

About 20 UW-Madison researchers and large numbers of students would have access to the telescope when it is completed, Savage said, and many more would play a role in its design and construction.

The observatory to house the WIN Telescope will be of innovative design. Instead of the traditional dome, the WIN Telescope enclosure will have a square design in order to minimize air currents that can distort the telescope's images.

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USING AN OVEN THAT SPINS, RESEARCHERS CAST AN INNOVATIVE TELESCOPE MIRROR

MADISON--For astronomers, one exciting aspect of the WIN Telescope will be its spin cast mirror, only the second of its kind in the world.

Spin cast technology is being pioneered by Professor Roger Angel at the University of Arizona, where technicians and scientists this past fall used an oven that spins on a turntable to cast molten glass into the primary mirror for the WIN Telescope.

In modern telescopes, mirrors are used to collect light given off or reflected by stars, planets, quasars and other celestial objects.

Traditionally, such mirrors were made by grinding great slabs of glass into the desired parabolic shape, a shape much like a curved dish or shallow bowl.

But that technique, according to UW-Madison Professor of astronomy Blair D. Savage, is a costly and time-consuming affair that has reached its technological limit.

The new spin cast technique allows for the construction of larger, lightweight mirrors with a higher degree of curvature, he said.

"As the furnace spins, the molten glass assumes a parabolic shape," said Savage. "The faster you spin it the more pronounced the curvature.

"When the glass solidifies it has the approximate shape you need. You don't have to spend enormous amounts of time and money grinding out glass."

-more-

Add 1--WIN sidebar

The high degree of curvature of the WIN Telescope's mirror means that the telescope itself will have a stubby appearance, being much shorter than a traditional telescope of equivalent power, Savage said.

But that also means the building to house the telescope will be smaller and cost less, he said. The total cost of the WIN Observatory will be about one-third as much as a traditional observatory of the same capability.

The top surface of the WIN mirror will be only about an inch thick and will be formed over a honeycombed structure that will give the mirror strength. The glass is then polished and coated with a thin layer of aluminum to give the mirror its shiny, highly reflective surface.

Because they are so thin, spin cast mirrors are amazingly light, according to astronomy Professor Arthur D. Code. With less mass, the mirror will be able to quickly achieve what astronomers call thermal equilibrium.

Thermal equilibrium means having the telescope's mirror at the same temperature as its environment. If the mirror is not at the same temperature as its environment, small distortions in the surface of the mirror can blur its images.

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-- Terry Devitt (608) 262-8282

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Researchers will cast an innovative telescope mirror

WI,Week 3/15/89

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"When the glass solidifies it has the approximate shape you need. You don't have to spend enormous amounts of time and money grinding out glass."

The high degree of curvature of the WIN Telescope's mirror means that the telescope itself will have a stubby appearance, being much shorter than a traditional telescope of equivalent power, Savage said.

But that also means the building to house the telescope will be smaller and cost less, he said. The total cost of the WIN Observatory will be about one-third as much as a traditional observatory of the same capability.

The top surface of the WIN mirror will be only about an inch thick and will be formed over a honeycombed structure that will give the mirror strength. The glass is then polished and coated with a thin layer of aluminum to give the mirror its shiny, highly reflective surface.

Because they are so thin, spin cast mirrors are amazingly light, according to astronomy Professor Arthur D. Code. With less mass, the mirror will be able to quickly achieve what astronomers call thermal equilibrium.

Thermal equilibrium means having the telescope's mirror at the same temperature as its environment. If the mirror is not at the same temperature as its environment, small distortions in the surface of the mirror can blur its images.

—By Terry Devitt

UW part of consortium

Astronomical observatory within sights

Astronomy Dept

WI. Week 3/15/89

By Terry Devitt

More than a century after building its first large astronomical observatory, the UW–Madison is poised to embark upon a new era of ground-based astronomy.

The university has joined a consortium and, if sufficient private funds are raised, will participate in the building and operation of a major new observatory at Kitt Peak, Ariz.

UW–Madison astronomers announced their intentions Thursday (March 16) researchers at the University of Arizona unveiled the primary mirror for a telescope of unique design and ability that will be housed in the new observatory.

"When completed, it will be the largest multi-object instrument of its kind," said UW–Madison astronomer Arthur D. Code. "In terms of traditional astronomy, it will be like having 100 telescopes."

Plans call for a research consortium to build and operate the observatory. Indiana University and the National Optical Astronomy Observatories (NOAO), along with UW–Madison make up the consortium, known as WIN.

The cost of the observatory, estimated at $10 million, would be shared by consortium members. It will be constructed at the Kitt Peak National Observatory west of Tucson, Ariz. Through technologies developed here, UW astronomers would be able to operate the telescope from an observing station on campus.

The new observatory "represents a major new astronomical facility for the country," said UW–Madison astronomer Blair D. Savage. "It will allow us to tackle an enormous spectrum of astronomical programs ranging from studies of the planets of our own solar system to objects near the edge of the universe."

Wisconsin has long been considered a pioneer in space astronomy—placing telescopes and other astronomical devices on

AN ARTIST'S RENDITION of the proposed WIN observatory at Kitt Peak, Ariz.

—over—

UW directories now available

Staff and student directories, distributed last week, feature color photos of the University Bay Marsh. Among new features is the complete campus map folder, with 1986–87 statistics, in the back of the staff directory.

Norman Lenburg took the cover photos last summer for the University News and Information Service. The cover design is by Earl Madden, art director for University Publications. John Gruber, Office of Public Information, is editor/coordinator. For the staff directory, the Payroll Office provided the alphabetical list, and Secretary of the Faculty's office the lists of departments and faculty by schools and colleges. The publisher, Telephone Directory Marketing, Ltd., Madison, is responsible for advertising sales for both directories.

Copies may be purchased through University Stores, stock item 3221 for the staff directory, 3227 for the student directory.

For personal use, the directories are on sale at University Book Store, Union South and Brown's Book Shop. ■

Noren heads health center

WI. Week 10/22/86

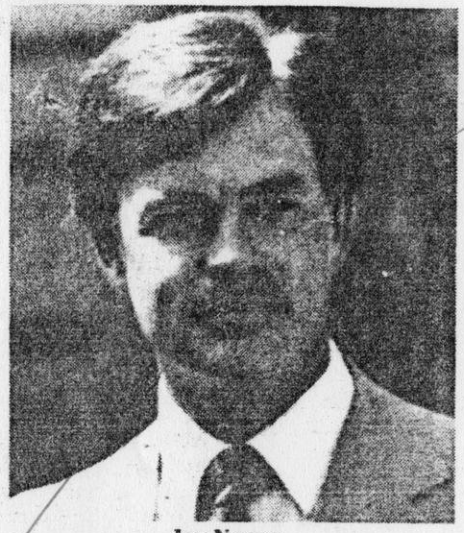
Dr. Jay Noren has been named vice chancellor for health sciences at UW–Madison.

Chancellor Irving Shain announced Noren's appointment last Friday following UW Board of Regents' approval of the action.

Noren, 41, has been a member of the Center for Health Sciences administrative staff since 1982, and has been serving as acting vice chancellor for health sciences. In that role, Noren oversees the operation of health-related programs of the UW–Madison, including UW Hospital and Clinics, the Medical School, School of Nursing, School of Pharmacy, School of Allied Health Professions, State Laboratory of Hygiene and University Health Service.

An associate professor in the UW Medical School department of preventive medicine, Noren directed that department's administrative medicine program from 1979 to 1983.

A member of the UW Medical School faculty since 1976, Noren holds an M.D. degree from University of Minnesota Medical School and a master's degree in public health from Harvard University. His areas of clinical specialization are preventive medicine, occupational medicine and internal medicine. ■



Jay Noren

Lagally, Finman honored

WI. Week 10/22/86

Ted Finman, a professor of law, and Max G. Lagally, a professor of metallurgical and mineral engineering, have been appointed Bascom Professors of Law and Surface Science and Technology, respectively.

The UW System Board of Regents approved the appointments Friday, Oct. 10.

Finman has had an active role in civil service and has used his knowledge of civil procedure, legal process, professional responsibility and free speech to help the university deal with social and political issues of the last decade and a half.

He served as chairman of the University Committee from 1974–76. He also assisted the university in drawing up the University's rules on sexual harrassment, and chaired the recent Ad Hoc Task Force on UW–Madison Enrollment. Through the offices he's held, Finman has had a major role in shaping the policies, procedures and customs of the University of Wisconsin–Madison.

Lagally is one of the world's top experts in the use of diffraction for the analysis of surface structure. He has designed and built advanced instruments in that area, and his research program stands out as one of the strongest and best-supported in the UW–Madison College of Engineering.

Lagally was instrumental in developing UW–Madison's Materials Science Program, and currently is director of the Thin-Film Deposition and Application Center.

Their professorships are named for John Bascom, who served as the UW's sixth president from 1874–87. ■

Hotline open for space buffs

Astronomy Dept

Now that Halley's Comet is blazing a trail back to deep space, the popular "Halley Hotline" will sign-off.

The Hotline, established as a telephone service of UW–Madison's astronomy department provided callers with comet viewing tips over the past year.

But have no fear fellow space enthusiasts, you can still phone 262–4636 for your space information needs. "Celestial Connections" will relay monthly messages on stellar and planetary observations, sky trivia, public lectures and public viewing hours at UW–Madison's Washburn Observatory. ■

P U B L I C S E R V I C E
A N N O U N C E M E N T

From the University of Wisconsin-Madison
500 Lincoln Drive/Madison WI 53706

University News Service
(608) 262-3571

For use through 4/25/86

11/14/85

VERSION 1: 10 seconds

GET THE LATEST TIPS FOR VIEWING HALLEY'S COMET BY CALLING THE HALLEY HOTLINE. YOU'LL GET UP-TO-DATE COMET INFO FROM SOME OF THE NATION'S TOP ASTRONOMERS. CALL THE HOTLINE AT 608-262-INFO.

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VERSION 2: 15 seconds

ATTENTION, HALLEY'S COMET WATCHERS! GET THE LATEST VIEWING TIPS BY CALLING THE HALLEY HOTLINE. A RECORDED MESSAGE WILL PUT YOU IN TOUCH WITH THE LATEST COMET NEWS FROM TOP ASTRONOMERS. YOU CAN ALSO LEAVE YOUR NAME AND ADDRESS TO RECEIVE FREE ISSUES OF "THE HALLEY HERALD." DIAL THE HALLEY HOTLINE AT 608-262-INFO.

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uw news

From the University of Wisconsin-Madison / News Service, Bascom Hall, 500 Lincoln Drive, Madison 53706 / Telephone: 608/262-3571

Release: Immediately 11/14/85

[Editors/News Directors: Halley sky charts are available for the media from Kathy Stittleburg at the Space Astronomy Lab, (608) 263-4686. The charts will be updated periodically during the months that Halley can be observed.]

CONTACT: Mark Slovak (608) 262-7542

UW-MADISON ASTRONOMERS INSTALL HALLEY HOTLINE

MADISON--As a service to Halley's comet watchers, University of Wisconsin-Madison astronomers have set up a Halley's Hotline to provide the latest information on the celestial happening of the year.

By dialing (608) 26C-INFO, callers can tap a recorded message giving the most up-to-date Halley information as well as viewing tips from some of the nation's top astronomers.

Sponsored by the university's astronomy department and the UW-Madison Space Astronomy Lab, the service allows callers to leave names and addresses to receive issues of "The Halley Herald." To be published for the next six months, the free publication will provide detailed charts and information on where to look for the comet and the best times to catch a glimpse.

The Herald, also available free at Madison public libraries, will have stories on such things as comet watching, Halley's through history and the comet armada, a fleet of unmanned spacecraft sent up to meet the comet. The publication also will contain a comet trivia feature and cosmic comet calendar.

Scientists say Halley's will be the faintest it's been in two thousand years in this once-every-75-year sweep past the earth. Still, the comet can be seen with the aid of a small telescope or pair of binoculars. And the key, say astronomers, will be knowing just when and where to look for the comet.

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-- Terry Devitt (608) 262-8282

uw news

From the University of Wisconsin-Madison / News Service, Bascom Hall, 500 Lincoln Drive, Madison 53706 / Telephone: 608/262-3571

Astronomy Dept

Release: Immediately 10/29/85

CONTACT: S. Adam Stanford, Barbara Whitney (608) 262-3071

UW-MADISON ASTRONOMERS GET FIRST PEEK AT HALLEY'S COMET

MADISON--Halley's comet is back.

After an absence of 75 years, the legendary comet was sighted Saturday by University of Wisconsin-Madison astronomers using the 36-inch telescope at the university's Pine Bluff Observatory west of Madison.

Graduate students S. Adam Stanford and Barbara Whitney spotted the comet -- the first reported sighting by professional astronomers here -- at 3:40 a.m. Saturday (Oct. 26). There have been earlier reports of sightings by amateur astronomers in Wisconsin.

"The comet still is pretty faint," said Stanford, "It's going to get brighter in the next few weeks, but it's still going to be hard to spot."

Stanford and Whitney observed the comet while making routine observations in support of WUPPE, the Wisconsin Ultraviolet Photopolarimetry Experiment. WUPPE is a sophisticated ultraviolet telescope that will go into orbit next March aboard the space shuttle for an intimate look at Comet Halley.

And while the good news is that Halley's Comet is back, the bad news, according to Stanford, is that the comet will not be nearly as visible as many people expect.

"It's not going to be as dramatic this time around," said Stanford. "There's been an awful lot of hype in the media, but I'm afraid the appearance

-more-

of the comet is not going to be as spectacular as a lot of people think it will be."

Nevertheless, Stanford said the comet will become more visible as the full moon wanes. Optimal viewing is expected about mid-November and again in March of 1986 when the comet returns from a short hiatus behind the sun. Stanford said the comet should be visible then through small telescopes and binoculars.

The UW-Madison astronomers spotted the comet Saturday in the southeastern sky about 60 degrees above the horizon.

According to Stanford, he and Whitney, instead of straining at the eyepiece of the state's largest reflecting telescope, were scanning the heavens with the aid of a television monitor connected to the telescope.

"We were looking around and got to the point where we thought it would be, and it appeared as two little points of light on the screen," Stanford said. "A star appears as a single point of light. The comet's image is spread out more."

Stanford said new technology is enabling astronomers to get a much better picture of the comet. Light from the comet, he said, is collected by the telescope, converted to electrical impulses and stored in a computer. The UW-Madison astronomers can then have the computer display images of the comet or other celestial objects on a television screen.

"It's not as romantic as climbing into the observer's cage of a large telescope and peering through an eyepiece for hours on end," Stanford said. "But scientifically, the information we get is much better."

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-- Terry Devitt (608) 262-8282

uw news

From the University of Wisconsin-Madison / News Service, Bascom Hall, 500 Lincoln Drive, Madison 53706 / Telephone: 608/262-3571

Astronomy Dept

Release: Immediately 12/10/84

CONTACT: John C. Brandt (301) 344-8701, Arthur D. Code (608) 262-3071

NASA SCIENTIST UNVEILS WELL-KEPT 'SECRET' DURING UW-MADISON VISIT

By LANCE QUALE
University News Service

MADISON--One of NASA's best-kept secrets -- a satellite probe into the mysteries of a little-known comet -- was unveiled to a group of University of Wisconsin-Madison scientists this week.

The secret was unintentional, according to NASA official John C. Brandt. But the U.S. satellite flight through a comet's tail next September has been overshadowed by massive international efforts planned for the return of Halley's comet in 1986.

Brandt, chief of the National Aeronautics and Space Administration's Laboratory for Astronomy and Solar Physics, said Japan, the Soviet Union and the European Space Agency are all sending satellites to rendezvous with Halley's comet.

Brandt said the U.S. will devote a space shuttle mission to studying Halley's comet, and the shuttle payload will include an ultraviolet telescope being developed by a UW-Madison team led by astronomy Professor Arthur D. Code. UW-Madison astronomy Professor Kenneth Nordsieck will be on board as a mission specialist.

Comets are balls of ice and cosmic dust that have highly elliptical orbits which periodically bring them near the sun. Halley's comet returns every 76 years while the fainter and lesser known comet Giacobini-Zinner returns every

-more-

6.5 years.

As comets move closer to the sun, the outside heats up and water vapor is released, forming a gaseous cloud around the comet. Dust is also shed by the comet and helps to form its distinctive tail. The tail reflects sunlight, so that comets with very large tails can be visible to the naked eye.

Though a theoretical model exists, the exact structure of the tail is not known. But Brandt said the flight through comet Giacobini-Zinner's tail should answer many of the questions scientists have about the composition and physics of comet tails.

The satellite, now called the International Cometary Explorer (ICE), was not originally intended to study comets, according to Brandt. He said ICE, launched in 1978 under another name, had been in a fixed orbit between the earth and the sun monitoring the solar wind, a stream of sub-atomic particles that radiates out from the sun.

Since the solar wind is believed to have significant effects on comets, NASA decided in 1982 to divert the satellite to rendezvous with comet Giacobini-Zinner when the comet returns in 1985.

This "recycling" of a satellite represented a substantial savings to NASA, Brandt said, but was not without risk. Brandt said five separate lunar passes were required to redirect the satellite to the comet. And one of these passes, Brandt noted, brought ICE within 75 miles of the moon's surface.

Passing through the comet's tail will require precision, according to Brandt. If ICE gets too close to the comet's head the satellite could be destroyed by dust. But if it is aimed too far down the tail, it might miss altogether because irregularities in the solar wind cause the tail to "flap" in an unpredictable manner.

Brandt said the Giacobini-Zinner encounter is also being used as a trial run for the more complex Halley watch.

"These events have led to considerable international cooperation in a time

when that might seem surprising," Brandt said. "The International Halley Watch has set up a network of more than 800 observatories around the world to obtain an essentially continuous record of the comets. Since comets can change very rapidly, it is important to obtain as complete a record as possible of their passage."

Brandt said ensuring that the European spacecraft, called Giotto, reaches its intended target is a good example of the degree of cooperation involved.

"Giotto is intended to pass within 300 miles of the nucleus and obtain high resolution photographs," Brandt explained. "The whole problem of getting it that close is figuring out where the comet is. From the telemetry we know exactly where the satellite is, but not the comet.

"But the two Soviet spacecraft will encounter the comet a few days before Giotto, and their exact positions will be known, so we can use them as reference points for targeting Giotto."

Since the countries will exchange data obtained from their separate missions, Brandt concluded "that the next two years should be the beginning of a golden age of cometary studies."

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-- Lance Quale (608) 262-3846

feature story

From the University of Wisconsin-Madison / News Service, Bascom Hall, 500 Lincoln Drive, Madison 53706 / Telephone: (608) 262-3571

Release: Immediately 11/23/83

IT'S A SMALL WORLD FOR COLUMBIA ASTRONAUTS

by MARK BELLO,
University News Service

MADISON--For astronauts Robert A.R. Parker and Brewster H. Shaw Jr., who will be aboard the Space Shuttle Columbia when it is scheduled to lift off on Nov. 28, it's a small world in more ways than one.

In 1967 when NASA selected him as a scientist-astronaut, Parker, one of two mission specialists on the six-man crew, was a professor in the University of Wisconsin-Madison astronomy department. Unknown to Parker at the time, Shaw, the pilot for the mission, was an engineering mechanics student at the same university.

Now, more than 16 years later, Shaw and Parker will embark on their first journey into space and spend nine days together orbiting above the earth. It will be the ninth mission for a U.S. Space Shuttle.

Parker, 46, was a UW-Madison astronomy professor between 1961 and 1967, and still holds the rank of an honorary fellow in the department. Shaw, 38, earned his bachelor's and master's degrees in engineering mechanics in 1968 and 1969.

"Brewster was an exceptionally good student," said Philip G. Kessel, the UW-Madison engineering mechanics professor who was Shaw's adviser. "In fact, he was one of the best students I've ever had. He always said he'd be an astronaut. It was his dream."

-more-

Kessel noted that it was not all work and no play for his former student, however. Shaw found time to play in a rock band while attending UW-Madison, he said.

Members of the UW-Madison astronomy department also show pride when they discuss their astronaut colleague.

When Blair Savage, department chairman, recites his department's many contributions to the nation's space research efforts, he mentions scientist-astronaut Parker along with the sophisticated telescopes and satellites that UW-Madison astronomers have designed and built.

Of Parker's first trek into space, Robert Bless, also a UW-Madison astronomy professor, said, "I think it's great that after more than 15 years, he has an opportunity to travel into space. We're looking forward to the time when he has a chance to come here and discuss the mission."

Parker and Shaw are members of the largest crew in the history of the Space Shuttle program. They also will be participating in the Space Shuttle program's longest mission and the first mission with around-the-clock operations.

The six-man crew will be split into two teams, each working 12-hour shifts. Parker will be a member of the red shift and will work days. Shaw, a member of the blue team, will pilot the Columbia during the night, while mission commander John Young naps in a bunk bed on the spacecraft's middeck.

The Columbia also will be towing the largest payload in the program's brief history -- the European Space Agency's $1 billion, 30,000-pound Spacelab 1, a portable laboratory for conducting experiments in space.

The mission has a demanding scientific agenda. About 70 experiments, designed by researchers from 14 countries, will be conducted with Spacelab's 40 different instruments. The experiments include measuring the sun's energy output, investigating the composition of the earth's atmospheric gases,

studying the human body's reaction to space flight and examining the growth of crystals in a gravity-free environment.

Parker's role as a mission specialist involves the experiments, but he also will help operate the spacecraft, particularly during takeoff and reentry.

To accommodate the heavy schedule of experiments, Shaw and Young will be guiding the spacecraft through a complex series of space acrobatics, pointing the Columbia at the earth, then at the sun, then at the stars and then back at the earth.

During the mission, Shaw and Young will have guided the Columbia through more maneuvers than were conducted during the first three Space Shuttle missions combined.

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feature story

From the University of Wisconsin-Madison / News Service, Bascom Hall, 500 Lincoln Drive, Madison 53706 / Telephone: (608) 262-3571

Release: Immediately 6/28/83

(Photos available)

CONTACT: Christopher Anderson (608) 262-0492

'WORKHORSE' PINE BLUFF OBSERVATORY NOTES ITS 25TH YEAR

MADISON--In 1958, a night-loving group of researchers bid farewell to the bright lights of the sprawling University of Wisconsin-Madison campus and retreated to a dark hilltop in western Dane County.

The researchers, members of the university's astronomy department, still frequent the hilltop on clear nights, foregoing sleep to conduct experiments on the 53-acre site known as Pine Bluff Observatory.

On Thursday (June 30), the astronomy department marks the 25th anniversary of the dedication of its nocturnal home away from home.

Since a quarter century ago, when 150 scientists from around the nation gathered at the dedication ceremony, the Pine Bluff Observatory has been a scientific workhorse, the site of many important behind-the-scenes advances in the study of the stars.

"The observatory has been useful and productive all these years, and we anticipate that it will continue to be so," said astronomy Professor Christopher Anderson, a 15-year veteran of the observatory staff.

The observatory is a modest one, even by the standards of 25 years ago. But it represented a major improvement over the department's venerable but outdated Washburn Observatory, whose 15.6 inch refracting telescope was the third largest in the country when it was erected in 1879. Also, Pine Bluff was

-more-

largely beyond the obscuring lights and haze of Madison, which had rendered the Washburn telescope virtually useless for research.

The major viewing instrument at Pine Bluff, a 36-inch Cassegrain telescope, is dwarfed by such giants as the 150-inch Mayall Telescope at Kitt Peak near Tucson, Ariz., but it has served UW-Madison astronomers well.

"The Pine Bluff telescope is on the small side for exploring and discovering new objects in space," Anderson explained. "But we can look at objects that are well-known and find out new things about them. We can learn about what makes things tick."

For example, the findings of a recently-graduated doctoral student, Olivia Lupie, are challenging theoreticians' ideas about how stars lose mass. Lupie determined that gases flow asymmetrically from hot supergiant stars rather than in a spherical or cyclical pattern as some researchers suggested.

Lupie is the most recent of scores of graduate students who have learned the science and art of astronomical observation at Pine Bluff.

The new instruments and techniques developed at Pine Bluff are as important as the facility's observational studies, its astronomers noted. Space scientists around the world have benefited from equipment that Wisconsin astronomers built to improve the effectiveness of their eye on the sky.

"This (astronomy) department has always been big on building and perfecting new types of instrumentation," Anderson said. "That tradition continues today. At Pine Bluff, we learn how to do things."

For example, the telescopes and other equipment at Pine Bluff were among the first to be controlled by computer, now a common practice at observatories throughout the world.

Initially, UW-Madison astronomers working at the observatory concentrated on photoelectric photometry. They developed highly sensitive electronic devices to determine the absolute brightness of stars. By the mid-1960s, the emphasis shifted to spectroscopy, the study of the different wavelengths or

colors of light emitted by stars. More recently, the scientists branched into the study of polarized light, or polarimetry.

Astronomers and technicians at Pine Bluff did much of the pioneering work on the Echelle spectrograph, which today is standard equipment at most observatories. The high-resolution device is attached to a telescope and analyzes light of different wavelengths in great detail.

To complement the Echelle spectrograph, which can monitor only small portions of the spectrum at one time, university astronomers built a low-resolution spectrograph to detect light emitted over a larger range of wavelengths. Incurable gadgeteers, the scientists enhanced the device's resolution by adding an instrument they call an "Intensified Reticon Detector." The detector is a very sophisticated version of the electronic device used in stores to read uniform product codes on packaged goods.

Satisfied with the performance of the hybrid instrument he helped build, astronomy Professor Kenneth Nordsieck will use a similar combination of devices in the Wisconsin Ultraviolet Photo Polarimetry Experiment, scheduled to be used on three Space Shuttle missions beginning in March 1986. With a 13-foot-long telescope now being built at the UW-Madison Space Astronomy Laboratory, Nordsieck, Anderson and two other astronomy professors, Arthur D. Code and Robert C. Bless, will study Halley's Comet and such unusual stellar objects as black holes and quasars.

Parts of the WUPPE equipment package, as well as methods for analyzing data sent back from space, will be tested at Pine Bluff.

In addition, Bless and his technicians are checking data-handling procedures for the high-speed photometer, the UW-Madison instrument that will be part of NASA's Space Telescope, scheduled now for launch in mid-1986.

Some of the instruments that have or are being perfected at the Pine Bluff Observatory are valued at many times the original cost of the facility. The observatory was built with a $200,000 grant from the Wisconsin Alumni Research Foundation.

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--Mark Bello (608) 262-8282

feature story

Astronomy Story

From the University of Wisconsin-Madison / News Service, Bascom Hall, 500 Lincoln Drive, Madison 53706 / Telephone: (608) 262-3571

Release: Immediately 2/8/79 jhs

CONTACT: William J. Tobin (608) 262-3071/3072

ASTRONOMY STUDENTS TO BASK IN MOON'S SHADOW

MADISON--A crescent sun will command Wisconsin skies Feb. 26, its disc more than eight-tenths blocked by the moon during the last solar eclipse in North America this century.

But for eight astronomy students at University of Wisconsin-Madison, eight-tenths is not enough. They will drive 750 miles to Manitoba to bask in the full shadow of the moon.

"We're going just for the glory of it," said William J. Tobin, informal leader of the group. "We're going to 'ooh' and 'ah' at the corona."

The corona, a shell of incandescent gas surrounding the sun, is visible only during a total solar eclipse. After Feb. 26, the next chance North Americans will get to see one is Aug. 22, 2017.

The eight students--"That's one station wagon load," Tobin said--will drive to Winnipeg a day or two beforehand. Then, depending on the roads and weather, they will travel another 60 miles north to Riverton or 115 miles west to Brandon. There, under the center of the moon's shadow, they will get the longest possible exposure to the total eclipse: just under three minutes.

Wisconsin residents unwilling to brave a Manitoba February will still get a dramatic show, Tobin said. As the moon's shadow slides northeast across the continent, a partial eclipse will be visible as far south as Panama. In Milwaukee, for instance, 82 percent of the sun will be obscured, leaving a thin crescent with its horns pointing up.

- more -

But even that thin crescent is bright enough, Tobin warned, to damage the eyes of anyone who tries to look at it directly. The only safe way to view the event is indirectly, by looking at a projected image.

The simplest way to get the image is by letting the sun shine through a pinhole, Tobin said; a visible image will be projected up to an arm's length away.

An ordinary pin is used to make the hole in a piece of thin cardboard, say from a new shirt or file folder, and the image projected onto a piece of white paper. The shape of the pinhole is not critical.

Tobin's favorite method is to cut a two-inch hole in the cardboard, tape a piece of aluminum foil over the hole and then make the pinhole in the aluminum foil. For a better picture, the "screen" can be shielded from glare by putting it in the bottom of a cardboard box.

Looking through the pinhole at the sun is definitely unsafe, Tobin said.

In Milwaukee, the moon will begin to edge in front of the sun at 9:38 a.m. The peak will come at 10:54 a.m. and by 12:12 p.m. the moon will have moved away.

In Minneapolis, the equivalent times are 9:33 a.m., 10:47 a.m. and 12:05 p.m. Intermediate places will have intermediate times.

The students bound for Manitoba have not been able to suppress their scientific curiosity completely, said Tobin, a research assistant whose interests normally run more to distant star clusters than to "local" phenomena like eclipses. The group expects to take light meters, polarizing filters and colored filters to make some formal observations of the corona.

Even if the clouds do not cooperate, there will be one small consolation, Tobin said. "It'll get dark no matter what the clouds do," he said.

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uw
news

From The University of Wisconsin-Madison / News Service, Bascom Hall, 500 Lincoln Drive, Madison 53706 / Telephone: (608) 262-3571

Astronomy Dept

Release: Immediately 6/14/78 pk

CONTACT: John Mathis (608) 262-3071

NATIONAL MEETING TO ATTRACT 700 ASTRONOMERS

MADISON--Approximately 700 stars in the astronomy field are expected to rendezvous at the American Astronomy Society Meeting June 26-28, at the Memorial Union on the University of Wisconsin-Madison campus.

Former director of Washburn Observatory at UW-Madison, Donald E. Osterbrock, will comment on "The Continuation of the Wisconsin-California Axis" in celestial research during the June 27 afternoon session. He is the former chairperson of the Madison astronomy department and current director of the Lick Observatory at the University of California in Santa Cruz.

"Osterbrock contributed greatly to the tradition of astronomy at Wisconsin. We think hosting this scholarly convention is an appropriate salute to the Washburn Observatory which celebrates its centennial this year," Prof. John Mathis, chairperson of the UW-Madison astronomy department suggested. "For instance, we have planned a mini-symposium on the IUE, International Ultraviolet Explorer satellite."

Scientists at Washburn Observatory have devoted years to examining ultraviolet rays. Mathis pointed out that the earth's atmosphere absorbs wavelengths that extend beyond the visible spectrum. The IUE gives the astronomer that outside perspective.

The three-day national convention of scientists opens a week of activities that will orbit around probing the depths of space. Osterbrock, who partook in such inquiries at the Washburn for 15 years, will present one of an estimated 371 position papers delineating research ventures. "Ionized Gas and Dust in Active Nuclei of Galaxies" will be his topic. Faculty members in the UW physics and astronomy department will give 20 reports.

- more -

Another California astronomer, R.K.Ulrich from the University of California at Los Angeles, will lecture June 26 on "Five Minute Oscillations, Solar Rotation and Solar Structure."

Ulrich and Osterbrock are among four astronomers invited to deliver review papers before the whole assembly of their peers. J. Elliot, Cornell University, and the Harvard-Smithsonian Center for Astrophysics scientist, J. M. Morton, also will address the conclave. After the general speeches, the group will divide into about a half dozen smaller coteries to share results of research.

Investigating Earth's distant neighbor, Uranus, Elliot uncovered new facts concerning, "Uranus' Rings." Uranus lies 19 times as far away from the sun as our world and embodies 60 times as much volume. Its methane atmosphere contains faint cloud belts.

Sir William Herschel, who contemplated the possibilities of life on Mars and proved that the solar system moves through space, concluded in 1781 that Uranus was a planet, not a comet or star.

Uranus, the first planet discovered with a telescope, evades all but the keen-sighted. Nevertheless, although distance reduces its mass until the human eye only perceives a four inch-wide greenish-blue disk, in fact, Uranus is a solar giant, rivaling Jupiter and Saturn in size.

"The recent discovery of rings around Uranus similar to the famous ones of Saturn but much darker, was quite a surprise to everyone. Elliot's talk will focus on this new development," Mathis explained.

Mathis said that many interesting facts will surface during the intellectual rally but will require substantial professional training to appreciate. Therefore, the general public is not invited.

Twelve participants will set up displays in the "Poster Session" Wednesday afternoon. Exhibitors at this adult science fair will answer questions from colleagues browsing through the exhibit.

After the American Astronomy convention closes, Solar Physics Division members will gather for their meeting. They will concentrate on solar flares.

"Solar flares are violent outbursts of particles and radiation from the upper part of the sun's atmosphere," Mathis explained. "Intense aurora and breaks in communication sometimes occur when flares erupt." He pointed out that although many people refer to the phenomena as northern lights, the luminous happenings brighten skies over both the North and South Poles.

An estimated 200 amateurs in astronomy will caucus at the end of the week for the Astronomical League convention to hear members of the American Astronomical Society speak.

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TEMPORARY NEWS SERVICE LOCATION:
115 Science Hall
550 North Park Street

From The University of Wisconsin-Madison / University News and Publications Service, Bascom Hall, Madison 53706 / Telephone: (608) 262-3571

Release: Immediately 10/3/75 ns

NEWS BRIEFS FROM THE MADISON CAMPUS

MADISON--The riddle of Stonehenge will be the topic of a University of Wisconsin-Madison public lecture Wednesday (Oct. 8) at 8 p.m. in Rm. 1300 Sterling Hall.

Stonehenge is a structure built of stone slabs estimated to be 5,000 years old. It is located in England, hundreds of miles from the nearest source of rock.

Prof. R. C. Bless, chairman of the astronomy department, will explain what is known about the builders of Stonehenge and present theories on why and how it was constructed.

- o -

MADISON--The University of Wisconsin-Madison African Studies Program will sponsor a talk by Ms. Stephanie Urdang on "Women in the Struggle Against Portuguese Colonialism in Guinea-Bissau" Thursday, Oct. 9 at 8 p.m. in the Wisconsin Center.

Ms. Urdang is presently completing a book on the women of Guinea-Bissau. She also works with the Southern Africa Committee in New York and is editor of "Southern Africa."

During the months before and after the Portuguese coup in Guinea-Bissau, Ms. Urdang worked in that country with the PAIGC liberation movement.

- o -

- more -

MADISON--Two visiting faculty members have joined the geography department for the fall semester to do research at the University of Wisconsin-Madison.

Robert A. Muller, professor at Louisiana State University, will do research on climatology as a visiting fellow.

Kingsley O. Ologe, lecturer at Ahmadu Bello University in Zaria, Nigeria, is a Fulbright-Hays fellow. He will do research in geomorphology, and will learn lab and field techniques to apply on river behavior in Nigeria.

- o -

MADISON--A Nobel Prize winner in chemistry will lecture at 4 p.m. Wednesday (Oct. 8) in Room 1361 of the University of Wisconsin-Madison Chemistry Building.

Prof. Lars Onsager of the University of Miami Center for Theoretical Studies was born in Norway. He is visiting the Midwest in connection with the 150th anniversary of the first Norwegian immigration to the United States.

His topic will be "The Origins of Life."

Admission is free. The public is invited.

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Astronomy Dept.

Release: Immediately 2/17/75 tj

MADISON--A public lecture titled, "The Birth of Stars," is being presented by the University of Wisconsin-Madison astronomy department on Feb. 19 at 8 p.m. in room 1300 Sterling Hall.

The lecture by astronomy Prof. Joseph P. Cassinelli is the first in a series of illustrated lectures about recent developments in astronomy and astrophysics.

Two more lectures are scheduled for March 19 and April 16. The topics and speakers will be announced.

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Astronomy Dept.

Release: Immediately 2/10/75 gf

NEWS BRIEF FROM THE MADISON CAMPUS

MADISON--The discovery of new sub-atomic particles and its effect on physics theory will be the topic of a University of Wisconsin-Madison public lecture Wednesday at 8 p.m. in room 1300 of Sterling Hall.

Prof. Robert March, who is conducting research on the subject, will discuss events leading up to the discovery and theory which has evolved.

March is a recipient of the U.S. Steel award for science writing in physics and astronomy for his book, "Physics for Poets."

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Astronomy Dept

Release: Immediately 9/18/73 rf/bb/mn

NEWS BRIEFS FROM THE MADISON CAMPUS

MADISON--Students, faculty and staff of the University of Wisconsin-Madison gave 604 pints of blood in a special donation held on campus last week.

The blood was collected by the Red Cross Badger Regional Blood Center for distribution to 88 hospitals in 45 area counties.

Two upcoming special donations on the Madison campus will be held this semester at the Southeast Residence Halls Oct. 15-18, and at the Lakeshore Residence Halls Oct. 29-Nov. 1.

Regular donations are also held daily each afternoon during the week at Union South.

- o -

MADISON--The University of Wisconsin-Madison astronomy department will hold a free public lecture-demonstration titled "Stellar Explosions," Friday at 7:30 p.m. in the planetarium in Sterling Hall.

The demonstration, which will deal with how stars die, will consist of projected simulations of the constellations.

The planetarium is located on the roof of the east wing of Sterling Hall. Groups planning to attend should call the astronomy department at 262-3071.

- o -

MADISON--Dr. Alfred L. Kennan, head of Madison's Midwest Medical Center, will speak on the University of Wisconsin-Madison campus Wednesday.

"Abortion, Contraception and Population Problems" will be the topic of the 7 p.m. lecture at 180 Science Hall. The talk is sponsored by the Institute for the Environment-Forum on the Environment.

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From The University of Wisconsin-Madison / University News and Publications Service, Bascom Hall, Madison 53706 / Telephone: (608) 262-3571

Astronomy Dept.

Release: Immediately 3/6/73 dh

MADISON--"Solar Flares: Explosions on the Surface of the Sun" will be the topic of a free lecture-demonstration by the University of Wisconsin-Madison astronomy department Friday at 7:30 p.m.

It will be held at the planetarium on top of Sterling Hall. Groups planning to attend are asked to give advance notice by calling the department at 262-3071.

- o -

MADISON--"What a Picture Looks Like" will be the title of a paper to be read by Prof. Herbert B. Cole of the University of Wisconsin-Madison philosophy department this Friday at 3:30 p.m. in 4281 Helen White Hall.

Cole will discuss how a picture becomes a symbol of reality and what this means to humans. The reading, which is open to the public, is the second of a semester-long series given by the department.

- o -

MADISON--Prof. Gordon Bell of Carnegie-Mellon University will speak about interconnected computer systems in a special colloquium given by the University of Wisconsin-Madison computer sciences department.

The colloquium will be held Friday at 3 p.m. in room B214 of the computer sciences building. Past applications and present work in interconnected systems will be discussed.

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Astronomy Dept.

Release: Immediately 2/14/73 hh

DEATH OF A SATELLITE

MADISON--Late Tuesday, the power system of an astronomical observatory orbiting earth wore out, and the satellite fed back the last information it will give to University of Wisconsin-Madison astronomers.

Astronomers here have been monitoring the satellite since its launching four years ago. Launched in December, 1968, the orbiting astronomical observatory, or OAO-2 as it's called, would have been counted a success had it relayed information for only one month, according to astronomy Prof. Arthur D. Code, principle University project investigator.

Code says scientists will be busy analyzing OAO-2 data for a long time to come. It carried seven telescopes designed by UW astronomers, and relayed observations that unraveled mysteries about the composition of comets and the nature of stars.

The satellite was second in a series of similar National Aeronautics and Space Administration ventures. If a space shuttle becomes a reality, the now-silent observatory could be re-activated.

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From The University of Wisconsin-Madison / University News and Publications Service, Bascom Hall, Madison 53706 / Telephone: (608) 262-3571

Astronomy Dept.

Release: Immediately 10/23/72 dh

MADISON--"Glowing Vacuums in Space" will be the subject of the next lecture-demonstration to be given by the astronomy department of the University of Wisconsin-Madison.

The lecture will be presented at 7:30 p.m. Friday at the planetarium on top of Sterling Hall. Guests can enter Sterling from the N. Charter st. entrance and follow the hall to the right to the elevator. At the sixth floor they can ascend the steps near the elevator.

Those attending the lecture-demonstration are asked to be prompt. Groups planning to attend are urged to give advance notice by calling the department at 262-3071.

The 15-inch telescope on Observatory Hill on the Madison campus will be open to the public from 7:30-9:30 p.m. on the first and third Wednesdays of each month providing the sky is clear.

Informal explanations will be given for sighted objects.

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Astronomy Dept.

Release: FOR RELEASE AT NOON THURSDAY, NOV. 18 11/16/71

University-Industry Science Writing Program (1-608-263-2811, 1-608-263-2876)

(Photographs available on request)

By THOMAS BURROUGHS
UW Science Writer

UPTON, N.Y.--(ADVANCE FOR THURSDAY NOON, NOV. 18)--The Orbiting Astronomical Observatory (OAO-2), which provides astronomers with a view of celestial light never before seen by man, is leading to a greater understanding of the universe.

For centuries astronomers have been forced to observe the universe from the bottom of an ocean of air that absorbs most celestial light and distorts the rest, University of Wisconsin-Madison astronomer Arthur D. Code said Thursday at a meeting of the Council for the Advancement of Science Writing held at Brookhaven National Laboratory.

"But since OAO-2 went into orbit 480 miles above the earth in December, 1968, it has been making continual measurements of ultraviolet light (UV) that doesn't penetrate the atmosphere," Code said. "The observatory has opened up new fields of astronomical measurements and has led to a number of new interpretations about the nature of the universe."

OAO-2, whose telescopes were designed, built, and operated primarily by UW scientists, is the largest and most complex unmanned satellite ever launched. Code, a pioneer in space astronomy, is director of the Wisconsin project.

One of the new findings Code described is his discovery that comets are frozen balls of ordinary ice surrounded by huge clouds of hydrogen gas.

- more -

The ice vaporizes as the comet gets closer to the sun, eventually breaking down into hydrogen atoms--which form the surrounding cloud--and other basic water ions.

"Comets are composed of ancient material from which our solar system was made," Code added. "By learning about the composition of comets we are, in effect, looking at some of the original gaseous material that formed the sun, earth, and other planets."

Observations from OAO-2 have also changed ideas about another space spectacular--the bright nova formed when a star "explodes." From earth, a nova appears to reach peak brightness very quickly and then it fades over several months.

"From ultraviolet light measurements we found that the star doesn't actually explode," Code explained. "Only a thin outer shell of material is puffed off the star, which changes UV passing through it into visible light creating the illusion of an explosion."

Thus a nova is not very catastrophic for a star, he said, because there is not actually a great change in its energy content.

Another discovery from OAO-2 by UW scientists is that the tiny particles of material between stars are mostly small, spherical graphite and silicate grains and not bits of ice as previously thought.

Knowledge about the composition of interstellar dust is important to understanding the birth and death of stars, Code noted. When stars are nearing the end of life, they give off these particles, which form clouds in space and eventually condense to form the nucleus of a new star.

In addition to the history of stars, OAO-2 observations of UV light from galaxies and distant clusters of stars are providing information useful in understanding the history of the entire universe.

"While OAO-2 has contributed important astronomical information about many celestial objects, it also serves as a harbinger of the future," Code concluded. "Bigger and better telescopes on future space crafts will provide even more information, hopefully answering some of the questions that OAO-2 has only posed."

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Astronomy Dept.

Release: Monday PM, Aug. 23 8/20/71

UIR Science Writing Division (263-2875)

By HARRY LESLIE
UW Science Writer

AMHERST, Mass. -- (Advance for Monday PM, Aug. 23) --- Identifying tiny dust grains is hard enough under a microscope but when the grains are in interstellar space, trillions of miles away, the task would seemingly be impossible.

Nevertheless, University of Wisconsin astronomer Daya P. Gilra announced Monday at the Orbiting Astronomical Observatory Symposium in Amherst, Mass., that he believes some interstellar dust particles are small, uncoated, spherical graphite grains.

Knowledge about the interstellar dust is important to understanding the birth and death of stars, Gilra explained. As stars die, they become red giants and emit dust particles. These particles form clouds in space which eventually condense to form a nucleus around which a new sun is born.

The processes involved in this dynamic cycle can be better understood if s scientists know what makes up the dust particles, Gilra noted.

Gilra has described such space particles from analysis of detailed calculations and the ultraviolet light data gathered by the University's highly successful orbiting observatory, OAO II.

"When light strikes a substance, certain wavelengths of the light are absorbed," he explained. "The absorption depends upon the composition of the substance, its size, shape, and whether or not it is coated with another material like ice."

-more-

Gilra contended that previous identification of such dust particles was inaccurate because researchers failed to take into account plasma oscillations -- the atomic vibrations which occur when light strikes a substance. Each substance has its own peculiar vibration and the frequency is again dependent upon the particle's size, shape, and coating, Gilra noted.

Gilra's calculations lead him to believe that silicates and silicon carbide are also present in space. But, he added, that more observations are needed to confirm his findings.

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Astronomy Dept

Release: Immediately 8/23/71

UIR SCIENCE WRITING DIVISION (263-2875)

By Thomas Burroughs
UW Science Writer

AMHERST, Mass.--The years of vision, planning, and hard work behind the success of the Orbiting Astronomical Observatory (OAO-2)--the largest and most complex unmanned satellite ever launched--culminated here Monday in the opening of a special symposium to discuss the project's results.

The University of Wisconsin, whose scientists designed many of the satellite's delicate instruments, organized the two-day meeting. Over 40 scientists from universities, aerospace industries, and research institutes across the nation--including a large delegation from UW's Astronomy Department and Space Astronomy Laboratory--will present papers on topics ranging from the earth's atmosphere to the farthest reaches of the universe.

"The Observatory has opened up new fields of astronomical measurements, and has led to a number of new interpretations about space," says UW astronomer Lowell R. Doherty. "The tremendous amount of new and varied information obtained will be reflected in the papers presented at this meeting."

Since it went into orbit 480 miles above the earth in December, 1968, OAO-2 has been providing astronomers with a view of distant stars, galaxies, and hundreds of other objects in space, Doherty says. It is the first project of its kind, making continuous measurements of ultraviolet light (UV) from these objects that doesn't penetrate the earth's atmosphere.

- more -

Information from UW's instruments on the OAO-2, which also contains instruments from the Smithsonian Astrophysical Observatory, eventually ends up on the Madison campus for initial analysis, he explains. In order to get maximum benefits, some of the data is then given to "guest investigators" around the country, who work closely with UW scientists.

"Everyone who has analyzed data from the satellite will be presenting his results," says Doherty. "These fall under four general categories: our solar system; properties of stars; gases and particulate material between stars; and clusters of stars and other galaxies."

In one paper, for example, Daya P. Gilra, a UW graduate student who has identified the properties of some of the dust material between stars, will present his findings to the group. The effects of this material on UV light has never been confirmed before, Doherty explains, also noting that this information is important in understanding the birth and death of stars.

Other papers, especially those presented by UW Prof. Arthur D. Code, will deal with the way galaxies emit UV light--information useful in learning about the history of the entire universe.

Code, a pioneer in space astronomy and director of the Wisconsin OAO-2 project, will also present his discovery that comets are frozen balls of ice surrounded by huge clouds of hydrogren gas. Since earth-based telescopes do not receive the UV light helpful in identifying a comet's composition, it wasn't until OAO-2 was launched that this could be determined.

"In general," Doherty says, "the vast amount of information we have obtained from OAO-2 has made us feel something like one of the early explorers who thought he had only discovered an island, but finally realized there was an entire continent before him."

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Astronomy Dept.

Release: Immediately 5/20/71

UIR Science Writing Division (263-2877)

By LINDA WEIMER

MADISON, Wis.--Though space research is, by definition, far afield, the practical by-products it spawns are often no further than our own back yard.

In a time when public support -- both moral and financial -- for space research and research in general, is flagging under arguments of expense and impracticality, too little attention is given to the economic and technological side-benefits of such projects.

One project involving the University of Wisconsin has been the Orbiting Astronomical Laboratory (OAO-2), the largest and most complex unmanned satellite ever launched.

Since it slipped into orbit 480 miles above the earth in December, 1968, OAO-2 has accomplished its objective of providing astronomers with a view of distant stars and planets in ultraviolet wavelengths that don't penetrate the earth's atmosphere.

It has been the source of many new scientific discoveries -- revealing that hydrogen gases surround the heads of comets, adding new insight into the nature of exploding stars, and showing that blue-white stars, the youngest and largest of stars, are twice as hot as scientists had always believed. An exhibit describing many of these findings and a full scale model of the OAO-2 spacecraft are currently on display in the State Capitol.

- more -

But, beyond the wealth of basic scientific information, project director Arthur D. Code, a UW astronomy professor, describes the less visible but more immediate and practical effects that OAO has had on the midwest economy and on the state of Wisconsin, in particular.

To begin with, Code cites technological "spin-offs" of the OAO program:

"New clean room techniques, developed by Grumman Aerospace Corp. for OAO spacecraft construction have now found their way into hospitals and were used by Grumman in building the Lunar Landing Module."

Other techniques developed in the building of the OAO-2 -- that of pre-stressed riveting, for example -- have found wide industrial applications. The computer on board the OAO spacecraft served as a precursor to IBM's impressive 360 computer system.

In terms of more direct benefits to Wisconsin, Code includes the expanded teaching capabilities of the University's astronomy department that have resulted from Wisconsin's role in the OAO project. This role was instrumental he says, in attracting federal funds to establish the multi-million dollar Space Science and Engineering Center on the Madison campus.

"We are attracting scholars of high caliber and ability from all over the world," Code states, "who, while working on the project, have enriched our teaching program at all levels."

Code, a scholar in his own right who was recently elected to the distinguished National Academy of Sciences for his outstanding work, feels that this is a crucial side benefit to basic research.

"Textbook teaching is adequate but it can't communicate the sense of excitement and intellectual adventure that comes from teachers who are actively engaged in research. These things give shape and meaning to textbook facts."

This kind of teaching has made Wisconsin's the country's leading graduate school in space astronomy. Twenty-seven graduate students have worked on OAO and, of these, 14 have so far received their PhDs.

Sixty-six undergraduates have also worked on the OAO project, many receiving partial support for their education in this way. In some cases, their involvement resulted in renewed academic interests. Code tells of one high school drop-out who after working on the project, decided to go back to school and subsequently, was graduated from the University.

For all the benefits OAO has reaped in basic science information, technology, and teaching, it has been an expensive proposition. The UW has so far received $6,738,420 in contracts and grants from the National Aeronautics and Space Administration, the lion's share of this money going into Wisconsin's economy.

About half of the OAO funds were introduced indirectly, according to Code, through salaries paid to students and researchers, laboratory equipment costs, University overhead, and costs of University services such as computer time, photography, and duplicating services.

The remaining $3,400,000, says Code, found a more direct route into the midwest economy.

The Astronautics Corporation of America in Milwaukee was granted a subcontract of $288,000 to develop a three-axis stabilized platform for observing stars in the ultraviolet light from space. This grant came at a time when the company was fighting for survival and was instrumental in helping the A.C.A. to become Wisconsin's largest electronics firm.

Another $200,000 went toward purchase of supplies for the project, and a subcontract of $2,900,000 was awarded to the Cook Electric Co. in northern Chicago for building two prototype experimental flight units.

"The cost of a spacecraft is like that of a bridge or a few miles of highway and, as such, money for space projects stays right here on earth," says Code. "No money even goes into space; the value of the materials in satellites orbiting the earth, if melted down, is probably less than $100. The money is used to obtain the services of people, and it returns to the economy by way of food and clothing purchases, taxes, tuition and in many other ways."

Code feels that this argument of expense, often leveled at the space program in general, is shortsighted.

"Space science, which has blossomed only in the last decade, has opened up a whole new frontier and unchained man from the confines of this earth," he contends. "We are like fish emerging from the sea to find the whole planet revealed to us for the first time. It is unthinkable that we should sink back into the sea and not exploit our newly-won talents."

This year will probably mark the end of experiments on board the OAO-2 as a result of equipment breakdowns and cutbacks in NASA's budget.

The failure of another OAO instrumented and operated by the Goddard Flight Center to achieve orbit last November was a disappointment to astronomers, but the plans are still on for Princeton University's OAO-C, scheduled for launch in early 1972.

In the planning, says Code, is the launch of a 3-meter Large Space Telescope in the late 1970s.

The OAO project is just one example of many basic research projects going on at the UW which have substantial side benefits to Wisconsin students and to the general community.

Expensive? Yes, but in this case, the bill has been paid largely by the federal government while the money has found its way into the pockets of many Wisconsin residents.

Impractical? Perhaps in its long-range goal, but in the short run, OAO-2 has provided jobs, educational opportunities, and new technology from which we all benefit.

Perhaps Code's analogy for space as a new frontier has some parallel for basic research in general. We are emerging from a sea of ignorance to find our world and its mysteries unfolding before us. It is unthinkable that we should lose our grasp and slip into the sea again.

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Astronomy Dept. of

From The University of Wisconsin News and Publications Service, Bascom Hall, Madison 53706 • Telephone: (608) 262-3571

Release: Immediately 2/10/71 vh

MADISON--Planetarium lecture-demonstrations, long a popular University of Wisconsin public service on the Madison campus, will be resumed in time for the Astronomy-Physics Open House on Saturday, and will be a featured part of the event.

Extensive damage to Sterling Hall and contents, caused by the bombing last August, forced temporary curtailment of performances for the public with this teaching aid.

Prof. Donald E. Osterbrock, chairman of astronomy, will open the second semester Planetarium season at 7:30 p.m. Friday. He will talk about "Glowing Vacuums in Space" and illustrate these phenomena on the Planetarium indoor "sky."

Graduate students will deliver two lecture-demonstrations for the Open House: "Mysteries of the Universe" at 11 a.m., and a repeat performance at 2 p.m.

The look behind the scenes in two major scientific departments on the Madison campus will also include the viewing of the six-inch refracting telescope and the 12-inch reflecting instrument used in undergraduate instruction as well as a variety of displays concerning Wisconsin's activities in astronomy.

Attractions in the physics department will cover facilities and operations in space research, thermonuclear power, nuclear structure, solid-state physics, optics, elementary particles and other branches of applied physics. All laboratories will be open and guides will be available to explain and give directions.

- more -

Add one--Open House: Astronomy and Physics

There will be a continuous showing of science films covering many areas.

The University has long been known for its early efforts in photo-electric photometry. This method of astronomical observation was largely pioneered here and remains today one of the important means for Washburn Observatory research.

Outstanding achievements in space astronomy have since been added to the record. The Orbiting Astronomical Observatory, launched in 1968 and carrying Wisconsin-designed instruments, has already unlocked important secrets of the skies and has provided enough data to keep Badger researchers interpreting this for years to come.

Astronomy and physics are the only two departments now occupying Sterling Hall.

For purposes of the Open House, 9:30 a.m. to 5 p.m., all guests will enter and leave the building by the Charter Street entrance. The astronomy department can be reached by elevator to fifth and sixth floors in the east wing. The Planetarium will be found by taking the elevator to the sixth floor and the stairs immediately ahead to the roof.

Faculty members and graduate students will be on hand to give directions and tell about opportunities for astronomy instruction and research on the Madison campus. Displays and exhibits will be found mainly in Room 5508, fifth floor.

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Release: Immediately 2/1/71 jb

MADISON--Did you ever see a laser in operation? Or a satellite used to probe for the origins of cosmic rays?

Want to learn what University of Wisconsin scientists are doing to develop a new source of energy that is pollution-free and runs on cheap fuel abundant everywhere?

Did you ever see a computer "read" a photograph?

Are you curious to see the progress of recovery as Sterling Hall builds back from the bombing on campus last August?

Answers to these questions will be supplied Feb. 13, from 9:30 a.m. to 5 p.m., when the UW departments of physics and astronomy open the doors of Sterling Hall to the public.

The open-house will provide an opportunity for persons to look behind the scenes at a major scientific teaching and research operation that is widely recognized as one of the largest and most prestigious in the U.S.

All laboratories will be open, with guides available to explain the facilities and operations in space research, thermonuclear power, nuclear structure, solid-state physics, astronomy and astrophysics, optics, elementary particles, and other branches of applied physics.

- more -

Add one--Sterling Hall Open-House

There will be a continuous showing of science films covering many areas. Shows at the University's Planetarium will be offered throughout the day and weather permitting, a telescope will be set up to project a large, clear image of the sun.

The teaching role of the two departments will be much in evidence. They serve more than 3,000 undergraduates each semester, plus more than 250 graduate students working for advanced degrees.

Persons who saw the bomb damage to Sterling Hall last fall will observe that the nuclear physics accelerator laboratory, in the basement close to the blast, is now back in operation for round-the-clock study. The space formerly occupied by the Mathematics Research Center is being remodeled into teaching facilities.

Sterling Hall is located on N. Charter st., near Linden dr.

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feature story

From The University of Wisconsin News and Publications Service, Bascom Hall, Madison 53706 • Telephone: (608) 262-3571

Release: ADVANCE FOR MONDAY, DEC. 7 12/5/70

By VIVIEN HONE

MADISON, Wis.--(Advance for Monday, Dec. 7)--Astronomers are not given to thanking their lucky stars. Nevertheless, the feeling is one of gratitude here Monday as members of a University of Wisconsin research team mark a second anniversary milestone in space astronomy history.

Exactly two years ago, OAO-2, an orbiting astronomical observatory with Wisconsin instruments on board, had been successfully launched at Cape Kennedy. Ever since then the "flying" observatory, still the largest, heaviest, and most complex of America's unmanned scientific satellites, has been exploring the mysteries of the skies through observation and measurement of ultraviolet starlight.

The main objective has been to learn how young, hot stars--they emit mainly ultraviolet light--are born and develop, but the NASA-supported space research has many facets.

The gratitude of the Wisconsin group is all the more understandable in view of the failure of a first Wisconsin OAO, launched in 1966, and defeat again for OAO-3, a Goddard Space Flight Center project, launched and lost only a week ago.

"One year ago our scientific interpretations of the OAO measurements were based on very limited data," explained Prof. Lowell R. Doherty, one member of the UW team. "But now we have a greater variety and larger amount of information and

- more -

researchers are beginning to interpet it in much greater detail. Also, we have more people involved now. These include new members of the research group, graduate students, and guest investigators."

Free of the obscuring atmosphere which has hampered ground-based observatories ever since the science of astronomy began, OAO-2 to date has made more than 10,000 orbits of the earth at an altitude of 480 miles above it. It has observed and measured the ultraviolet radiation of 1,300 unique objects, mainly stars, star clusters, galaxies, and bright planets. For some objects such as the variable star Beta Lyrae as many as 20,000 individual measurements have been obtained.

Thereby the researchers are evolving new insights on the solar system; bright, variable, and eclipsing stars; interstellar matter and other galactic sources of ultraviolet light; and even on the origin and structure of the universe.

Thus far within the principal areas of the OAO-2 investigations, the studies of interstellar matter have yielded the most scientific results, Doherty said. "Profs. Robert Bless and Blair Savage now have more information on how interstellar dust grains obscure starlight and, hopefully, this will lead to more knowledge of the composition of the dust grains themselves. All of this in turn has an important relationship to dust clouds and their part in the birth of stars."

Unplanned observations have also yielded important dividends, according to Doherty, as for instance, one made by Arthur D. Code, director of the Wisconsin space astronomy program. "When Comet Tago-Sato-Kosaka happened to pass close to the sun, Prof. Code discovered it was enveloped in a cloud of hydrogen gas. This gas was produced in and ejected from the comet's head. Finding out these things has told us more about the structure of comets, and may tell us more about the history of the solar system."

At this point in OAO-2 history, two of the seven telescopes in the Wisconsin research "package" are no longer functioning. "Our main problem is not with these instruments," Doherty explained, "but with the guiding and pointing equipment of the spacecraft. There has been a gradual loss of the ability to point in special directions, so at any one given time, we are more restricted on where we can look."

These drawbacks notwithstanding, the Wisconsin astronomers remain grateful as OAO-2 orbits toward a third year of technological wonders and scientific rewards.

"People would have been happy with even a few months of good operation," Doherty said. "We're overjoyed that OAO-2 has performed so well and keeps going. There are so many exciting things left to do."

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Astronomy Dept.

Release:

Immediately 10/29/70 vh

MADISON--The public is invited to hear Dr. Robert P. Kraft, prize-winning University of California astronomer, speak at the University of Wisconsin Nov. 9 on "Exploding Stars, Pulsars, and the Crab Nebula."

The Monday evening talk will be given at 8 p.m. in 1300 Sterling Hall in Madison.

A former director and current staff member of Lick Observatory, Prof. Kraft holds the 1963 Helen B. Warner Prize, an award given yearly to outstanding young astronomers. Noted for his research in novae (exploding stars), he is also widely known as a popular lecturer.

The pulsars, to be included in Kraft's talk, are of great interest to today's scientists. Though known to be fast rotating neutron stars, they still present many mysteries to astronomers.

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NEWS OF THE UNIVERSITY OF WISCONSIN

Astronomy Dept. of

From the University's Statewide Communications Service, 1752 Van Hise Hall, Madison 53706

Release Immediately 10/16/70 jb

STERLING REPORT

MADISON--A summary compilation of the personal losses suffered in University of Wisconsin departments as a result of the Aug. 24 bomb explosion on the Madison campus was presented to the UW regents Friday.

Prepared by faculty members with offices, laboratories, and classrooms in the Sterling Hall area, hit hardest by the blast, the report was requested by Regent Ody J. Fish.

"The greatest loss was Dr. Robert E. Fassnacht," Physics Prof. J. R. Dillinger stated. "He had developed special talents for working with superconductors while earning his Ph.D. which was granted in 1967. He stayed on as a research project associate to pursue other problems defined by his thesis work."

Dr. Fassnacht, working late hours on a low temperature physics project, was killed in the explosion and four others were injured.

A summary of the individual reports:

ASTRONOMY--Teaching facilities damaged, and one classroom lost for the full semester; planetarium suffered interior damage and will not be available for elementary courses or ILS classes, and visitor nights have been cancelled; numerous books and journals destroyed in the library area; six offices still not usable; considerable research equipment and data severely damaged or lost; two professors lost years of data reduction and analysis effort, and a Ph.D. candidate lost 90 per cent of his thesis and notes and books valued at $1,000.

- more -

Add one--regent report

BOTANY--Two professors each lost a month on experiments and another lost 57 electron microscope plates.

PHARMACY--Undergraduate teaching laboratories damaged and equipment and supplies destroyed; 25 teaching and research programs interrupted; offices of Extension Services in Pharmacy destroyed with loss of files and mailing lists, and one special course was cancelled; Prof. Melvin H. Weinsvig lost collection of slides, teaching aids, and literature for far-reaching program on "Drug Respect"; education of numerous pharmacy students delayed or hampered; graduate students and faculty lost heavily in personal and professional material.

PHYSICS--Department's tandem electrostatic accelerator suffered near total damage to ion sources at low energy end; of local design, these cannot be replaced; a $250,000 on-line computer and associated equipment also suffered great damage; total loss estimated at $500,000 plus 18 man-years of work in nuclear physics area alone; two professors lost six months in research delay;

Graduate students lost heavily in personal property, equipment, and notes; enrollment in physics course limited for first time; Prof. R. R. Borchers forced to delay or resign a Guggenheim fellowship for research in Brazil; laboratories damaged so badly that restoration still problematical; serious loss of research files and records; loss of nearly all experimental apparatus constructed or acquired in 15 staff years in one area, 24 years in another.

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From The University of Wisconsin News and Publications Service, Bascom Hall, Madison 53706 • Telephone: (608) 262-3571

Astronomy Dept.

Release: Immediately 8/25/70 jfn

BELOIT--The University of Wisconsin-Madison physics department, one of the nation's finest, bore the heaviest research damage from Monday's campus bombing, Chancellor Edwin Young told the Beloit Rotary Club Tuesday.

Chancellor Young said physics department leaders have estimated equipment losses of more than $2 million as well as destruction of research efforts "accumulated over a period of several years."

"Besides killing one of the junior staff members of the physics department and injuring a graduate student, the explosion ruined the life work of five physics professors and wiped out the Ph.D. theses of two dozen graduate students who lost their records, equipment, and research results," the chancellor reported.

Chancellor Young said effects of the bombing on University research needed clarification for Wisconsin residents not familiar with the campus. He explained that the Mathematics Research Center destruction was costly but mathematicians work chiefly "with paper and pencil." The bomb was detonated in the immediate area of physics research equipment on the first two levels of the MRC building and adjacent Sterling Hall.

The chancellor said the blast also ruined research facilities and data of other nearby departments, including pharmacy, astronomy, botany, mathematics, and chemistry.

- more -

Young also disclosed that an international conference on polarization phenomena in physics--scheduled next week in Madison--will be held, "although unique apparatus which the participants from all over the world had expected to see has now been destroyed." The meeting Aug. 31-Sept. 4 will include participants from European and Asian countries, as well as U.S. physicists.

The chancellor said he realized the bombing had caused grief and anger throughout Wisconsin but he cautioned against "blaming students indiscriminately."

"We must not confuse such acts of violence with everyone who advocates change on our campus," Young said. "We believe in change, too, but change which is arrived at in a rational manner."

The chancellor said a propaganda campaign against the math center had led to misunderstanding about its role. He explained that MRC faculty members worked on basic and applied mathematical problems. Their research is not classified and its results are open to the public, Young said.

The Beloit group also heard the chancellor describe Madison campus plans for "programmed growth" from now until 1985, with emphasis to be placed on studies which "improve the quality of life."

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From The University of Wisconsin News and Publications Service, Bascom Hall, Madison 53706 • Telephone: (608) 262-3571

Astronomy Dept

Release: Immediately 3/18/70

UIR Science Writing Division (262-5984)

By ROBERT HORVAT

MADISON, Wis.--The first ultra-violet pictures of comets taken from the Orbiting Astronomical Observatory (OAO-II) are giving University of Wisconsin scientists some new hints as to the nature and composition of these strange objects.

Looked upon in the past as portents of military defeat or natural disaster, comets long have puzzled astronomers, particularly as to details of origin and composition.

Comet observations from the ground were limited by the atmosphere, which blocks the kinds of light that can be used to identify the chemicals making up the comets.

Since the successful launch of OAO-II in 1968, the Wisconsin-designed instrument package aboard has been looking at the heavens unhampered by the earth's blanket of air. Data relayed to earth are not pictures in the true sense but ultra-violet radiation measurements. These are actually of more value to astronomers than pictures.

After focusing on Tago-Sato-Kosaka, a comet now speeding away from the sun, measurements of the ultra-violet light coming from this gaseous cloud of material are being examined by Theodore E. Houck and Charles F. Lillie, Wisconsin astronomers.

- more -

It has been accepted generally that hydrogen, the most common substance in the universe, probably is abundant in comets. The Wisconsin observations confirm this belief. Oxygen, carbon, water, and ammonia also appear.

"These are the same materials present in the atmospheres of the outer planets in our solar system," Lillie explains.

The atmospheres of the smaller inner planets once contained the same substances, but didn't have sufficient gravity to hold onto them. Gradually the substances leaked away to space.

Astronomers have suggested there may be some connection between the composition of comets and the lost atmospheres of the inner planets. The planetary material lost from the planets would have drifted to the far reaches of the solar system--the place where comets begin their journeys, Lillie points out.

Hopefully the new data from OAO-II will lead eventually to a better understanding of these visitors.

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From The University of Wisconsin News and Publications Service, Bascom Hall, Madison 53706 • Telephone: (608) 262-3571

Astronomy Dept

Release: For Sunday, Dec. 7 12/5/69 vh

MADISON, Wis.--(Advance for Sunday, Dec.7)--Today, on the first anniversary of its launch, the University of Wisconsin's orbiting astronomical observatory "has no major problems" and has already gathered enough information on the stars to keep researchers busy for years.

Three days after America's largest, heaviest, and most complex unmanned satellite was boosted skyward at Cape Kennedy (Dec. 7, 1968), Prof. Arthur D. Code, director of Wisconsin's Washburn Observatory, reported OAO operating "beyond our expectations."

Four months after launch, Wisconsin astronomers said the telescopes on board the giant spacecraft already had provided them with important data on the atmosphere of planets and stars, the evolution of galaxies, and the structure of the entire universe.

Wisconsin's space astronomy "package" continues to observe and measure ultraviolet starlight. With the aid of OAO, Washburn researchers expect to learn much more about the birth and development of young hot stars. Such stars emit mainly ultraviolet radiation. But until the advent of OAO, astronomers had little opportunity to observe such light for it could not penetrate the earth's atmosphere and reach ground-based instruments.

- more -

Add one--UW's OAO

Now the space age has wrought the miracle. Orbiting the earth every 100 minutes, OAO performs at an altitude of 480 miles, a point well above the blanketing atmosphere. As of today, it has circled our globe 5,300 times, according to Prof. Robert C. Bless of Washburn's space team. It has measured the light of 600 stars and has made observations of the planets, particularly Mars, Venus, and Jupiter. Beyond this, the instruments have made scattered observations of nebulae including the Crab.

"Our men are working very hard now to develop computer methods for extracting the information," said Bless.

The Smithsonian Institution, which shares research space with Wisconsin on OAO, is developing by means of television cameras a sky map in four broad wave length bands. The research projects of Wisconsin and Smithsonian complement each other.

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From The University of Wisconsin News and Publications Service, Bascom Hall, Madison 53706 • Telephone: (608) 262-3571

Astronomy Dept

Release: 7 pm Tuesday, April 1 3/31/69

UIR Science Writing Division (262-5984)

Photograph Available

By JOHN WOLF

HONOLULU, Hawaii--(for use after 7 pm April 1)--Scientists in the last few months have literally thrown new light onto studies of the heavens, and Tuesday they presented the first reports of their pioneering work.

Using NASA's Orbiting Astronomical Observatory satellite (OAO-2), researchers at the University of Wisconsin and the Smithsonian Institution have reached above the earth's atmosphere to look at the universe in a different light--ultraviolet light.

Wisconsin Astronomy Prof. Arthur D. Code, speaking at the spring meeting of the American Astronomical Society in Honolulu, asserted that "all previous investigations into the structure of the universe must be reviewed in the light of the OAO-2 findings."

Code, in charge of the Wisconsin experiment aboard OAO-2, explained that data from the satellite have already given valuable information about atmospheres of other planets and stars, the evolution of galaxies, and the structure of the entire universe.

"Data gathered by OAO-2 will be of interest and importance in a wide variety of areas," Code continued. "The exciting part of this experiment is the realization that any data we gather will greatly augment ground-based observations."

Astronomers on the earth's surface cannot detect ultraviolet (uv) radiation from the heavens because uv is absorbed by gases in the planet's atmosphere.

- more -

However, scientists believe that uv radiation holds many clues to astronomical problems.

Stationed above the atmosphere, OAO-2 has already detected uv radiation from 250 sources in the sky--including planets, stars and galaxies.

Within our own solar system, OAO-2 has looked at the atmospheres of Venus, Jupiter, Saturn and Uranus. When pointed at Jupiter, the Wisconsin equipment "saw" uv signals which indicated a new and unknown gas in the atmosphere of our sun's largest planet. Scientists are now evaluating the nature of this gas, Code reported.

Aiming much deeper into space, OAO-2 has also trained its ultraviolet eyes on the youngest and most massive stars, which give off most of their energy as uv radiation. Measurements by the Wisconsin instruments show that some of these young stars may be twice as hot as formerly believed, Code noted.

Wisconsin scientists pointed OAO-2 at a cool star, Betelgeuse, whose diameter is as large as our solar system. They found that this super-giant star emits an unusually great amount of uv radiation. Code said that this excess uv is probably coming from Betelgeuse's "chromosphere"--the envelope of hot gases surrounding the star.

"Further studies of OAO-2 likely will reveal information about the nature of chromospheres surrounding many other stars," Code predicted.

"Observations obtained by OAO-2 also bear directly on the structure of the universe," the UW astronomer explained. In particular, the satellite has been looking at the brightness of the sky where there are no stars. OAO-2 readings have already shown that ground measurements of sky brightness have been misinterpreted due to scattering of light by the earth's atmosphere, Code said.

"OAO-2 instruments are measuring sky brightness to find out how much of this light comes to us from other galaxies."

Studies of sky brightness readings from OAO-2 tend to support the so-called "Big Bang" theory for the creation of the universe, Code stated.

OAO-2 is also trying to find differences in amounts of uv radiation from younger and older galaxies. Such differences might help tell how galaxies evolve.

In addition, Wisconsin's equipment aboard OAO-2 has been looking at exceptional objects like quasars and exploding galaxies. Code noted that no unusually high level of uv radiation has been seen coming from such sources, however.

OAO-2, which was launched last Dec. 7, provides a very stable platform for making astronomical observations. The butterfly-shaped satellite weighs 4,400 pounds. The Wisconsin and Smithsonian experiments are housed at opposite ends of the spacecraft.

Other Wisconsin scientists involved in the OAO program are Theodore E. Houck, Robert C. Bless, andJohn F. McNall.

Code stressed that OAO-2 is only a pioneering effort in ultraviolet astronomy. Although answering some long-asked questions about the universe, OAO-2 is mainly providing tantalizing clues for future space astronomy projects.

"The real reward in scientific research is to be able to say that for a brief time you were standing someplace no one else has ever stood and were understanding something about the universe that only you knew," Code said.

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Astronomy

From The University of Wisconsin News and Publications Service, Bascom Hall, Madison 53706 • Telephone: (608) 262-3571

Release: Immediately 2/26/69 jw

UIR Science Writing Division (262-5984)

MADISON, Wis.--The University of Wisconsin experiment aboard the Orbiting Astronomical Observatory (OAO-2), launched into earth orbit early in December, has already returned good data on 250 stars and can be called a success.

John F. McNall, assistant director of the University's Space Astronomy Laboratory, said the satellite was officially a success after it had returned 50 hours of useful data. This occurred early in January. Wisconsin astronomy researchers prepared a package of seven instruments for OAO-2.

The UW team shares the use of OAO-2 with the Smithsonian Institution, which provided instruments for the second major experiment aboard the satellite.

Its purpose is to gain knowledge about the evolution of stars. Because the earth's atmosphere filters out much starlight, information being gained by OAO-2 cannot be obtained from ground-based observatories.

This summer Wisconsin scientists will have instruments aboard a rocket to be fired from the White Sands Proving Grounds in New Mexico to run a double check on the instruments aboard OAO-2. This "up and down" shot will be aimed at gathering additional information on some of the same stars being observed by OAO-2, so a comparison of results can be made.

One of the seven Wisconsin instruments has failed, according to McNall. This instrument was designed to collect data on nebulae, masses of outer space gas.

- more -

The other six instruments, however, are expected to supply much of the lost information.

Minor problems, which are expected in all pioneering space ventures, have also appeared during the OAO-2 experiments. McNall pointed out that the Wisconsin experiment is troubled by scattered sunlight during daylight hours. Also, the Van Allen radiation belts upset some readings obtained when the satellite is over South America.

Despite the difficulties, McNall reported OAO-2 is "pouring back information," and some results should be announced soon.

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University of Wisconsin Space Programs

With the opening of the Space Age in the late 1950s, the University of Wisconsin, in cooperation with the National Aeronautics and Space Administration, established several programs of research on the Madison campus to be forwarded through space flight activities. As extensions or additions to these originals, space programs are now being vigorously pursued by Wisconsin scientists in astronomy, meteorology, engineering and physics.

Space Astronomy

Washburn Observatory experimenters, among the first to recognize the possibilities in space flight, have planned and designed research instruments which, carried above the earth's obscuring atmosphere, could reveal new knowledge of young hot stars--and possibly even the key to the orgin and development of the universe--through observations of the ultraviolet light which such stars emit. In the past three years their efforts have yielded data gained with instruments mounted on rockets and on an experimental X15 plane. Six such rockets have been launched to date, all from Northern Hemisphere sites, and more are planned to be sent aloft from both Northern and Southern Hemisphere launching grounds.

In one of the most ambitious of space astronomy ventures, the Wisconsin scientists are today nearing the countdown for a second orbiting astronomical observatory. A first OAO, launched at Cape Kennedy in 1966, defeated Wisconsin research attempts when a power failure developed. The largest, heaviest, and most automated scientific satellite ever undertaken by the U.S., the "flying" observatory due this fall will carry 11 telescopes (7 for Wisconsin) and a wealth of electronic equipment as it goes into circular orbit some 480 miles above the earth.

Space Physics

In Wisconsin's space physics explorations, the experimenters are concerned with learning more about x-rays, gamma rays, and the solar wind. It is known that some celestial objects, as yet unidentified, emit large amounts of x-radiation.

- more -

On two occasions, August, 1967, and September, 1968, our physicists, sharing rocket space with our astronomers, have sent instruments aloft which may reveal how x-rays originate and establish with certainty how general is the phenomenon of enormous x-ray output from stellar sources.

A satellite x-ray experiment for Wisconsin is now scheduled for flight in 1970. It will be flown on a Saturn rocket as part of NASA's Apollo Application program. Also scheduled in the x-ray space investigations is a Tomahawk rocket to be launched from Wallops Island, Va., early next year.

And still another space physics instrument will be launched, this time to learn more about the solar wind. Following discovery of the wind, one of our scientists set about developing a detector for deuterium, the heavy isotope of hydrogen found in that wind. This instrument, now completed, has been approved for flight on two of NASA's interplanetary Monitoring Platform Satellites.

Space Meteorology

No examination of space science is complete without a salute to the men in the department of meteorology and the Space Science and Engineering Center and to the milestones they have laid down. Beginning with the launch of Explorer VII in 1959 and continuing with a series of Tiros satellites, this group has obtained the heat budget of the earth, has learned that the solar energy absorbed in tropical regions is considerably higher than previous estimates, and that the atmosphere and ocean currents redistribute this excess heat through the mechanism of weather.

With cameras mounted on a geosynchronous satellite, launched in 1966, they have photographed the entire Pacific hemisphere continuously from space and have viewed the tropics and associated weather motions as a single entity.

Launched the following year, another Applications Technology Satellite carried cameras for meteorology which are capable of photographing the earth in full color. The photographs they have provided, as opposed to non-color views, make it far easier to distinguish land from clouds, sea, and muddy river discharge. Out of of the experiment, rough estimates of cloud altitudes were made possible,

measurements of cloud motions were obtained, and moving pictures of severe weather situations were accomplished. From such pictures it is possible to pinpoint widely separated wind currents which, in combination, created the severe storm.

Because the geosynchronous platform permits continuous observations of the weather below, a whole series of new experiments concerned with small scale motions of the atmosphere, for instance, thunderstorms and convective cloud organization, is seen for the future.

Astronaut

In August, 1967, the National Aeronautics and Space Administration named a 30-year-old University of Wisconsin astronomer to the ranks of American spacemen. Astronaut Robert Parker was due for promotion to the rank of associate professor on Wisconsin's Washburn Observatory staff when the naming took place. His five years of experience on the Madison campus had included teaching, research and supervision of Washburn's major research facility, the Pine Bluff country observatory.

Parker faced a long period of training before any flights for NASA would be attempted, but it seemed likely then and seems likely now that he will ride an Apollo or post-Apollo in search of new knowledge of the universe. And it is not outside the realm of possibility that he will carry out experiments identified with his own campus. Though Parker has not been directly associated with Wisconsin's space astronomy efforts, he is thoroughly familiar with the program and its aims.

As American space exploration continues, research institutions will be applying to NASA to have their experiments flown in manned satellites, Parker predicted, "and if Wisconsin applications are accepted, I might very well be running one for Washburn."

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From The University of Wisconsin News and Publications Service, Bascom Hall, Madison 53706 • Telephone: (608) 262-3571

Astronomy Dept'f'd

Release: Immediately 12/14/68 vh

GODDARD SPACE FLIGHT CENTER, GREENBELT, MD.--Observations being made by University of Wisconsin instruments on board the orbiting astronomical observatory launched Dec. 7 are giving promise of revolutionizing astronomical studies, Wisconsin astronomers reported today.

OAO observations were begun on Dec. 11. Radiation from Beta Carinae, a southern hemisphere star twice as hot as the sun, was measured electronically and the results were relayed by radio to Wisconsin astronomers at their control rooms at NASA's Goddard Space Flight Center, Greenbelt, Md.

After three days of successful OAO performance, Arthur D. Code, the jubilant director of Wisconsin's Washburn Observatory, said:

"The spacecraft and experiment are operating not only well but beyond our expectations. In addition to the exciting science that can be done, the results have proven that an automatic space observatory is fully feasible and we hope this means that other more sophisticated facilities will be made available to the scientific community."

The OAO is circling the earth every 100 minutes at an altitude of 480 miles and from its vantage point above the earth's obscuring atmosphere has been observing stars in ultraviolet light. Wisconsin astronomers are particularly interested in studying the birth and development of young hot stars. Such stars emit mainly ultraviolet light, but that light cannot penetrate the atmosphere to reach observatories on the ground.

- more -

Aboard OAO are 11 telescopes, seven provided by the University of Wisconsin's Space Astronomy Laboratory, an arm of the Washburn Observatory, and four provided by the Smithsonian Institution's Astrophysical Observatory. The Wisconsin telescopes include one with a 16-inch mirror, four eight-inch ones, and a pair of six-by-eight inch rectangular instruments that can scan the spectrum.

They have been designed specifically to make detailed measurements, in many different wave lengths, of the amount of radiation which is emitted by individual objects. The Smithsonian experimental package is expected to produce television pictures of a large portion of the sky in four broad wave length ranges. Thus the two research approaches complement each other.

The preliminary checkout operations of Wisconsin's OAO experiment have yielded significant observations of 13 extremely interesting stars, Prof. Code said. By far the brightest of these objects in the ultraviolet light is the southern hemisphere star Gamma Velorum, he pointed out. Its ultraviolet radiation produces a huge cloud of glowing hydrogen gas. The star emits far more energy in the ultraviolet than it does in the visible regions of the spectrum. Ground based observations of Gamma Velorum's visible radiation indicate that this star may have an unusual chemical composition (an overabundance of carbon). The newly gained ultraviolet data could settle the question.

Other stars observed include several of normal chemical composition (that is, similar to that of the sun) but with a wide variety of surface temperatures. Another star observed belongs to the interesting class known as Cepheid variables. These stars are used to determine the distance from our own galaxy to other galaxies.

Code said that plans for the future include observations of the planets Jupiter, Mars and Uranus, of hundreds of stars, and of the mysterious quasar, 3C 273. He also indicated that Wisconsin astronomers are eager to turn OAO telescopes on the giant galaxy Virgo A which is a strong source of x-rays and radio waves. Objects

which are now hidden by the sun will become observable for the telescopes if the OAO can continue in operation for several months, members of the Washburn Observatory staff pointed out.

Wisconsin's space astronomy team includes Profs. Code, Theodore E. Houck, Robert C. Bless, and Dr. John F. McNall. McNall had the task of guiding the project through many complex engineering problems.

Code paid tribute to his team and to all others concerned with OAO when he said today: "I'm not only pleased but proud of the exceptional way that all of my associates have performed both in bringing about the Wisconsin experiment and in its present operation."

Wisconsin's part of OAO stems from an idea for a 300-pound astronomical satellite conceived by Drs. Code and Houck in 1958. Between this idea and the Wisconsin telescopes now in orbit lie hundreds of man years of effort on the part of the National Aeronautics and Space Administration and the Wisconsin men, of work by scientists, engineers and technicians. Cook Electric Company, Morton Grove, Ill., built the prototype instruments and the final experimental package for Wisconsin. The spacecraft, which carries the research loads for both Wisconsin and Smithsonian and also provides power, control and communications facilities, is the product of the Grumman Aircraft Corp., Long Island, N.Y. and NASA's Goddard Space Flight Center.

In total, the 4,400 pound OAO is the largest, heaviest, and most complex unmanned satellite ever attempted by the U.S.

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uw news

From The University of Wisconsin News and Publications Service, Bascom Hall, Madison 53706 • Telephone: (608) 262-3571

Astronomy Dept.

Release: This Wisconsin advance has been prepared for use upon launch of the Orbiting Astronomical Observatory (OAO-2), expected Wednesday, Dec. 4

12/3/68

By VIVIEN HONE

CAPE KENNEDY, Fla.--(ADVANCE)--Some 360 years ago Galileo, Italian philosopher-astronomer, turned a strange instrument toward the stars and brought many of them, for the first time, within the visual range of man.

The orbiting astronomical observatory (OAO-2), launched today from Cape Kennedy and now circling the earth every 100 minutes, may be another great landmark in science, perhaps as great an advance in the ancient study of the heavens as Galileo's telescope. Many astronomers think this is likely and none hope for it more fervently than the scientists at the University of Wisconsin's Washburn Observatory. In cooperation with the National Aeronautics and Space Administration, they have staked more than nine years of effort--of planning design, development and experimentation--on the hope that seven modern versions of Galileo's instrument could be carried above the earth's obscuring atmosphere and there in the new found clarity and stillness of space, resolve old mysteries concerning our physical universe.

Since the Space Age began a decade ago Wisconsin has had notable success in star study with sounding rockets carrying telescopes. However, by this means, the measurements of starlight cannot go beyond fifth magnitude stars (typical visible stars) and one star only can be observed and for only a very short time.

- more -

"The atmosphere not only filters out the light of stars and other sky phenomena but also dims and distorts it," explained Prof. Theodore Houck, director of Washburn's Space Astronomy Laboratory. "And since we can't go to the stars and can only interpret them by the light received, an orbiting astronomical observatory promises the next best thing."

Prof. Arthur Code, director of Washburn Observatory, pointed out: "Each time a new window to the universe has been explored astronomy has made a momentous stride forward. The OAO is the first step in opening up the ultraviolet and spectral region to systematic stellar investigations."

The 4,400 pounds of "flying" observatory, now in circular orbit nearly 500 miles above the earth, is the largest, heaviest, and most automated unmanned scientific satellite ever attempted by the U.S. Tailor-made for its mission--to photograph and record the ultraviolet light of stars--it has required great quantities of time, money, technical skill and scholarly knowledge to achieve that tailoring. Through measurement of the ultraviolet light that young hot stars emit, Wisconsin astronomers hope to learn about the birth and evolution of such stars, and beyond that, to determine whether the universe is infinite or has a beginning and an end.

One of the most important features of OAO is the equipment which will keep the telescopes in Wisconsin's 500-pound research package "locked" on or pointing at a particular star until men at the ground-based controls at Goddard Space Flight Center, Greenbelt, Md., wish to change them. Washburn men say the pointing system is so accurate that it can distinguish between one side of a quarter and the other at a distance of one mile.

Wisconsin will examine one star at a time in detail. A 500-pound research "package" from the Smithsonian Institution's Astrophysical Laboratory, riding the opposite end of the spacecraft, holds television cameras ready to photograph a larger number of stars in the ultraviolet and in less detail.

Add two--OAO-2 launched

Washburn Observatory scientists are old hands at studying the stars and other sky phenomena through photographing, measuring and recording their light as degrees of relative brightness. The method of photoelectric photometry was largely pioneered on the Madison campus and is the basic means for Washburn research today. But the Badger space astronomers are understandably cautious about assuming success at this point.

An orbiting astronomical observatory (OAO-1) with Wisconsin instruments on board and with the same mission as OAO-2 was successfully launched from Cape Kennedy in April, 1966, but a power failure in the spacecraft cancelled all possibilities of research.

During the second day of orbit of OAO-2, buttons at the central control console will be pushed and the spacecraft's experimental "packages," and some five ground stations for receiving data will go into a nine-day comprehensive shakedown. Other testings will be made and on the 11th day following launch initial experimental operations will begin. This phase will continue into the 24th day. If all has gone well on this schedule, the final phase called "extended and continuing operations" will commence. When that long-waited moment comes, then and only then will the Wisconsin men believe the new window on the universe has truly opened.

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Astronomy Dept

From The University of Wisconsin News and Publications Service, Bascom Hall, Madison 53706 • Telephone: (608) 262-3571

Release:

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Editors: This is a suggested lead-in for the accompanying tape which runs 7½ minutes

Many of you heard the news today of the orbiting astronomical observatory. It was launched into space in the pre-dawn hours of Wednesday from Cape Kennedy. University of Wisconsin astronomers have a large stake in the "flying" observatory. Here as a special feature of Station ---------- is an interview with three principals in the Wisconsin team which has labored for nine years to develop the OAO. Our scientists are Prof. Arthur D. Code, director of Washburn Observatory, Prof. Theodore Houck, director of Washburn's Space Astronomy Laboratory, and Prof. Robert Bless, also of the Washburn Observatory staff.

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Astronomy

From The University of Wisconsin News and Publications Service, Bascom Hall, Madison 53706 • Telephone: (608) 262-3571

Release: Immediately 8/22/68

By VIVIEN HONE

MADISON--An Aerobee-Hi rocket carrying instruments for two separate areas of University of Wisconsin space research is scheduled to be launched from the U.S. Department of Defense proving grounds at White Sands, N. Mex. on Friday (Aug. 23).

For Wisconsin astronomers, the nighttime shot represents the third launch in their expanded program of research by rocket. When this expansion began in 1967, Prof. Robert Bless of the Washburn Observatory staff said: "We've observed ultraviolet radiation from many stars on the first flights and have a fair amount of data. Now we're after data from more stars and over a broader spectral range."

A Washburn research associate, Dr. Wolfgang Haupt, says of the coming Friday attempt: "Our objectives are the same as before--looking at young hot stars down to the fifth magnitude."

For Wisconsin physicists, again sharing research space on an Aerobee-Hi with Washburn scientists, Friday's rocket means another chance to probe for x-rays from stellar sources.

"Our hope is to see sources of x-rays and establish their positions, intensities, and spectra," explained research associate Dr. Alan Bunner.

The 61-pound scientific "package" to be lifted above the earth's obscuring atmosphere for Washburn holds nine telescopes--three covering the range of around 1,200 Angstroms and six covering the range of 2,000--4,000 A's.

-more-

The 47-pound load for the space physicists includes two detectors or proportional counters with mechanical collimators. The counters have thin plastic windows and are fitted with an argon methane gas mixture.

As in the past, a radio system for transmitting data received to ground stations and parachutes for recovery of the scientific instruments will be part of the freight.

Wisconsin joined the National Aeronautics and Space Administration in a space astronomy program in 1959 and has since worked to observe stars in the ultraviolet by means of rockets, an x-15 plane and an orbiting observatory. To date, the rockets have been the most successful as a transportation means.

Wisconsin physicists, led by Prof. William L. Krauschaar, joined the astronomers to share rocket space when the expanded program began last year.

On hand at White Sands for the Friday shot will be the following men from the Madison campus: from the Space Astronomy Laboratory--Prof. Bless, Dr. Haupt, Don Michalski, an electronic engineer, and Charles Piper, an electronic technician; and from the space physics group--Dr. Bunner and graduate students Dan McCammon, Tom Palmieri, and Phil Coleman.

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From The University of Wisconsin News and Publications Service, Bascom Hall, Madison 53706 • Telephone: (608) 262-3571

Astronomy Dept.

Release: Immediately 5/21/68

UIR Science Writing Division (262-5984)

By LOUISE PURRETT

MADISON, Wis.--A University of Wisconsin astronomer has found a way to measure what poets and peasants have marveled at for ages--the brightness of the stars.

But Charles Lillie didn't undertake the project to satisfy poetic--or even pedantic--curiosity.

Astronomers, says Lillie, need a measure of starlight intensity to understand the physical condition of matter in interstellar space.

He explains that there are two ways by which outside forces can affect interstellar matter--collisions with speeding particles or collisions with light rays.

To determine the effect of light on interstellar matter, the amount of light available must be known. Lillie says starlight intensity has been calculated but never actually measured. Results of calculations are often conflicting.

Measuring starlight is a good deal more complicated than most poets might initially suspect. You can't just point a photographic light meter at the midnight sky and take a reading.

For one reason, only about 22 per cent of light in the nighttime sky comes from starlight. The rest is zodiacal light and air glow. Zodiacal light is a faint glow caused by sunlight reflected from meteoric particles in interplanetary space.

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In addition to this reflected light, the earth's atmosphere has a light of its own--airglow or night-glow. Lillie describes air glow as "a permanent aurora, not visible to the eye."

Lillie had to find the brightness of these two kinds of light in order to isolate the starlight.

Also, a portion of the light from the stars never makes it through the earth's atmosphere. Some is absorbed by dust particles and some is scattered by air molecules.

Lillie's method was to divide the stellar light rays into six frequency bands, or colors, and measure the intensity of each band. To do this, he designed a "three-channel photometer"--a device that measures three bands at once. Lillie comments that, as far as he knows, there are only two other such instruments in existence.

Besides cutting down on observing time, this device has the advantage of giving relative as well as absolute measures of the intensities of different bands. This enables Lillie to make usable observations even through clouds.

He is also able to monitor the air glow on one channel to determine how much to subtract from the other colors. With the photometer attached to a clock-driven three-inch telescope, Lillie scanned the sky from Kitt Peak Observatory, near Tucson, Ariz.

In addition to ground-base observations, Lillie collected data from an Aerobee rocket launched by Wisconsin's Space Astronomy Lab.

Lillie feels that the very fact that he used data from these two sources is significant. There has been fierce competition for research funds between the proponents of rocket and ground-base observations. Lillie thinks his study shows that "each needs the other."

Ground-based observations are more accurate, but rockets can be used to obtain data for a wider range of radiation frequencies.

Add two--stars

Lillie's results contained a few surprises. Zodiacal light turned out to be fainter than expected, and Lillie discovered a large amount of radiation in one frequency band that is unaccounted for by present knowledge.

But on the whole, he says, his observations agree with theoretical predictions.

Most of Lillie's equipment was built to his specifications by the Space Astronomy Lab with funds from NASA and the astronomy department. The instruments have also been used to help evaluate potential sites for a new observatory.

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astronomy Dept.

From The University of Wisconsin News and Publications Service, Bascom Hall, Madison 53706 • Telephone: (608) 262-3571

Release: Immediately 5/23/68 vh

MADISON--Three University of Wisconsin astronomers will be on the federal proving grounds at White Sands, N. M., for the scheduled 1 a.m. launch Saturday of an Aerobee-Hi rocket bearing a research "package" from the University's Washburn Observatory.

They will be particularly concerned with a new device, not present on the four previous rockets launched in Wisconsin's space astronomy program--an attitude control system permitting the ground-based astronomers to select positions favorable for observations.

"The attitude control system allows us to point the rocket anywhere we wish in the celestial sphere," explained the assistant director of Washburn's Space Astronomy Laboratory, John McNall.

Like all four previous research "packages" sent aloft by Aerobee-Hi's, Saturday's load will contain telescopes and photometers constructed to receive and record ultra-violet starlight, McNall said, as well as a radio system for transmitting data to ground stations. Like the others, its purpose is the unraveling of the mysteries of young, hot stars from heights well above the earth's obscuring atmosphere.

Like number four, number five will be equipped with a parachute to make recovery of the "package" possible.

- more -

Add one--rocket launch

Since 1959, when Wisconsin joined the National Aeronautics and Space Administration in a space program for astronomical research, Washburn Observatory has attempted experiments by means of rockets, X-15 high altitude planes, and an orbiting astronomical observatory. By early 1967, three rockets carrying Wisconsin instruments had been launched and had reached altitudes well in excess of 100 miles.

When these three experiments had been carried out, Prof. Robert Bless pointed out: "We've observed ultraviolet radiation from many stars on these first flights and have a fair amount of data. Now we're after data from more stars and over a broader spectral range."

Launchings from both southern and northern hemisphere sites are planned in the newer Wisconsin studies of the stars via rockets, McNall said.

Washburn Observatory staff men who will be present for the rocket five launching include Prof. Robert Bless, Wolfgang Haupt, research associate, and Donald Michalski, electrical engineering specialist.

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From The University of Wisconsin News and Publications Service, Bascom Hall, Madison 53706 • Telephone: (608) 262-3571

Release: Immediately 11/24/67 vh

MADISON--The first photographs of stars taken in the daytime and above the earth's atmosphere have been produced in the University of Wisconsin's space astronomy program.

Prof. Lowell Doherty of Wisconsin's Washburn Observatory staff reported this week that the photographs, as recorded by ultraviolet light, were gained with cameras mounted on an X-15 rocket plane in two separate flights out of Edwards Air Force Base, California, during the late summer of 1966. Under analysis by Doherty, they confirm measurements of the brightness of hot stars made by means of rockets carrying instruments from Wisconsin, the Naval Research Laboratory, and the Goddard Space Flight Center.

The Wisconsin experiment yielded other dividends: measurement, for the first time, of the ultraviolet brightness of a giant cool star, and measurements of day airglow brightness. The latter have a practical application for astronauts in that they set the limits of ultraviolet daylight glare which the astronauts can expect to encounter in space.

Wisconsin astronomers in cooperation with the National Aeronautics and Space Administration, have worked for more than eight years toward carrying out observations by instruments in the high, more favorable reaches of space. Mechanical failures of an orbiting astronomical observatory, launched in 1966, have delayed

- more -

Wisconsin's research by the "flying" observatory means. A second OAO carrying a Wisconsin experimental package is scheduled for launching in 1968. Rockets equipped with the University's astronomical apparatus have already been used with considerable success.

All of these pioneering efforts are aimed at observations of young, very hot stars. Such stars emit largely ultraviolet light. Comparative studies of their energy output could provide new understanding of the lifespan of these stars and even of the beginning and evolution of the universe. However, since little ultraviolet light can penetrate the earth's atmosphere, ground-based observations have provided only limited information.

The X-15 flights, one made on Aug. 3, 1966, and the second on Aug. 12, reached altitudes of approximately 47 miles, where very little of the earth's blanket of air is left.

"From our point of view and at the wave length we were trying to work at, the atmosphere was non-existent," Prof. Doherty said.

Each flight lasted in total no more than 10 minutes, according to the Wisconsin scientist, and the two Wisconsin cameras, making four exposures each, operated for no more than one half minute at flight peak. The hatch was closed then, immediately following the fourth exposure, and the X-15 began its 3,000 miles per hour descent.

"The cameras caught the stars we were aiming at--Eta Aurigae on Aug. 3 and Castor, one of the Gemini twins, on Aug. 12," Doherty said.

It was on the Aug. 3 flight that the cameras also recorded Capella and Rho Aurigae, Doherty said. Rho Aurigae is a hot star, but Capella, though as hot as the sun, is considered a cool star.

Because of some movement, the phctographs were not too sharp, Doherty reported, "but since we were interested in measurement of star brightness, this didn't matter."

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From The University of Wisconsin News and Publications Service, Bascom Hall, Madison 53706 • Telephone: (608) 262-3571

Astronomy Dept.

Release: Immediately 8/22/67 vh

MADISON--The public is invited to view the prototype or test model of the experimental "package" for University of Wisconsin astronomy studies in space which will be on view in the Wisconsin Center, Madison, Thursday, 9 a.m. to 4 p.m., and from 9 to noon on Friday.

The 500-pound assembly including seven telescopes and spectroscopes duplicates in all respects the "package" which will be placed aboard a spacecraft at Cape Kennedy and sent into orbit via an Atlas-Centaur rocket sometime in 1968.

The 1968 launch will be Washburn Observatory's second attempt to study the ultraviolet light of the stars from an unmanned orbiting astronomical observatory, circling the earth well above the obscuring atmosphere. Wisconsin's first OAO was placed in orbit from Cape Kennedy in April, 1966, but was cancelled out when the electrical power system failed.

A movie on the development of the orbiting astronomical observatory and a short sound film featuring Wisconsin's Pine Bluff Observatory and Prof. Robert A. R. Parker, newly-named scientist astronaut who has been in charge of operations there, will also be shown in the lobby area while the prototype is on view.

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Astronomy Dept.

From The University of Wisconsin News and Publications Service, Bascom Hall, Madison 53706 • Telephone: (608) 262-3571

Release: **Immediately** **6/15/67 vh**

MADISON--A grant of $150,000 to the University of Wisconsin for investigations and studies of ultraviolet stellar spectra has been offered by the National Aeronautics and Space Administration, the federal agency announced Thursday.

The funds will be used toward support of a continuing astronomy program for instrument development in the laboratory and observation of stars from sounding rockets.

The $150,000 to Wisconsin is one of a number of supplementary or new research grants and contracts totaling $1,542,484 and recently awarded by NASA to 23 universities, colleges, and private research institutions.

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From The University of Wisconsin News and Publications Service, Bascom Hall, Madison 53706 • Telephone: (608) 262-3571

Release: Immediately 3/24/67 vh

EDITORS NOTE: Louise Webster is the daughter of Mr. and Mrs. D. E. Webster of 3 Smith Street, Walkerville.

MADISON, Wis.--She makes no claims, but others will tell you that Louise Webster, a quiet, dark-eyed young "Aussie" on the Madison campus, is the University of Wisconsin's first woman teacher in astronomy.

They will also point out that she is the first woman to earn a Ph.D. in astronomy from Australian National University.

Appointed to the Washburn Observatory staff last fall, the Down Under newcomer spends half her working hours in teaching--largely classes in introductory astronomy. The other half is devoted to research in nebulae, the gaseous clouds that lie between and sometimes around the stars. Wisconsin's wide reputation for work in nebulae weighed heavily in bringing Louise Webster from half a world away to begin her professional career on the Madison campus. "This department is the best in my field," she declared.

Her presence here can also be explained as a logical step in women's recently earned place in scientific enterprise. Wisconsin opened a new $200,000 country observatory, equipped with a modern 36-inch reflecting telescope, in 1958.

A climb in enrollment including enrollment of women also began in this period and by 1963 Wisconsin had granted its own first Ph.D. to a woman in astronomy. Competence, not gender, was the measuring stick as Louise Webster became another milestone in Washburn Observatory history this fall. "She's very good. We're happy she's here," said Prof. Donald Osterbrock, chairman of astronomy studies.

- more -

Astronomy presents no special handicaps for women, least of all observations with the big telescopes, as Instructor Webster sees things. The "big eyes" are about as fully automatic as is practical, she pointed out, but she conceded that "a little knowledge of electronics is helpful."

Instruments such as Washburn's 36-inch 'scope and auxiliary equipment at Pine Bluff--"among the most progressive in photo-electric techniques," according to the instructor, are the familiar mechanisms of her profession. She trained at Mount Stromlo Observatory, now attached to Australian National University. Here at this largest observatory in the southern hemisphere are photo-electric facilities as well as telescopes, the largest being a 74-inch reflector.

Australia has made important contributions in optical astronomy, Louise Webster said, "and our radio astronomy is among the world's best."

Other members of the Washburn Observatory staff point out that in proportion to her population (11,000,000) "Australia is exceedingly active in astronomical science." That nation, too, is working in space astronomy.

However, because of a somewhat isolated geographical position, the Down Under country offers limited opportunities to young astronomers for meeting prominent outsiders in the field; for this reason among others, it is very much oriented toward the U.S.

"I find it very stimulating to be here in a country where the greatest percentage of the world's astronomers is gathered," Miss Webster said. "Almost every student receiving his Ph.D. from Mount Stromlo has spent one or more years in the U.S.," she added.

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Astronomy Dept.

Release: Immediately 2/24/67 vh

MADISON, Wis.--During the next two years, University of Wisconsin astronomers will launch a number of instrument-bearing rockets from both northern and southern hemisphere sites, Prof. Robert C. Bless of Wisconsin's Washburn Observatory staff said Friday.

Wisconsin space physicists will also place instruments on board the rockets in this expansion of one arm of a space program which Washburn began in 1959, Bless said.

The University entered the space program in cooperation with other research institutions and the National Aeronautics and Space Administration. Wisconsin efforts to observe ultraviolet starlight at altitudes well above the earth's obscuring atmosphere have since been attempted by means of an orbiting astronomical satellite, with instruments mounted on an X-15 plane, and with instruments mounted on rockets. These rockets--three Aerobee-Hi's--were all launched from Wallops Island, Va.

"We've observed ultraviolet radiation from many stars on these first flights and have a fair amount of data," Bless said. "We're now after data from more stars and over a broader spectral range."

The first rocket in the new series is scheduled for launching in July from a federal site at White Sands, N. M., according to Bless. The 200-pound

- more -

experimental "package" which the Wisconsin scientists will place in its nosecone will include nine telescopes. Together these instruments with varying wavelength sensitivities will cover a spectral range from 1,000 to 3,000 Angstroms. The previous rocket-carried instruments have been limited to a range of 2,000 to 3,000 A's.

Instruments developed by Prof. William L. Kraushaar and his group of Wisconsin experimenters in space physics will also ride the first rocket in the extended program. Detectors for X-rays, they will be sensitive to 10 Angstrom X-rays.

Like the earlier research loads lifted into space via rocket, the newest one will be fitted with a radio system for transmitting data received to ground stations. Unlike the others, for which recovery was not feasible, the newest one will be equipped with parachutes for recovery.

"We will probably send up a second one of the same general type sometime this year," Bless stated, "and several more in the next two years including two launched from the southern hemisphere."

The Wisconsin astronomer said the southern hemisphere launching sites probably would be located some place in South America.

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From The University of Wisconsin News and Publications Service, Bascom Hall, Madison 53706 • Telephone: (608) 262-3571

Astronomy Dept

Release: **Immediately** **12/12/66 jh**

MADISON, Wis.--A $140,000 grant to the University of Wisconsin for investigation and study of ultraviolet stellar spectra was announced Monday by the National Aeronautics and Space Administration.

The grant will continue support for space astronomy studies carried out by Wisconsin's Washburn Observatory over the past several years, including investigations made by means of the X-15 experimental plane and the Aerobee-Hi sounding rockets.

Members of Washburn's space astronomy team include Prof. Arthur D. Code, director of Washburn; Prof. Theodore Houck, director, and John McNall, assistant director of the Space Astronomy Laboratory; Prof. Robert Bless; and Tim Fairchild, a project supervisor.

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From The University of Wisconsin News and Publications Service, Bascom Hall, Madison 53706 • Telephone: (608) 262-3571

Astronomy Dept.

Release:

Immediately **11/17/66 vh**

MADISON, Wis.--A dogged team of University of Wisconsin astronomers has reached another milestone in the rough course of space pioneering.

Prof. Theodore E. Houck of Wisconsin's Washburn Observatory team said Thursday the experimental package for a second orbiting astronomical observatory (OAO) has been accepted by the University from its builder, Cook Electric Co. of Morton Grove, Ill. and that "we hope to see a successful orbiting sometime in 1968."

The 500-pound assembly of telescopes and highly complex electronics designed by the Wisconsin men will be turned over to the National Aeronautics and Space Administration's Goddard Space Flight Center for approximately a year of testing. Ultimately it will be put aboard a spacecraft and lifted above the atmosphere via an Atlas Agena rocket. The blanket of air which surrounds the earth has hampered land-based observations for centuries.

The second OAO was already in the making when the first was orbited at Cape Kennedy last April. It took on new importance after a malfunction in the power system of the first "flying" observatory dashed initial hopes for "a new window on the universe."

The recently completed research equipment essentially duplicates the first OAO package. It contains seven telescopes and spectrometers, and once again the mission will be to observe young hot stars and measure their light which is largely

- more -

ultra-violet. Comparative studies of this energy output could lead to new knowledge about the lifespan of stars and possibly about the beginning and evolution of the entire universe.

Houck stressed the quality of versatility which is found again in the newer "package." Like a ground-based observatory, the "flying" one will be capable of being used in many astronomical problems, he pointed out.

"All the things we wanted to do with OAO-1 we now hope to do with OAO-2," the Washburn Observatory researcher said.

Wisconsin alone among the institutions taking part in the federally supported orbiting observatories program has been assigned space on two separate satellites. In a previous schedule of launch for the first four OAOs, Wisconsin "packages" were to be placed on number one and number three. Revised plans call for Wisconsin's second OAO to go second in the launching order for the series.

Wisconsin's originally assigned research partner, the Smithsonian Institution's Astrophysical Observatory, remains the same. When instruments from the Smithsonian are loaded into one end of a nine-foot long hexagonal spacecraft and Wisconsin's instruments placed at the other end, the entire assembly will again constitute the largest and most complex of the satellites attempted by the U.S.

Washburn Observatory's space team includes Profs. Arthur D. Code, director of Washburn, Theodore E. Houck, and Robert C. Bless, and John McNall and Tim Fairchild, project associates.

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U.W. NEWS

Astronomy Dept

From The University of Wisconsin News and Publications Service, Bascom Hall, Madison 53706
Telephone (Area Code 608) 262-3571

Release: Immediately

4/5/66 vh

CAPE KENNEDY, Fla.--Another attempted launch at Cape Kennedy of an orbiting astronomical observatory with University of Wisconsin instruments aboard was "scrubbed" Tuesday(at 2:48 Eastern Standard Time) when the automatic sequencer shut down split seconds after ignition.

In the past 10 days, launches have been scheduled or attempted and cancelled or curtailed for one reason or another--tornados, other unfavorable winds, and technical difficulties.

The National Aeronautics and Space Administration said soon after the shutdown this afternoon that one of the small Vernier engines did not build up proper thrust and the sequencer, sensing malfunctioning, shut down the engines. NASA added that the two main booster engines and a sustainer engine did not ignite, but obeervers at a press site were convinced that the main engines and booster "burped" briefly.

There is general concern being shown by the experimenters or research personnel and contractors involved in the OAO project over possible harmful effects to the experimental "packages." The payloads of research equipment, mounted in the spacecraft, have been sitting on top of the Atlas Agena rocket, pending launch, for two weeks or more.

If launch is not made soon, the spacecraft may have to be "de-mated" and each experimental package re-validated. This would delay the launch for three weeks.

NASA spokesmen said that in view of the experiment sensitivity, an OAO launch will be scheduled again as soon as possible. Launch on Wednesday or Thursday (April 6-7) is being considered.

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U.W. NEWS

Astronomy Dept.

From The University of Wisconsin News and Publications Service, Bascom Hall, Madison 53706
Telephone (Area Code 608) 262-3571 Release: Immediately
3/21/66 vh

MADISON, Wis.--The first orbiting astronomical observatory toward which a team of University of Wisconsin scientists has been working for more than six years is slated to be launched from Cape Kennedy on Monday, March 28, Arthur D. Code, director of Wisconsin's Washburn Observatory, said today.

Technical difficulties have postponed more than once the launching of this largest, heaviest and most complex of U.S. unmanned scientific satellites.

The University of Wisconsin has 50 per cent of the research load--or some 500 pounds of equipment designed for observing and measuring ultra-violet light--on board the 3,900 pound satellite. With the research "package", the Washburn Observatory scientists hope to turn man's mechanical "eyes" on young, hot stars and from them learn more about their lifespan and, possibly, about the evolution of the universe.

If the launch is successful and highly complex systems of optical instruments, data processing, and controls all function, astronomers will have "escaped" for the first time the barriers of the earth's atmosphere and will scan the skies with a never-before-attained clarity and precision.

The Washburn space team includes Arthur D. Code, director of Washburn, Theodore E. Houck, director of the Space Astronomy Laboratory, Prof. Robert Bless, and John McNall.

Wisconsin is scheduled to place another research "package" on board a third OAO in the latter half of 1967, a Washburn Observatory spokesman said.

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U.W. NEWS

Astronomy Dept

From The University of Wisconsin News and Publications Service, Bascom Hall, Madison 53706
Telephone (Area Code 608) 262-3571 Release: MONDAY, MARCH 21
3/18/66 hp

MADISON, Wis.--(Advance for release Monday, March 21)--The University of Wisconsin soon may be partners in operating a 150-to 200-inch reflecting telescope, one of the largest in the world.

In a proposal submitted today to the National Science Foundation, Wisconsin and other member universities of the Committee on Institutional Cooperation (CIC) solicited funds for the study phase of a program directed toward a large telescope observing station facility, Arthur D. Code, chairman of Wisconsin's astronomy department, announced.

The CIC--consisting of the Big Ten Universities and the University of Chicago--will operate the telescope on a regional basis. This program of university cooperation is a new idea, midway between the Kitt Peak National Observatory and the private observatory, and offers advantages of both set-ups.

Study phase of the program will concentrate on finding a suitably developed site, selecting an existing telescope design, and planning the construction, operation, and administration of the facility in detail.

The CIC decided to utilize a developed site and existing telescope design in their effort to place a large telescope in operation as quickly and economically as possible.

Sites under consideration include Anderson Mesa near Flagstaff, Arizona, and "Little Flat Top" adjacent to McDonald Observatory near Fort Davis, Texas.

Among telescope designs under consideration are the Palomar Observatory's 200-inch reflector and the Kitt Peak National Observatory's 150-inch telescope.

-more-

Add one--CIC telescope

The proposed observing station will be a Midwest regional telescope operated primarily for Midwest astronomers. Worthy scientific programs by other investigators will also be given consideration.

The station will be operated as an observing facility with no resident research staff. Maintenance and operation will be the responsibility of the individual CIC universities.

Auxiliary instruments, such as spectrographs, photometers, and polarimeters, will be under the supervision of astronomers using them in their own research projects.

A smaller instrument, such as one similar to the Kitt Peak National Observatory's 84-inch reflector, may precede the larger telescope.

Such a smaller telescope could test the site, carry out observations not requiring the large instrument, provide proving grounds for the validity of research programs, and provide valuable experience to astronomers and graduate students alike.

It is anticipated that the study stage will take a maximum of two years and construction about three years, Prof. Code said.

##

U.W. NEWS

Astronomy Dept.

From The University of Wisconsin News and Publications Service, Bascom Hall, Madison 53706
Telephone (Area Code 608) 262-3571 Release:
2/15/66 hp Immediately

By HOWARD PLOTKIN

MADISON, Wis.--The mystery of the planet Jupiter--is it a planet or is it a star--has been solved in a new theory put forth by an astronomer working at the University of Wisconsin.

The mystery is simply that photoelectric studies indicate Jupiter radiates about 1.2 times more heat than it receives from the sun. This has led one prominent astronomer to declare that Jupiter, in a sense, is more a small star than a large planet.

If this view is taken literally, then the sun, like many other stars, is a member of a binary, or double, stellar system.

Utilizing a photoelectric scanning monochromator coupled to the Wisconsin Pine Bluff Observatory's 36-inch telescope, Prof. Donald J. Taylor, now at the University of Arizona, calculated Jupiter's temperature if the planet radiated exactly as much heat as it received from the sun. This "equilibrium temperature" came out to be 105 degrees Kelvin.

Recent values for Jupiter's surface temperature, however, average near 128 degrees K, or 23 degrees K in excess of the temperature to be expected from solar heating alone on the basis of Taylor's calculations.

The difference between the temperatures is believed to represent radiation of heat from the interior of Jupiter.

-more-

This agrees with earlier observations which show that Jupiter's tremendous cloud activity does not appear to result from solar heating.

But Jupiter is probably not actually a star. There is no evidence that Jupiter's energy output is due to the thermonuclear processes that illuminate stars. Astronomers believe the source of this heat is a remnant of original gravitational contraction energy.

A previous interpretation of the surface temperature explains that Jupiter is merely radiating absorbed sunlight as a "grey body."

In this theory, the energy radiated by Jupiter is equal to the energy radiated by a black body with an equilibrium temperature of 105 degrees K. Furthermore, the brightness of a black body having a surface temperature of 128 degrees K equals a grey body with a surface temperature of 145 degrees K.

This latter temperature is higher than Jupiter's actual measured surface temperature, however, and so this theory must be discarded.

Another possible explanation of Jupiter's surface temperature maintains that Jupiter is conducting heat through its mantle to the surface.

On the basis of extensive calculations, however, Taylor concludes that Jupiter's mantle transports interior heat to the surface by convection.

"Jupiter has cooled off slowly enough to be still radiating its initial contracting energy by convection through its mantle," Taylor explains.

His calculations show that Jupiter's initial core temperature must have been about 200,000 degrees K and the surface temperature about 2,000 degrees K.

For a final temperature of 128 degrees K, Jupiter would have had to cool off for about three billion years.

"Since this length of time approximates estimates of the age of the solar system, it appears reasonable that Jupiter might still be radiating energy by convection from its original contraction," he states.

"Neither radioactivity, meteor bombardment, tidal friction, or magnetic field decay look promising as alternative sources of energy to explain Jupiter's surface temperature," Taylor concludes.

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U.W. NEWS

From The University of Wisconsin News and Publications Service, Bascom Hall, Madison 53706
Telephone (Area Code 608) 262-3571

Release:
Immediately

1/28/66 hp

MADISON, Wis.--Undergraduates in elementary astronomy courses at the University of Wisconsin this semester will have the opportunity to work with photoelectric equipment for the first time.

Six small optical telescopes and photoelectric photometers have been purchased by the department.

Photoelectric experimentation is an extremely important aspect of modern observational astronomy, and Wisconsin is one of the world's leaders in this type of astronomical investigation.

By participating in photoelectric measurements, students can gain an understanding and enthusiasm for astrophysics that cannot be provided by usual laboratory procedures.

"The new equipment will enable students to acquire a sound understanding of problems of astronomical observation, data reduction, and interpretation," says Prof. Lowell R. Doherty, in charge of the new program.

Observations and quantitative measurements of celestial objects have always been an important aspect of the UW elementary astronomy courses, but the large student enrollment and unfavorable conditions--usually one clear evening per week-severely hamper observational efforts.

The new telescopes will greatly increase the amount of observing time available to the individual, and will also permit him to make illustrative astronomical meaaurements.

-more-

Add one--Astronomy

Photoelectric photometer attachments to the telescopes will enable students to measure the brightness of the moon and planets and certain of the brighter stars.

By comparing the apparent magnitude, or brightness, with the corresponding absolute magnitude, distances of celestial objects can be determined.

Furthermore, by examining the brightness of stars through different colored filters, students can compute their absolute energy distribution.

"Repetition of these experiments on nights of varying weather conditions will give the student a good idea of how certain he can be in the interpretation of his results," Prof. Doherty explains.

When not in use on the roof of Sterling Hall on the Madison campus, the telescopes and auxiliary electronic equipment will be available for indoor demonstrations and laboratory exercises.

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U.W. NEWS

Astronomy Dept.

From The University of Wisconsin News and Publications Service, Bascom Hall, Madison 53706
Telephone (Area Code 608) 262-3571

Release:
Immediately

1/17/66 vh

By VIVIEN HONE

MADISON, Wis.--The launching of a first orbiting astronomical observatory appeared only a step or two away as 500 pounds of University of Wisconsin research instruments and the craft they will ride in space were shipped this week from the Grumman Aircraft plant, Bethpage, N.Y., to Cape Kennedy.

"It's on its way," Prof. Arthur D. Code, director of Wisconsin's Washburn Observatory, said happily when the three-to-four day journey by truck began. Code and a team of Wisconsin astronomers have been working toward the unmanned flying observatory since 1959. Their goals are two: first to launch successfully an OAO, and once done, to gain more knowledge of the stars through OAO photoelectric observations and recordings of ultra-violet starlight.

The cargo, escorted by National Aeronautics and Space Administration personnel, represents more than six years of planning and development.

However, if the OAO is successfully launched in late February or March and functions as hoped for, a major breakthrough in astronomical observational techniques will have been accomplished. Ever since man has looked to the stars for knowledge of the universe he has been hampered by the earth's atmosphere. This blanket of air surrounding our globe blots out or dims and distorts the light of stars and other sky phenomena. But at heights of 500 miles or more above the earth, the OAO would escape the atmosphere and the problems its presents.

-more-

Wisconsin's research "package"--seven telescopes and spectroscopes and a great array of electro-mechanical mechanisms--will ride into space in one half of a 10-foot long hexagonal carrier craft. Instruments from Massachusetts Institute of Technology, NASA's Goddard Space Flight Center, and the Lockheed Aircraft Corp. will fill the other end of the carrier. The satellite will be boosted aloft by an Atlas Agena launch vehicle.

The data gathered by the OAO will be either radioed immediately to one of three ground stations or stored on board and transmitted later to them.

Once arrived at Cape Kennedy, the OAO will go through a month of functional tests. It will then be put in a launch tower, attached to the Atlas Agena and go through additional testing. During this testing period a team of technicians at Goddard Space Flight Center, Greenbelt, Md., will gain experience in remote control operation of the OAO through simulated orbital runs. The control center at Goddard is the only one of the three ground stations which can give or change commands for the satellite.

Work is already underway by the University of Wisconsin on another orbiting astronomical observatory bearing Washburn Observatory research instruments which may be launched within 18 months of the first.

A number of institutions concerned with astronomical research are joined with NASA in the cooperative program for flying observatories. Participants in these pioneer attempts foresee a day when a space vehicle will be launched carrying a telescope as large as 36 inches in diameter and capable of guiding on a star to an accuracy of a tenth of a second of arc.

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Astronomy Dept.

U.W. NEWS

From The University of Wisconsin News and Publications Service, Observatory Hill Office, Madison 53706

Telephone (Area Code 608) 262-3571 Release: Immediately

7/2/65 vh

EDWARDS AIR FORCE BASE, Calif.--University of Wisconsin research in astronomy by means of high altitude manned aircraft got off to a flying start here Thursday as Wisconsin cameras on board an X-15 plane photographed the stars high above the earth's obscuring atmosphere.

The milestone event for Wisconsin science, carried out at NASA's Flight Research Center here, was performed at 209,000 feet or an approximately 40-mile / altitude with the specific research goal of photographing the ultraviolet light from Gamma Cassiopeia and other stars within the Cassiopeia constellation.

Astronomers from Wisconsin's Washburn Observatory indicated that it would be some days before analysis and interpretation of the data brought back by the plane could establish the degree of research success.

The Wisconsin instruments, mounted on a stabilized platform and located in a hatch directly behind the pilot's compartment in the X-15, included four 35 millimeter lenses especially designed for work in the ultraviolet and a small spectrograph for analysing the spectral emissions of the day sky, Prof. Lowell Doherty of the Washburn staff said.

"The various regions of the ultraviolet are isolated by means of filters so that we can hope for photographs of the sky as it appears in various spectral regions from 2,000 to 3,000 Angstroms," Doherty explained.

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Add one-- Data Flight, X15: Astronomy

The University of Wisconsin joined other American science institutions and the National Aeronautics and Space Administration in a large-scale space astronomy program six years ago. In the federally supported program, Wisconsin astronomers are aiming at high altitude research by three major means: sounding rockets, earth satellites (orbiting astronomical observatories), and manned aircraft. All have the advantage of instrument investigation carried out at heights above the earth's obscuring atmosphere.

The blanket of air which surrounds our planet has posed problems for astronomy ever since the science began. It bends light, makes stars appear fuzzy, and absorbs as much as 90 per cent of their ultraviolet light. Only the brightest stars can penetrate this atmospheric shroud.

High altitude research by manned aircraft has the additional advantage of returning the data to earth safely, "in one piece."

Two rockets carrying Washburn Observatory research equipment already have been launched during the six years of planning and early testing. If all goes well, America's first orbiting astronomical observatory, a 500-pound Wisconsin experimental "package" aboard, will be shot aloft sometime this winter.

For nearly two years, preliminary tests for X-15 flights in the service of University of Wisconsin research have also been going on. The latest X-15 flight inaugurates a series of data flights which the Washburn scientists have planned to further investigate ultraviolet starlight.

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U.W. NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON, WISCONSIN 53706

2/9/65 vh

RELEASE: Immediately

MADISON, Wis.--The University of Wisconsin will have new partners in space research when the first orbiting astronomical observatory (OAO) is launched at Cape Kennedy, probably late this year.

The first OAO is now being pushed toward completion by scientists from Wisconsin and the National Aeronautics and Space Administration (NASA). Moreover, under a new agreement with NASA, Wisconsin instruments will go aloft on a second of the first four such space platforms to be launched.

"It is nice not to have to put all our eggs in one basket," said Prof. Theodore E. Houck, director of the Space Astronomy Laboratory at Wisconsin's Washburn Observatory. "We are already working with NASA toward providing another flight model."

The OAOs are the largest and most complex of all the unmanned satellites undertaken by the U.S. The plan is to orbit a series of astronomical research stations high above the earth's atmosphere.

The air which blankets the earth has severely handicapped astronomical research. Attempts to measure ultra-violet starlight have been handicapped, for example, because up to 90 per cent of such light is absorbed by the atmosphere, permitting only the brightest stars to shine through.

In addition, the earth's atmosphere bends the light and gives stars a fuzzy appearance.

-more-

Add one--OAO

The Astrophysical Observatory of the Smithsonian Institute was originally paired with Wisconsin on the first of the projected flying observatories, but the Smithsonian has encountered setbacks in readying its "package." Under the new plan for shared space on the first observatory, NASA has grouped a research foursome.

Wisconsin's 500-pound experimental package--including seven telescopes and spectrometers and many other electronic devices--will take its originally assigned place at one end of the 10-foot long, hexagonal carrier craft. Instruments from Massachusetts Institute of Technology, the Goddard Space Flight Center, and Lockheed Aircraft Corp. will fill the other end.

All three of Wisconsin's new partners will be investigating radiation with wave lengths shorter than the ultra-violet.

All of their research equipment has already been flown or has been built for future flight on other satellites," Prof. Houck pointed out. With this advantage and with the carrier craft and Wisconsin instruments in the final stages of testing at eastern plants, the launching of the first OAO "sometime in the last quarter of 1965" seems likely.

The University of Wisconsin entered the federally supported OAO program in 1959. At that time the first three OAOs were assigned to the following institutions in the following order: 1--Wisconsin-Smithsonian, 2--Goddard Space Flight Center, 3--Princeton.

Last June, five years and $2 million dollars later, an important milestone was reached when the Cook Electric Co. of Morton Grove, Ill., completed construction of Wisconsin's research package. A UW Washburn Observatory team on the Madison campus has been at the forefront in designing and developing the very specialized optical and electronic devices for high altitude viewing.

In the revised plan for the earliest OAOs, Wisconsin and Goddard maintain respectively their number 1 and number 2 positions for launch. Paired with her old partner, the Smithsonian, Wisconsin will occupy the third OAO. Princeton's equipment will ride a fourth OAO.

An interval of 18 months is expected to separate the launching of the two flying observatories with which Wisconsin is vitally concerned, Prof. Houck said. Both will be boosted aloft at Cape Kennedy with an Atlas Agena B rocket.

##

NEWS FROM THE UNIVERSITY OF WISCONSIN

Serving the state through campuses at Madison and Milwaukee, nine University Centers, and a statewide extension system.

2/5/65 jb

RELEASE Immediately

MILWAUKEE--Fourteen contracts with federal agencies, including a National Aeronautics and Space Administration allocation of $285,000 to the University of Wisconsin Graduate School, were approved by the University regents Friday.

The NASA agreement continues support of 15 full-time predoctoral students in the areas of space-related sciences and technology.

The contracts, which totaled $927,892, call for various services to be performed by University departments.

The contracts, amounts, and departments:

U.S. Air Force, $42,483, with the sociology department; Navy, $3,570, astronomy, $30,000, zoology, and $5,629, naval science;

Weather Bureau, $4,800, soils department; Office of Education, $3,000, German, Spanish-Portuguese;

Atomic Energy Commission, $250,000, physics, $55,884, nuclear engineering, $35,000, radiology, and $23,440, genetics;

Office of Naval Research, $92,000, meteorology; and Geological Survey, $68,050, to support ground water investigations by the state geologist.

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Astronomy Dept.

U.W. NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON, WISCONSIN 53706

11/12/64 vh

RELEASE: Immediately

MADISON, Wis.--The University of Wisconsin won high praise Thursday for its astronomical research, fine buildings, and general cordiality as four Russian scientists toured the Madison campus.

The scientists--two astronomers and two specialists in optical instrumentation--are in the United States on an inter-academy exchange program arranged by the American and Russian academies of sciences.

"I was here 17 years ago and had the great pleasure to vist Washburn Observatory and meet the famous Prof. Joel Stebbins of your University, the father of photo-electric photometry," said Vladimir B. Nikonov, himself a specialist in photo-electric photometry and head of the stellar physics section of Russia's Crimean Astronomical Observatory. (Dr. Stebbins retired from Wisconsin in 1948, but has maintained close ties with the Madison campus.)

The reason for visiting Wisconsin this time, according to Nikonov, is "because photo-electric photometry is so well developed today under the leadership of Prof. Arthur Code."

Present with Nikonov at the interview were: N. N. Mikhelson, senior scientific associate at Pulkovo Observatory, who has applied his astronomical knowledge to the automation of telescopes and is involved with the design of large telescopes; A. R. Gorshkov, vice president of the State Optical Instrument Plants, Leningrad, and also senior scientific associate at Pulkovo; and B. K. Ioannisiani, leading Soviet designer of telescopes, consultant at Pulkovo, and section head at the State Optical Instrument Plants.

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Nikonov said he and his colleagues are especially interested in calling at American institutions where some branch of astronomy has reached a high degree of development. Wisconsin, where photo-electric methods for observation were pioneered, "is one of the most famous," Nikonov said.

The Russians recently spent 20 days at Lick Observatory in California where their host and the director there was A. E. Whitford. Until 1958, Prof. Whitford was the director of Wisconsin's Washburn Observatory and for many years identified with Wisconsin's research in astronomy.

Russia and the U.S. lead the nations in astronomical instrumentation, the visitors and their Wisconsin hosts agreed. The U.S. possesses the two largest telescopes in the world while Russia has the third largest. All three are larger than 100 inches.

However, Russia.. is well ahead of America when it comes to women in astronomy, it was pointed out. At least half of the staff of 200 at the USSR's Crimean Astrophysical Observatory are women, Nikonov said, and Mikhelson declared the same is true at Pulkovo Observatory.

Women in the U.S. are only beginning to enter the field, the record shows. Wisconsin granted a first Ph.D. in astronomy to a woman in 1963, and expects to grant two more in 1965.

While on the Madison campus, the scientists have inspected Washburn Observatory facilities including the Space Astronmy Laboratory and the Pine Bluff Station, Wisconsin's chief observational facility. They also have exchanged ideas with the Washburn staff, met faculty and student members of the UW Spectroscopy Club, attended a colloquium in astronomy at which one of the visitors spoke, and made a general tour of the campus.

Recalling the campus of 17 years ago, Prof. Nikonov said: "Your University is (growing) better and better. Wonderful nice buildings including your new dormitories. And before there was only the old observatory. Now there is Pine Bluff."

He expressed the hope that more American astronomers would visit Russia. "Such exchange would be very helpful for better understanding between Russia and the United States," he said, "and for the peaceful co-existence which Russia hopes for."

After their four days at Madison, the scientists will conclude their two-month U.S. tour by visiting Harvard astronomers and their observatory. The group will return to the USSR in late November.

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Astronomy Dept.

U.W. NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON, WISCONSIN 53706

11/5/64 vh

RELEASE: Immediately

MADISON, Wis.--Four Russian scientists--astronomers and specialists in optical instrumentation--will visit the staff and facilities of the University of Wisconsin's Washburn Observatory at Madison beginning Monday (Nov. 9).

Their four-day get together with Wisconsin astronomers is part of an inter-academy exchange program being carried out by the American National Academy of Sciences and the Academy of Sciences of the USSR.

The visiting scientists are Vladimir B. Nikonov, head of the stellar physic. section, Crimean Astrophysical Observatory; N. N. Mikhelson, senior scientific associate at the Main Astronomical Observatory of the Academy of Sciences, Leningrad; A. R. Gorshkov, also a senior scientific associate at the Main Astronomical Observatory and a consultant of the State Optical Instrument Plant, Leningrad; and B. K. Ioannisiani, consultant at the Main Stronomical Observatory and section head at the State Optical Instrument Plant, Leningrad.

The Russians arrived in the U. S. in late September for a two-month tour of American institutions concerned with astronomy. They have already visited western observatories such as Lowell at Flagstaff, Arizona, and Lick, Mount Wilson, and Palomar in California. They will visit the University of Chicago's Yerkes Observatory at Williams Bay, Wis., just prior to arrival at Madison. Harvard's astronomical facilities and staff will also be visited before the scientists leave for home shores in late November.

Russia and the U. S. are perhaps the two leading nations in astronomical research, UW Prof. Robert Bless, astronomy, pointed out as the coming visit of the scientists was announced. The Russians have a long tradition of studies in astronomy and their Pulkova Observatory at Leningrad is one of the oldest and most important observatories in Europe.

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Astronomy

NEWS FROM THE UNIVERSITY OF WISCONSIN

Serving the state through campuses at Madison and Milwaukee, nine University Centers, and a statewide extension system.

10/16/64 jb

Immediate Release

MADISON, Wis.--A $211,100 contract for the University of Wisconsin Space Astronomy Laboratory to continue research in satellite instrumentation for the National Aeronautics and Space Administration was approved by the UW regents Friday.

The new allocation brings the contract total since the UW-NASA program started to $2,613,011. The contract was sublet through the NASA's Goddard Space Flight Center in Greenbelt, Md. The UW's principal investigator is Prof. Arthur D. Code.

Five of the 10 other federal contracts approved by the regents Friday are with the Atomic Energy Commission. Two are for services to be provided by the department of physics, totaling $132,000; two with chemistry, $62,975; and one with the department of entomology, $1,637.

The other contracts:

With the Department of Labor, $3,000, with the Industrial Relations Research Center; U. S. Army, $94,094, meteorology, and $11,040, chemistry;

Department of Health, Education, and Welfare, $63,269, department of preventive medicine; and Department of Labor, $5,508, Industrial Relations Research Center.

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Astronomy Dept

U.W. NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON, WISCONSIN 53706

9/2/64 vh

RELEASE: Immediately

WALLOPS ISLAND, Va.--University of Wisconsin research instruments in astronomy, riding an Aerobee-Hi rocket, were lifted some 125 miles high late Tuesday night (Sept. 1) before plunging into the Atlantic as scheduled, 60 miles east of the Wallops Island, Va., launching site.

The successful flight of Wisconsin instruments, completed in less than eight minutes, was a necessary preliminary to the planned for launching of an orbiting astronomical observatory, Prof. Arthur D. Code, director of Wisconsin's Washburn Observatory, pointed out. If all goes well, Wisconsin, in cooperation with the National Aeronautics and Space Administration, will attempt to place the OAO high above the earth's obscuring atmosphere sometime in 1965.

The rocket launched Tuesday was the second of such preliminaries. An Aerobee-Hi with UW instruments in its nosecone successfully completed its mission in November, 1962, after a launching from the Virginia site. Both rockets, according to Prof. Code, carried instrument packages designed to measure the distribution of early-type stars and to test the mechanical and electronic components of instruments which will be duplicated on the OAO.

Tuesday's rocket carried eight photoelectric photometers and electronic equipment for transmitting the starlight data to ground stations. After relaying its information, the instrument package fell into the Atlantic, still attached to the rocket.

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Wisconsin, one of five institutions cooperating in a many faceted research project, entered the large federally-supported space program in 1959. Her research team of Washburn Observatory astronomers has the major objective of studying ultra-violet starlight with the advantage of instruments carried to very high altitudes. The blanket of air immediately surrounding the earth for many miles out bends and scatters the light and prohibits measurements in the finest detail. At heights above 100 miles, it is hoped this problem can be overcome.

Wisconsin also is working toward this goal of ideal observation through space instruments by designing and placing on board an X15 rocket plane another instrument package. The X15, unlike a rocket, returns to its base with instruments intact.

Sometime this year or next an X15 is scheduled to soar upward to place Wisconsin's more advanced instruments in operation.

An important milestone in development of the orbiting Astronomical Observatory was reached this past June when the 500-pound instrument load for the flying observatory was delivered to Wisconsin astronomers by the Cook Electric Co., Morton Grove, Ill. This represented five years of planning and construction and close to $2 million spent in development. For the next year this model and a prototype will be exposed to simulated flight conditions.

With luck, the flight model will be inserted into a carrier craft now being readied at the Grumman Aircraft Corp., Bethpage, N.Y., and shot into space by an Atlas Aegena rocket from Cape Kennedy sometime in 1965. Instruments from the Smithsonian Institution also will be on board the carrier.

Prof. Code pointed out that development of a space vehicle with a single telescope measuring as much as 36 inches in diameter is planned as part of the OAO program. This telescope will be able to guide on stars to an accuracy of one tenth of a second of arc.

Add two--UW rocket

The telescopes in the present OAO package measure eight and 16 inches in diameter.

Members of the Washburn Observatory space team on hand at Wallops Island when the Wisconsin rocket reached above the earth's atmospheric blanket included Director Code, Profs. Theodore E. Houck, director of the UW Space Astronomy Laboratory, Robert C. Bless and John F. McNall.

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Astronomy Dept

U.W. NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON, WISCONSIN 53706

RELEASE:

6/9/64 vh

10 A.M.,
THURSDAY, JUNE 11

MORTON GROVE, Ill. -- An important milestone in the development of an orbiting astronomical observatory carrying University of Wisconsin instruments was observed here today as the Cook Electric Co. delivered a completed "instrument package" to Wisconsin astronomers.

Delivery of the finished research equipment --a grand assembly of telescopes, spectroscopes, and electro-mechanicalmechanisms built by the Morton Grove firm-- was marked at Cook with National Aeronautics and Space Administration personnel, administrators for the UW and the states of Wisconsin and Illinois, and various Wisconsin space scientists on hand to rejoice.

The 500-pound "package" represents at this point approximately five years of planning and construction and close to $2-million dollars spent in its development. It will ultimately share space with instruments of the Smithsonian Institution on board the heaviest and most complex of all unmanned U.S. satellites orbited or planned to date. Wisconsin hopes to see the successful launching of the Orbiting Astronomical Observatory (OAO) from Cape Kennedy sometime in 1965.

Since the science of astronomy began, investigators have been plagued by the blanket of air which surrounds the earth, bends light and makes stars appear fuzzy, absorbs as much as 90 per cent of the ultra-violet light and thus permits only the brightest of stars to show through.

Boosted to heights of 500 miles or more, well above the atmosphere, the flying observatory will receive and measure by photo-electric methods ultra-violet starlight. Data received will be transmitted then to ground stations or stored

more

for later electronic relay.

Prof. Theodore E. Houck, staff member of Wisconsin's Washburn Observatory and director of Washburn's Space Astronomy Laboratory, said today: "We're extremely happy to have reached this stage in the project but are mindful that a great deal of work in testing and evaluating must be done before the satellite can be launched."

For the next year, he pointed out, the actual flight model, on view today at Cook, and a prototype or identical unit will undergo extensive tests both attached to and separate feom the space vehicle now being readied at the Grumman Aircraft Corp., Bethpage, N.Y. At NASA's Goddard Space Flight Center, Greenbelt, Md., tests on the prototype are already underway for structural integrity, possible interference between spacecraft and research instrumentation, and weak points under conditions of vacuum and extremes of temperature. The prototype will be exposed to levels well beyond those expected in flight. The flight model will be tested less severely.

The University of Wisconsin entered the federally supported Orbiting Astronomical Observatory program in 1959. Harvard, Princeton, the Smithsonian Institution and NASA's Goddard Space Laboratories are also associated with the cooperative project in astronomy research. Paired with Wisconsin, the Smithsonian is also developing a 500-pound "package." It will contain both telescopes and television cameras.

The Wisconsin-Smithsonian satellite, a 10-foot long cylinder with a gross weight of 3,300 pounds, is the first of three planned to be sent aloft in early undertakings of the continuing program.

Before the OAO is launched, Wisconsin expects to explore ultra-violet starlight by another high altitude means. Sometime this summer the much-heralded X15 experimental plane will attempt a flight high enough for very accurate reception and recordings of starlight. The X15 has the advantage for UW

astronomers of being able to return to earth with the data obtained.

Arthur D. Code, director of Washburn Observatory and chief of all Wisconsin astronomical studies, said today that completion of the OAO package is not only a milestone in the satellite development but represents important achievements at Wisconsin. Doctoral theses have been done in the area of space research and both undergraduate and graduate students have taken part in the design and construction of support equipment.

Every participating undergraduate who has received his degree (many are electrical engineers) has gone into space-oriented programs, Dr. Code added.

Dr. Code pointed out that the scientific objectives of the OAO still are to be realized.

"We cannot feel satisfied until the instrumentation has been successfully orbited and is relaying the astronomical data that represented the main incentive for embarking on the program in the first place," he said.

The major University of Wisconsin team for the OAO includes Profs. Code, Houck, and Robert Bless, and project associates John McNaul, Dan Schroeder, and Don Taylor.

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MADISON NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

RELEASE: Immediately

10/17/63 vh

MADISON--University of Wisconsin graduate students in astronomy will join staff members of Washburn Observatory as hosts for the annual Open House Sunday afternoon (Oct. 20) at the Pine Bluff Observatory.

The country station at Pine Bluff, a $200,000 installation, was opened in 1958 and is the University's major research facility for the science of the stars. Guests at the Open House, 1 to 4:30 p.m., will have an opportunity to see the instruments including the 36-inch reflecting telescope.

Lying 15 miles west of Madison, the observatory may be reached by following Mineral Point Road to the village of Pine Bluff, traveling Highway P after turning right at the village, and following Observatory Road after a left turn at the intersection with Highway P.

The bright metal dome of the research station can be spotted on a hilltop to the left.

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MADISON NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

RELEASE: Immediately

10/8/63 jb

MADISON--The University of Wisconsin's chief research facility in astronomy will hold an open house at the Pine Bluff Observatory on Sunday, Oct. 20, from 1 to 4:30 p.m.

The public is invited to inspect the grounds, buildings, and principal instruments. Observatory staff members will conduct tours and answer questions.

The observatory, 15 miles west of the University's Madison campus, may be reached via the Mineral Point Road, Dane County Highway P, and Observatory Road.

###

WIRE NEWS FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

RELEASE: Immediately

9/18/63 vh

MADISON, Wis.--A University of Wisconsin coed, Natalie A. Satunas, has earned the distinction of being the first woman to complete requirements for a Ph.D. degree in astronomy from the University.

The daughter of Mr. and Mrs. Victor Satunas (6519 S. Washtenaw Ave.), Chicago, she finished her final doctoral exams last week and has filed her thesis, a learned paper titled "Interstellar Dust in Ionization Shock Fronts."

Miss Satunas goes to a job on the West Coast in October--one that is closely related to her doctoral thesis studies.

"I will be doing excitation-in-ionization problems with regard to re-entry of space capsules into the earth's atmosphere," Natalie said Wednesday as she prepared to leave the Madison campus. Her employer will be the Northrup Space Laboratories, a division of the Northrup Corp. at Hawthorne, Calif., near Los Angeles.

She decided to become an astronomer in her senior year in college. She took her first degree, a B.S. in physics, at De Paul University, Chicago.

Wisconsin had four women graduate students in astronomy, Natalie Satunas among them, when a count was taken recently. This constitutes the largest enrollment of women in advanced astronomy studies in the history of Washburn Observatory, and represents one fifth of the total graduate enrollment in the science.

"We have had a total of seven women in graduate studies in astronomy since 1960," Prof. Robert Bless said. "Before that, probably none, and certainly no Ph.D. candidates."

###

WIRE NEWS FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

9/6/63 jb

RELEASE: Immediately

MADISON, Wis.--Nineteen contracts with governmental agencies, including one of $370,000 for research in theoretical chemistry, were approved by University of Wisconsin regents Friday.

Covering various services to be performed by the University, the contracts totaled $952,852.

In the two major contracts, the National Aeronautics and Space Administration's Office of Space Science allocated $370,000 to support special research by the UW's Theoretical Chemistry Laboratory, and $210,000, via its Goddard Space Flight Center in Maryland, for work to be handled by the University's department of astronomy.

Other projects, amounts, and departments:

With the Air Force, Air University, $11,636, air science department; Army Medical Research and Development Command, Office of the Surgeon General, $5,010, department of medicine; NASA, Goddard Space Flight Center, four additional contracts aggregating $131,445, all with the astronomy department;

State Conservation Commission, $1,150, for research in habitat utilization by ruffed grouse;

Navy, Bureau of Naval Personnel, $5,783, Naval Science; Department of Health, Education, and Welfare, Office of Education, $6,700, education; $3,344, Wisconsin Psychiatric Institute; and $15,794, education; U.S. Armed Forces Institute, four contracts totaling $14,490, education;

Department of Interior, Geological Survey, $14,000, Wisconsin Geological and Natural History Survey; and Department of State, Agency for International Development, $163,500, various departments.

##

FEATURE STORY

Astronomy Dept.

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

5/27/63 vh

RELEASE: Immediately

By VIVIEN HONE

MADISON, Wis.--There's more accent on the GAL in Galileo's science at the University of Wisconsin. Four coeds in Wisconsin's Graduate School now list astronomy as their major.

They constitute the largest enrollment of women in graduate astronomy studies in the history of Washburn Observatory, Prof. Robert C. Bless of the observatory staff pointed out. Further, they represent nearly one-quarter of this year's total graduate enrollment in the science.

The distaff quartet includes: Susan S. Simkin, Eagle Heights, Madison; Laura P. Bautz (daughter of Charles K. Bautz, 427 S. Wesley Rd.), Atlanta, Ga.; Bernadette G. Londak (daughter of Mrs. Bernadette M. Londak, R. R. 1), Culver, Ind.; and Natalie A. Satunas (daughter of Mr. and Mrs. Victor Satunas, 6519 S. Washtenaw Ave.), Chicago.

"We have had a total of six women in graduate astronomy studies since 1960," Prof. Bless said, "--before that, probably none, and certainly no Ph.D. candidates."

UW histories, short on references to women in astronomy, seem to bear out Prof. Bless's conclusions, but one bit of reminiscence given by Emeritus Prof. Joel S. Stebbins, one-time director of Washburn Observatory, may point to the contrary:

"Among the early workers at Washburn should be mentioned the team of Milton Updegraf and Alice Lamb. At the meridian circle, he observed the transits of stars for the right ascensions while she read the circle for the declinations."

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Prof. Stebbins does not reveal Alice Lamb's status as a student, but he does testify to a happy ending: "In due time, quite naturally, they were married and they went together to the Argentine National Observatory at Cordoba."

Prof. Bless suggested a number of reasons for the new coeducational look among advanced students at Washburn: greater acceptance of women in the sciences, an acceptance accelerated by World War II; the greatly improved UW facilities for modern research in astronomy dating from the 1958 opening of Wisconsin's Pine Bluff station; and "isn't the women's enrollment some indication of the latent interest which everybody has in astronomy these days?"

In the study of the stars, a certain number of women have served as observers, computer data reducers, and general detail workers for quite some time, according to Prof. Bless.

One evidence that women are now making strides in the profession can be found in the membership of the American Astronomical Society; approximately 10 per cent of the members are female. Another pointer is the case of Nancy Roman. Miss Roman heads the astronomy program for the National Aeronautics and Space Administration.

"There are no physical activities connected with astronomy that a woman can't do as well as a man," Prof. Bless said. "Even use of the big telescopes, all electrically controlled, is not physically hard."

"We've had no special problems associated with the girls," he added. "They are so much a part of the department--and having the women around certainly improves the scenery."

Wisconsin emphasizes the graduate studies portion of astronomy instruction, Prof. Bless pointed out. The prerequisite to advanced astronomy is a physics major with the appropriate math preparation. "Then when they get to us, they specialize in astrophysics," he explained.

Having earned an advanced degree at Wisconsin, the women astronomers will generally find their opportunities in the same areas as those for men: in the academic world of teaching and research; in government observatories and laboratories; and with those private industries interested in the space program.

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MADISON NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

12/13/62 vh

RELEASE: Immediately

MADISON--In the last public lecture before the Christmas recess, Robert Kovar, research assistant in astronomy, will tell his Friday (Dec. 14) evening audience at the University of Wisconsin Planetarium about the Geminids and other meteoric showers.

The lecture and demonstration on the Planetarium "sky" will begin at 7:30 p.m. in the east wing of Sterling Hall on the Madison campus.

The Geminid meteoric shower is expected to occur for about six days centered on Thursday (Dec. 13). This is one of the richest of the meteoric showers which occur annually, University astronomers point out.

On a clear night a fortunate observer can see as many as 50 meteors in an hour. However, the number seen this week will probably be less, the astronomers point out, for the sky will be brightened by a full moon.

Kovar will talk about what makes a meteor and give particulars about the Geminids.

All persons interested in astronomy are welcome to attend the public lecture-demonstration without charge. To reach the Planetarium, guests must take the east wing elevator to sixth floor and follow stairs on sixth to the roof level.

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MADISON NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

11/29/62 vh

RELEASE: Immediately

MADISON--"Star Clusters" will be explained by Laura P. Batz, research assistant in astronomy, in the Friday evening (Nov. 30) public lecture-demonstration at the University of Wisconsin Planetarium.

The performance will begin promptly at 7:30 and latecomers will not be admitted, because of the need to preserve the darkness.

Star clusters, actual physical groupings, are parts of galaxies and are usually composed of old stars. There are two kinds of these clusters, UW astronomers explained: the globular ones, compact and containing many stars; and the open ones, with fewer stars, arranged more loosely.

Miss Batz, the lecturer, returned to the University at Madison this fall for graduate studies in astronomy after a summer spent at Kitt Peak Observatory, Arizona. She served as an assistant at the newly-constructed national facility.

The Planetarium, located on the roof of Sterling Hall, can be reached by elevator to the sixth floor of the east wing and thence by stairs to the roof.

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MADISON NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

11/9/62

RELEASE: Immediately

MADISON--The public is invited to inspect the University of Wisconsin's chief research facility in astronomy at an open house to be held at the Pine Bluff Observatory on Sunday afternoon, Nov. 11.

Guests may inspect the grounds, buildings and principal instruments from 2-5:30 p.m. Observatory staff members will conduct tours and answer questions.

The observatory lies 13 miles west of the Madison campus.

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MADISON NEWS

Astronomy

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

11/7/62 vh

RELEASE: Immediately

MADISON--"M31, the Great Nebula in Andromeda" is the subject for Friday evening (Nov. 9) at the University of Wisconsin Planetarium.

The public is invited to hear the 7:30 p.m. lecture presented by Harland W. Epps, research assistant in astronomy, and to see the realistic demonstration on the indoor "sky."

M31, Wisconsin astronomers point out, is the nearest to planet earth of the giant systems of stars. It contains somewhere around 100 billion stars and is the most distant of the sky objects which can be seen with the naked eye from both hemispheres.

The Planetarium is located on the roof of the east wing of Sterling Hall. Visitors may take the elevator to the sixth floor, and follow the stairs directly in front of the elevator to the roof.

###

Astronomy

10/30/62 vh

Immediately

WALLOPS ISLAND, Va.--An Aerobee-Hi rocket carrying University of Wisconsin experimental instruments for astronomy lifted from a NASA launching pad at Wallops Island, Va., late Monday night (Oct. 29), reached an altitude of 132 miles during its mission, and fell into the Atlantic some 63 miles east of the launching site.

Arthur D. Code, director of the UW Washburn Observatory, said that the flight, completed in a little less than eight minutes, was a necessary preliminary to the orbiting astronomical observatories which the UW expects to place in operation above the earth's obscuring atmosphere.

The Wallops Island preliminary was one of several evidences that Wisconsin astronomers are moving steadily forward in the large federally-supported space program which they entered in 1959.

Wisconsin's 75-pound instrument "package," mounted in the nose-cone of the rocket, was designed, Code said, "especially to measure the distributions of early-type stars and to test the mechanical and electronic components of instruments which will be duplicated in the planned-for flying observatories."

Some 15 inches in diameter and 36 inches high, the package held three telescopes and three photo-electric photometers capable of measuring the ultra-violet light of the stars in four separate wave lengths. The package also held electronic installations for transmitting the data by radio to the ground.

-more-

Add one--Astronomy rocket

At 50 miles above the earth, the protecting cover of the nose-cone was blown off and Wisconsin's instruments went to work. By means of an altitude control system, the rocket first pointed toward the star Gamma Cassiopeia, then at Delta Persei. Finally a conical scanning of the sky was made before the rocket began its descent.

The Space Astronomy Laboratory of the UW Washburn Observatory and the laboratory at Cook Electrical Co., Morton Grove, Ill., both created parts for the "package" which fell, still attached to the rocket, and was not expected to be recovered.

On hand at the Wallops Island site to install instruments and observe flight performance were the following Washburn Observatory men: Director Code; Theodore Houck, director of the Space Astronomy Laboratory; Prof. Robert Bless; and William Reining, an electronics technician.

Wisconsin, in cooperation with other institutions of learning, entered the large federally supported program for space astronomy research with two primary goals:

1) to design and successfully place in operation "flying" observatories which would orbit the earth at altitudes well above the blanket of atmosphere, permit unobscured photometric observations of ultra-violet light, and transmit the data being gathered to earth;

2) to design and place on board an X15 high altitude rocket plane an experimental instrument "package," also for the measurement of ultra-violet starlight. Instruments and records on the plane would have the advantage of recovery with the return of the craft to its base.

The UW established its Space Astronomy Laboratory in 1960 with development of the OAO and X15 space research among its most important endeavors. Wisconsin will share equipment space with the Smithsonian Institution on board the first of three orbiting observatories planned for early phases in the National Aeronautics and Space Administration program.

-more-

Revised estimates now place the date for launching of the first OAO sometime in 1964. The X15 is expected to begin all-out flights with UW instruments on board by April of 1963. It is expected that by this time, the plane will have attained heights of 80 miles above the earth.

"We're beginning to assemble the experiments we've been working on for the past two or three years," Code said.

He explained that preparations for the research from the OAO have required the making of two instrument "package" models--the first or prototype and the second or actual flight model. The prototype, Code said, has been completed, has passed centrifuge tests at Washington, D.C., and acceleration and qualification tests at Cook Electric.

Units including seven telescopes and spectrometers will be coming to Wisconsin soon for assembly and approval, and sometime after the first of the year, if all goes well, will be shipped to NASA's Space Flight Center at Greenbelt, Md., for more extensive testing.

"We've already started work on the flight model at Madison," Code said.

Progress on the X15 project has included a number of preliminary flights of the rocket plane with one small UW photometer aboard. The first of these flights was made in April of this year. These will continue, one or two a month, Code said, until the X15 has reached high enough into space for the full-scale observations to begin.

Contrary to procedure with the OAO, no prototype precedes the actual flight model "package" for the X15.

"The X15 flight equipment is now in existence," Code said. "We recently accepted delivery of the stabilized platform on which our cameras will go, and this has been tested and shipped to Edwards Air Force Base. Our Space Lab has made the four cameras for the X15 and when these have been further tested, they will be fitted into the aircraft."

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MADISON NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

10/10/62 vh

RELEASE: Immediately

MADISON--Susan M. Simkin, WARF Fellow in astronomy, will present the University of Wisconsin Planetarium's first public lecture-demonstration of the fall season Friday evening, (Oct. 12).

"Mercury and Venus, Morning and Evening 'Stars'" will begin promptly at 7:30 p.m. on the east wing rooftop of Sterling Hall. The lecture demonstration is the first of seven Friday evenings at the Planetarium scheduled during the first semester for the benefit of the public.

On each occasion, one of the UW astronomy staff will lecture and illustrate the talk with the highly realistic stars and other phenomena in the Planetarium's "sky."

##

WIRE NEWS

Astronomy Dept.

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

7/25/62 vh

RELEASE: Immediately

MADISON, Wis.--"Hyvaa iltaa--" ("good evening"--and accent always on the first syllable, please).

This is the Finnish greeting which Arthur D. Code, director of the University of Wisconsin's Washburn Observatory, is rehearsing for Thursday afternoon when, via Telstar, he will carry on a seven-minute telephone conversation with administrators on a Finnish campus thousands of miles away.

The phone talk with G. J. Jarnefelt, director of the national observatory at the University of Helsinki, and with Edwin Linkomies, rector of Helsinki, is one of 23 two-way calls scheduled to be relayed Thursday afternoon over the new communications satellite.

Long distance by Telstar will unite by voice scientists and city officials in America with men holding similar roles in Europe. It will be 3:42 in the afternoon when the call starts on the Madison campus, but 10:42 p.m. in Finland, so "good evening" is in order.

Fred Bjorksten from Helsinki, a project associate in the UW's department of physiological chemistry, is rehearsing Dr. Code for the introductory phrases. Other than the beginning greetings and a personal identification, Prof. Code will talk in English.

Bjorksten also will exchange a brief greeting with Holger Rotkirch, chairman of Helsinki's International Student Club. These two--you guessed it--will converse in Finnish.

-more-

Code will chat with two educators who have ties with the UW campus. Director Jarnefelt has a son, Dr. Johan Jarnefelt, who carried out postdoctoral studies only a year or two ago at UW's Enzyme Institute. The well-known Finnish biochemist and Wisconsin alumnus is now working at Stockholm's Wenner-Gren Institute.

And Rector Linkomies is familiar, too, with the Badger campus. His recent visits to Pres. C. A. Elvehjem prefaced the establishment of a faculty exchange program between UW and the University of Helsinki.

The first visiting professor from Helsinki in the new program arrived early in 1962 to carry out work at UW during the spring and summer terms. He is Hans Luther, specialist in aquatic plants and one of Europe's leading limnologists. The scholar exchanges were suggested by the U.S. State Department in view of past ties and the large Finnish population in Wisconsin.

Prof. Code, who will receive the Telstar call at his departmental office on the sixth floor of Sterling Hall, has invited a few persons to witness the historic event. They include Pres. Elvehjem and UW Profs. Robert Parent, electrical engineering, and Verner Suomi, meteorology.

Parent and Suomi have been closely identified with a satellite project to determine the heat budget of the earth. Dr. Code and several of his staff members at Washburn also are involved in a space project, particularly a program to launch orbiting observatories and X15 rocket plane flights seeking new information on astronomical phenomena.

Wisconsin Telephone Company men who took care of technical details for the call also will be present.

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Astronomy Dept.

U. W. NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

7/24/62 vh

RELEASE: Immediately

MADISON, Wis.--The University of Wisconsin will be linked by Telstar with the University of Helsinki, Finland, in a two-way telephone hookup Thursday, July 26, beginning at 3:42 p.m.

The time in Helsinki will be 10:42 in the evening.

Astronomer Arthur D. Code, director of the UW Washburn Observatory, is slated to talk to Gustav J. Jarnefelt, director of the national observatory at the Finnish university, by means of the recently launched satellite communications system.

Some 23 separate phone calls between officials in American cities and towns and in European centers will be carried.

Prof. Code will receive the call at his office in Sterling Hall where a small group of state and University persons vitally interested in communications and space programs will witness the event. Wisconsin Telephone Company personnel who have made arrangements for the historic call also will be present.

Dr. Code is also scheduled to talk with the rector of the University of Helsinki, Edwin Linkomies. During the seven minutes allotted, a Finnish student on the UW campus, biochemist Fred Bjoksten, from Helsinki, will chat briefly with a student on the Helsinki campus. The student on Finland's end of the "line" will be Holger Rotkirch, chairman of Helsinki's International Student Club, who is planning to visit in America on a U. S. State Department grant.

The talk between the students will be in Finnish, the others in English.

-more-

The call is one of two between representatives of American and European institutions of higher learning. The president of the University of Rome, Prof. Giuseppe Ugo Papi, will talk with the president of the University of Boston, Dr. Howard Case. For the most part, the calls have been arranged between mayors or other city officials.

Among them will be calls between Mayors Robert Wagner of New York City and Willy Brandt of West Berlin; Mayor Richard Daley, Chicago, and the head of the postal, telegraph, and telephone service, Copenhagen, Denmark; Arthur Naftalin, mayor of Minneapolis, and the mayor of Oulu, Finland; and the mayors of Toledo, Ohio, and Toledo, Spain.

The U.S. Information Agency, which has arranged many of the details, has been active in providing European countries with materials which will acquaint them with the American scene and American participants.

USIA asked UW to supply information and photographs of the University, the city of Madison, and Director Code. The UW has even furnished motion picture film showing Dr. Code as he will appear while conversing with Helsinki.

The Wisconsin astronomer, who became director of Washburn Observatory in 1958, is administrator, teacher, and important figure in UW astronomy research. He is a key man in Badger efforts in the National space program. Wisconsin and other institutions hope to reach new areas of knowledge by means of orbiting observatories and X15 rocket plane flights.

In a recent letter from Edward R. Murrow, head of the U.S. Information Agency, Murrow thanked Code for his willingness to take part in the Telstar project and said further: "...I believe your participation will serve to dramatize both in the United States and in Europe the program of American science and our friendly interest in the citizens of other nations."

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MADISON NEWS

Astronomy

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

3/7/62 gr

Immediately

MADISON--"Mercury, the Elusive Planet" will be the subject of the lecture-demonstration at the University of Wisconsin Planetarium at 7:30 p.m. Friday, March 9.

Terry Edwards, a research assistant in astronomy, will speak on theories about the origin of Mercury and its place in the solar system. His talk will be illustrated by the movie-like projection of the heavens on the sky-model dome of the Planetarium.

Mercury, the smallest planet and the closest to the sun, is called "the elusive planet" because it is often obscured by the sun.

The Planetarium performances, to which all Madison area residents are invited, begin promptly at 7:30 on selected Friday evenings. The Planetarium, located in the east wing of Sterling Hall, is reached by elevator to the sixth floor, and by stairs to the roof.

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MADISON NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

Astronomy

2/7/62 vh

Immediately

MADISON--A Wisconsin Alumni Research Foundation fellow in astronomy, Natalie Satunas, will deliver the public lecture scheduled Friday (Feb. 9) at 7:30 p.m. at the University of Wisconsin Planetarium.

Gathered under the domed "sky," her audience will learn about gaseous nebulae, distant, giant masses or clouds of gas averaging two trillion miles across. These occur in those bodies of gas, dust, and stars known as spiral galaxies.

Astronomers have theorized that stars are born out of a condensation of the gas that makes the nebulae. The Orion nebula, occuring in our galaxy, the Milky Way, is now a spectacular phenomena in the winter sky.

The Planetarium performances, to which all Madison area residents are invited, begin promptly at 7:30 on selected Friday evenings. The Planetarium, located in the east wing of Sterling Hall, is reached by elevator to sixth floor, and by stairs to the roof.

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MADISON NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

1/29/62 vh

RELEASE: Immediately

MADISON--Dr. Orren C. Mohler, University of Michigan astronomer, will speak on "The Spots on the Sun" before a University of Wisconsin audience at 8 p.m. Monday, Feb. 12.

The lecture in 165 Bascom Hall is open to the public.

The assistant director of the McMath-Hulbert Observatory at Michigan comes to the Madison campus under a program of visiting professors in astronomy presented by the American Astronomical Society and the National Science Foundation.

Dr. Mohler's research interests include the solar chromosphere and photosphere; the active regions of the sun's surface and their relation to changes on the earth; and the design and construction of astronomical instruments.

The astronomer received his Ph.D. from the University of Michigan and studied as Fulbright research scholar at the Institut d'Astrophysique at the University of Liege, Belgium.

He comes to Wisconsin under local sponsorship of the UW astronomy department and the UW Committee on All-University Lectures.

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MADISON NEWS

Astronomy

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

1/24/62 vh

RELEASE: Immediately

"Orion and the Winter Constellations" is the subject scheduled for the Friday (Jan. 26) 7:30 p.m. public lecture-demonstration at the University of Wisconsin Planetarium.

On the Planetarium "sky" Robert Kovar, teaching assistant in astronomy, will show his audience Orion, the hunter, and other major winter phenomena such as Canis Major and Canis Minor, the dogs.

Sirius, the "eye" of Canis Major, is the brightest star of the heavens. The young, bright, blue stars in the constellation Orion are the type which astronomers are now using to trace the spiral arms of the Milky Way, earth's own galaxy.

The Friday performance at the Planetarium is one of nine within the second semester which Washburn Observatory has scheduled for the public.

Located on the east wing roof of Sterling Hall, the Planetarium can be reached by elevator to the sixth floor, and by stairs from sixth to the roof.

###

Astronomy

U. W. NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

1/15/62 vh

RELEASE: Immediately

MADISON, Wis.--A $415,000 contract between the University of Wisconsin and the National Aeronautics and Space Administration, approved by UW regents at their January meeting, has spotlighted the mounting effort of Wisconsin in space astronomy research.

The $415,000 support from NASA is a token of larger things to come. It will be included in a pending contract for $1,180,902, Washburn Observatory officials said, which is expected to carry forward work on Wisconsin's experimental "package" aboard an orbiting astronomical observatory.

When the pending contract is completed, the federal government will have assigned more than $1.5 million to Wisconsin for space astronomy research.

The UW entered the federally supported research program in 1959. Harvard, Princeton, the Smithsonian Institution and NASA's Goddard Space Laboratories also are associated with Wisconsin for various research projects.

UW studies were then begun to examine possibilities for measuring the ultra-violet light of the stars with special equipment mounted on orbiting space satellites and an X15 rocket plane. At the very high altitudes which these vehicles may be expected ultimately to reach, escape from the obscuring earth atmosphere should be possible and ideal, very accurate recordings of the ultra-violet starlight realized.

Wisconsin established its Space Astronomy Laboratory in 1960. At this branch of Washburn Observatory the OAO and X15 developments and other experimental studies are in progress.

-more-

Wisconsin will share space equipment with the Smithsonian Institution in the first of three satellites planned as the earliest launchings of the OAO program. In October, 1961, Arthur D. Code, director of Washburn, announced that the Cook Research Laboratory of Cook Electric Co., Morton Grove, Ill., had been selected to build the highly specialized "package" with its telescopes, spectrometers and other electronic devices which Wisconsin will place on board the space craft. Approximately three quarters of a million dollars will go to the Cook Laboratory for its construction efforts.

Wisconsin hopes to see the first satellite launched in 1963. It is expected that observations from the X15 will be carried out this year.

The UW Space Laboratory staff says that in later developments of the OAO program it will be possible to equip a space vehicle with a single telescope measuring as much as 36 inches in diameter and able to guide on a star to an accuracy of a tenth of a second of arc.

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MADISON NEWS

Astronomy Dept.

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

1/11/62 vh

RELEASE: Immediately

Guests at the University of Wisconsin Planetarium Friday evening (Jan. 12) will hear about a photo-electric method for measuring the diameter of stars in a lecture-demonstration titled "Occulations and the Motions of the Moon."

Lights go off and the performance for the public goes on at 7:30 sharp.

Similar in principle to stellar diameter measurement with the interferometer, occulation can only be applied in the observation of those stars which pass behind the dark edge of the moon.

The public is invited to attend the Friday evening lecture-demonstrations at the Planetarium in the east wing of Sterling Hall. The UW astronomy department has scheduled 10 of the events during the second semester.

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MADISON NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

12/6/61 vh

RELEASE: Immediately

Myron Bergenske of the University of Wisconsin astronomy staff will be at the controls when the UW Planetarium opens its 1961-62 series of public lecture-demonstrations Friday evening (Dec. 8), at 7:30.

"Jupiter and Saturn" will be the topic of the lecture and realistic demonstration on the Planetarium "sky."

The Planetarium is located on the roof of the east wing of Sterling Hall. To reach it: take the elevator to the sixth floor and follow stairs directly in front of elevator to Planetarium entrance. No guests will be admitted once the 7:30 performance has started, for it is essential to viewing that darkness be maintained.

###

MADISON NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

11/28/61 vh

Immediately

MADISON--Those Friday evenings with the stars are in force again at the University of Wisconsin Planetarium.

The UW astronomy department has announced the first public lecture-demonstration, "Jupiter and Saturn," will be given at 7:30 Friday evening, Dec. 8. The Planetarium is located on the roof of the east wing, Sterling Hall.

The public demonstrations on the indoor Planetarium "sky" will show the constellations of the season and the changing aspects of the sky as seen from different parts of the earth. In addition, a selected topic will be singled out for more detailed attention at each demonstration.

The complete program of the year to which all Madison area persons are invited lists the following:

"Jupiter and Saturn"--Dec. 8; "Occulations and the Motions of the Moon"--Jan. 12; "Orion and the Winter Constellations"--Jan. 26; "Gaseous Nebulae"--Feb. 9; "Eclipses of the Sun and Moon"--Feb. 23; "Mercury, the Elusive Planet"--March 9; "The Vernal Equinox and the Spring Skies"--March 23; "The Moon and Easter"--April 13; "Observing the Stars with Field Glasses"--April 27; and "Observing the Stars with Telescopes"--May 11.

Performances will start promptly at 7:30. Because darkness is essential, no one will be admitted after the show begins. Groups of 10 or more wishing to attend should give advance notice by telephoning Washburn Observatory, AL-5-3311, Ext. 2551.

"Because of large enrollments this year, groups cannot be accommodated at any other time than during the regularly scheduled demonstrations," the astronomy department stated. The Planetarium has a primary function as teaching aid for students in astronomy.

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MADISON NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

11/24/61 vh

Immediately

MADISON--A stubby, shining new telescope will be among research equipment which guests will view at a Sunday (Nov. 26) open house which University of Wisconsin astronomers are planning at the Pine Bluff Observatory from 2-5:30 p.m.

The UW astronomy department said installation of the new 16-inch reflecting telescope is now complete. The device takes its place beside the large 36-inch telescope and a 5-inch instrument as a welcome addition to Wisconsin research in the science of the skies.

Pine Bluff Observatory, UW's chief research facility for astronomy, was completed in 1958, a $200,000 gift from the Wisconsin Alumni Research Foundation.

Newcomers will find the Pine Bluff station, some 13 miles west of Madison, by following these directions: drive west on Mineral Point Road to village of Pine Bluff; turn right at this point, traveling County Trunk P for approximately one-half mile to intersection with country road; turn left on this road, proceeding through flatlands and finally up a sharply inclined hill. Observatory stands on the hilltop, to the left of the road.

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MADISON NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

11/21/61 vh

Immediately

MADISON--An open house offering the Madison friends of astronomy a chance to inspect Pine Bluff Observatory will be held Sunday afternoon, Nov. 26.

University of Wisconsin astronomers will be on hand from 2-5:30 p.m. to show visitors the UW's modern astronomical research station 13 miles west of Madison, its telescopes and other major equipment.

The astronomy department emphasized that on this afternoon occasion there will be no opportunity for guests to observe objects through the telescopes. Individuals may do this on first and third Wednesdays of each month at the Washburn Observatory Visitors' Nights on campus, it was pointed out.

To reach the country station: travel west on the Mineral Point Road to the village of Pine Bluff; turn right on County Trunk P; proceed one half mile to intersection with country road, then left at this point following the winding road to a hilltop. The observatory lies at left on the hill.

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Astronomy Dept.

U. W. NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

10/24/61 vh

RELEASE: Immediately

By VIVIEN HONE

MADISON, Wis.--The University of Wisconsin has moved one step closer to the orbiting observatories which her astronomers hope to see launched by 1963. Selection has been made of the company which will construct the UW research equipment to be placed on board a spacecraft.

Arthur D. Code, director of the UW's Washburn Observatory, and Theodore E. Houck, director of Washburn's Space Laboratory, announced this week that the Cook Research Laboratory of Cook Electric Co., Morton Grove, Ill., will build the major part of Wisconsin's "package" and electronic components for the Orbiting Astronomical Observatory (OAO) program of the National Aeronautics and Space Administration (NASA)

Wisconsin is one of five institutions--the others are Harvard, Princeton, the Smithsonian Institution, and NASA's own Goddard Space Flight Center--participating in the federally supported project. Plans and designs for the sky science investigations have been developing in Wisconsin's Space Lab, a branch of Washburn Observatory. Goddard has management and technical direction of OAO project.

Approximately three quarters of a million dollars will be paid to Cook for the highly specialized "package" with its telescopes and spectrometers designed especially to receive and measure ultra-violet light from the stars and to transmit to earth or store for later relay the data received.

-more-

add one--space observatory

The launching of three satellites, all carrying equipment for research in the ultra-violet, is the first objective of the cooperative project. Engineering for the space vehicles on which the special instruments will be mounted has been completed, Dr. Code said, and the Grumman Aircraft Engineering Corp., Bethpage, N. Y., is now in process of building a full-scale test model for Goddard. The "flying" carriers will all be constructed from a basic design best suited to the needs of all cooperating researchers.

Wisconsin will share space with the Smithsonian Astrophysical Observatory in the first of the three observatories. An Atlas-Agena B rocket will carry it aloft from the launching site at Cape Canaveral. At altitudes greater than 100 miles, the "flying" observatories will be free of the earth's atmosphere and the observational problems presented by it.

Code and Houck, describing both the carrier and Wisconsin's package, said the spacecraft would be an 8-foot wide, 10-foot long aluminum hexagonal structure. A cylinder with a 48-inch opening, centrally located, would extend the length of the craft, and into this hole in the "doughnut" the research instruments would be placed, Wisconsin's in the top half, Smithsonian's in the bottom. Banks of batteries, charged by solar cells mounted on paddles on the spacecraft, will provide power for the observatories.

Wisconsin and Smithsonian will each put 500 pounds of equipment on board. Weight of the craft itself, power supplies, an electronic computer and guidance apparatus will make up the balance for a gross weight of 3,300 pounds.

The UW "package" will include seven telescopes--a 16-inch 'scope mounted in the center with four 8-inch 'scopes and two telescope spectrometers grouped around it. The light will be received and recorded by the photo-electric method.

By electronic controls operated from ground stations or programmed into the mechanism, it will be possible to point the satellite toward any part of the sky with an accuracy of one minute of arc, Code said. Data will then be radioed directly to earth as the satellite passes over a ground station or stored on board until passage over a station again occurs.

-more-

add two--space observatory

Prof. Houck pointed out what the escape from the atmosphere which will be accomplished in the flying observatories will mean for observations of the future. The blanket of air which surrounds the earth and which has plagued astronomers since the science was begun, bends the light and makes the images of stars fuzzy. Scattering the light, it also produces a sky so bright that faintest objects cannot be seen. Further, it is opaque to most electro-magnetic radiation so that a major share of the light never passes through the atmosphere.

With the telescopes orbiting above this air blanket, it will be possible to "see" the ultra-violet light and to achieve a never-before-accomplished accuracy in measuring the brightness of sky objects in various wave lengths.

The Smithsonian equipment will contain several telescopes of sizes similar to Wisconsin's, each equipped with a TV camera to transmit photographs of the sky in the ultra-violet.

The orbiting astronomical observatory instrumentation is the largest project now being developed at the Space Astronomy Laboratory, Houck pointed out, but astronomers there are engaged in other research programs including development of the instrumentation to be carried into space by an X15 plane. It is expected that sometime before the flying observatories are launched the X15 will reach heights sufficient to photograph starfields in the ultra-violet.

Code, chief administrator for all UW astronomy studies, said that in later developments of the OAO program, a space vehicle "equipped with a single telescope measuring as much as 36-inches in diameter or larger and able to guide on stars to an accuracy of a tenth of a second of arc" may be launched.

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News Bureau
CALIFORNIA INSTITUTE OF TECHNOLOGY
Pasadena, California
SY. 5-6841 Ext. 214 MU. 1-7171

FILE?

FOR RELEASE MONDAY, SEPTEMBER 18, 1961

Pasadena, Calif.—Dr. Rudolph Minkowski, for 25 years an astronomer with the Mt. Wilson and Palomar Observatories and a pioneer in optically identifying radio objects in space, has been named recipient of the 1961 Bruce Gold Medal of the Astronomical Society of the Pacific, it was announced today.

Dr. Minkowski is the 54th astronomer to be so honored since the Katherine Wolfe Bruce Medal was first awarded in 1897. He will receive the award Sept. 21 at a dinner the society is sponsoring in his honor at the Athenaeum on the campus of the California Institute of Technology, which operates the observatories with the Carnegie Institution of Washington.

Dr. Minkowski retired from the observatories last year shortly after optically identifying the most distant object known in the universe, two interacting galaxies (islands of stars) several billion light years distant and receding from the earth at about 90,000 miles a second.

Since his retirement, Dr. Minkowski has been teaching as visiting professor of astronomy, first at the University of Wisconsin, Madison, and now at the University of California, Berkeley.

Dr. Minkowski is being honored for his many contributions to astronomy. In addition to optically identifying objects that emit radiations in the radio frequencies—the so-called "radio stars"—he also discovered nearly 200 hitherto unknown planetary nebulae, which are clouds formed by the ejection of gas from a central star, and contributed much knowledge about them. Previously, only 155 of these nebulae had been known. He photographed and classified the spectra of many supernovae (exploding stars) and directed the National Geographic Society's Palomar Observatory Sky Survey.

Born in Strasbourg, Alsace, Dr. Minkowski was educated in Germany and taught physics at the University of Hamburg. He came to this country in 1935 to join the observatories staff. During World War II he devised optical instruments for the U.S. Air Force.

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FEATURE STORY

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

3/2/61 vh

RELEASE: Immediately

MADISON, Wis.--The rapidly extending borders of the University of Wisconsin --at Madison and in the vast universe--were quietly proclaimed recently as workmen nailed a sign over the door of a rented building at 35 N. Park St., some three blocks south of University Avenue.

The sign reads: University of Wisconsin Laboratory for Astronomy and Atmospheric Sciences. Into the one-story brick construction with two-story quonset attached, the UW departments of astronomy and meteorology have moved some of their most ambitious research projects.

For astronomy this includes the project for satellite or orbiting observatories which is being developed in cooperation with other institutions and the National Aeronautics and Space Administration. First efforts are being directed toward launching of three satellites equipped with telescopes to probe problems concerned with ultra-violet light.

In a separate project, Wisconsin astronomers here are also developing the instrumentation which an X15 will carry into space sometime before the satellites are launched. It is expected that by the fall of 1961 such a plane will reach the heights necessary for the successful gathering of information on star fields through photographs of ultra-violet light.

Speaking of the work which his own department is carrying forward at the new quarters, Prof. Reid Bryson, chairman of meteorology, explained: "Meteorology is also interested in radiation research, but radiation at the opposite end of the spectrum. While astronomy will deal generally with ultra-violet, meteorology will work with infra-red radiation. Our measurements will be made from satellites and high altitude balloons."

-more-

This work will be under direction of Prof. Verner E. Suomi, who led in development of the first meteorological satellite, Discoverer VII. Among the meteorological satellite programs of study by Suomi's group is one which will map world distribution of thunder storms.

Wisconsin will share space on the orbiting observatories with the Smithsonian Institution. Prof. Arthur D. Code, chairman of the UW department of astronomy, said this week that designs for the "package" which the UW will place aboard the first of the satellites "has been completed up to the point where integration with the rest of the space craft is now being investigated."

The new quarters for astronomy and meteorological research, providing some 6,154 additional square feet of working facilities, hold nine offices and conference rooms, optical, spectroscopic, and electronics laboratories, darkrooms, a machine shop, and storage space.

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Astronomy Dept.

MADISON NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

2/16/61 vh

Immediately

RELEASE:

MADISON--It's a two-star performance in more ways than one for guests at the University of Wisconsin's Friday night lecture demonstration in the Planetarium.

Subject for the program, which begins at 7:30 and is open to the public, is "The Conjunction of Jupiter and Saturn." Approximately every 20 years, the two largest planets in our solar system arrive at positions which make them appear unusually close together, their angular separation less than half the moon's apparent diameter. That time is near at hand again.

Martin Burkehead, research assistant in astronomy, will lecture to the guests on this sky phenomenon and will demonstrate the event on the Planetarium "sky."

Then those who are hardy enough may leave the Planetarium with their new knowledge to witness the conjunction itself. Astronomy staff members point out that the event will take place just before dawn on Saturday, Feb. 18.

Pick a spot where the horizon is unobscured, they say, and look to the east, low in the sky.

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Astronomy Dept.

FEATURE STORY

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

2/16/61 vh

RELEASE: Immediately

By VIVIEN HONE

MADISON, Wis.--"We are not quite low man on the totem pole, but we were for a long time," Dr. Rudolph Minkowski pointed out this week at the University of Wisconsin as he discussed the nation's laggard role in radio astronomy.

And the U. S. has only begun to find ways and means for constructing the giant instruments which this greatly promising new development in the oldest science demands, he said.

The veteran astronomer, a visiting professor this year at the UW, has spent long, distinguished years on the staff of California Institute of Technology and the Carnegie Institution, of Mount Wilson and Palomar Observatories; he is member of a National Science Foundation panel investigating facilities for radio astronomy; and he is the renowned discoverer of the most distant radio source known to man.

"These things don't get named," Dr. Minkowski said of that source, but finally, reluctantly, he offered the number 3C295 for title. Reluctant also to estimate the distance from earth of the farthest known radio-emitting object--"this depends upon how the universe looks"--he finally hazarded, "somewhere in the order of six billion light years."

But there was no reluctance to define radio astronomy, to point to how it may expand knowledge of the universe, and to suggest what is needed in the U.S. for developing the infant science.

"Radio astronomy observes objects with the aid of radio waves just as optical astronomy observes with the aid of visual light," he said.

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Add one--Radio Astronomy: Minkowski

"We have in the radio region the same sort of thing as in the optical region, light emitted from an object in a continuous sequence of colors--the spectra, and we also have in both, light emitted in only a narrow band of that sequence.

"As it happens," Dr. Minkowski continued, "the only such discreet wave length now known in radio is the one that is given off by hydrogen--and a whole sub-branch of radio astronomy is devoted to investigation of the structures of galaxies with this hydrogen line."

"An object observed by optical telescope may appear quite different when observed by radio," the visiting professor emphaized. "It may be giving off very weak visual light waves but very strong radio waves. Sometimes information may be obtained by radio on parts of a galaxy which before we didn't even know existed."

In other words, radio astronomy tells us something else; it is a new method for gaining new knowledge of our universe, he declared. "We're getting information on processes which we didn't know existed 10 years ago."

The 1932 discovery of a University of Wisconsin graduate, Karl Jansky (A.B., '27, M.A., '36) touched off work in the new arm of man's oldest scientific endeavor. The Bell Telephone Laboratories employee was the first to observe that extra-terrestrial radio radiation was reaching earth. In 1940, another American, Grote Reber, showed that the Milky Way can be observed with the aid of radio waves. The science, however, was not truly launched until 1948 when Australia found the first individual radio sources in the sky. Thereafter radio astronomy in England, Holland and Australia developed rapidly.

But in the U.S. few were very actively interested even in 1954, Dr. Minkowski indicated. American scientists were already leaders in optical astronomy, "largely because we had the best instruments. There was less reason then, perhaps, for us to look for opportunities in other techniques."

"Except for the great difference in size, radio telescopes are much like any household radio set," the astronomer said. "You have an aerial hooked up to a receiver. But in the radio telescope," he pointed out, "the aerial is infinitely larger and the receiver much more sophisticated."

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There is one particular difficulty with radio astronomy, Dr. Minkowski said, and here is where the need for the giant instruments relates: the quality of the focussing depends upon the ratio of the size of the radio aerials to the size of the radio waves being received. Wave lengths of visual light are of the order of a few one millionths of an inch. Radio waves range from a few inches to a few yards.

"So if you want only to build something equivalent in performance to reception of light by the unaided human eye, you will need an antenna something like five miles across," the Wisconsin scientist declared.

It is impossible technically to build above the ground a thing larger than 600 feet in diameter, according to the scientist, but there are tricks which help. The performances of an impossibly large aerial can be equally achieved by arrangements of many smaller aerials spread over a very large area. There are many varieties of these aerials. To date, perhaps the best known are the big, mounted, steel or aluminum bowls. But whatever the arrangement, these installations are necessarily huge in size and in cost.

Instruments built or in the making are investments each of one million dollars or more, Dr. Minkowski pointed out, "and those in the future will be in the 50 to 100 million dollar range," he predicted.

"It is quite clear how the development will have to go," he said. "The larger instruments can only be built and run with federal government funds."

But national facilities at this point "are still in pitiful shape," he pointed out. The largest instrument at the recently established National Radio Observatory at Greenbank, Va., is only 85 feet in diameter and a 140-foot one is not complete. England, by comparison in the international scene, has a 250-foot radio telescope in operation at Manchester; another, 210 feet, nears completion in Australia.

The largest operating radio facility in the U.S. today is an instrument comprising two 90-foot "dishes" or bowls, Dr. Minkowski said. This is a Cal Tech installation. Cornell is erecting a 1,000-foot fixed telescope in Puerto Rico.

Add three--Radio Astronomy: Minkowski

"No, radio astronomy has no direct bearing on national defense," the scientist said in answer to a question, "and neither has optical astronomy, but there are some aspects which go in that direction. You can use radio sources for celestial navigation, you can 'see' with the aid of radio signals in a cloudy sky.

"But the main point is that this nation cannot afford as a matter of national accomplishment and prestige to continue this lag," the astronomer emphasized, and if we are to play as important a role in radio astronomy as in the older optical branch, we must develop the technical facilities, he declared.

But the super-size telescopes are not enough, Dr. Minkowski said. Almost as severe a shortage lies in trained radio astronomers. We must recruit talented young people for training at our universities, and we must build radio telescopes adequate to that training, in the scientist's opinion.

"These need not be among the largest and most powerful of the instruments for research." Comparatively "small" or medium-sized, they would still be sufficent for student training, Prof. Minkowski pointed out. We need these, not at all universities with instruction in astronomy, but at all which have interests turned in the direction of radio observation.

"We also need research fellowships--that sort of thing. We can't build the huge radio installations if we haven't the people to run them--and it is hard to bring people into the field if they can't see adequate facilities."

Circumstances will improve, Wisconsin's distinguished visiting teacher is certain, and this includes improvement in instrument design. "The radio telescope of the future will probably be an assembly of a number of instruments on rails so that they can be moved freely around for many miles."

Today's instruments, tomorrow's--with such as these the structure and magnetic fields of the galaxies will be probed, Dr. Minkowski affirmed, secrets of the sun's corona will be revealed, and man will reach deeper than ever before into the whirling universe.

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CUT LINES

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

1/19/61 vh

RELEASE:
Immediately

(Astronomy)

MADISON, Wis.--Pictured here is a preliminary model (most likely subject to change) of the University of Wisconsin "package" for measurement of starlight in the far ultra-violet. The instrument when completed will be part of the orbiting astronomical observatory which the UW in cooperation with Smithsonian Institution hopes to see launched in 1963 or '64.

The two institutions will share the first of a series of such "flying" observatories being developed under a National Aeronautics and Space Administration program. Harvard, Princeton, and NASA's Goddard Space Laboratory are also identified with the project.

The UW experiment will consist of a number of small telescopes equipped with photo-electric photometers. The model, a design study of how the instruments can be fitted into the allotted space of the satellite, indicates seven telescopes. The center one is a 16-inch reflector to be used for the measurement of nebulae. The four smaller ones, grouped in pairs, are eight-inch off-axis parabolas to be used with filters for stellar sources.

The other two instruments indicated are objective grating spectrometers in which the light will first fall on a set of gratings, be reflected and disbursed to the telescope mirror at the top of the "package," and then pass down between the two gratings to the photo-electric photometer.

With the objective grating spectrometers, it is thus possible to select any desired region of the ultra-violet by pointing the entire satellite.

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Astronomy Dept.

U. W. NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

8/4/60 vh

RELEASE: Immediately

MADISON, Wis.--A project to launch satellite observatories capable of taking very accurate astronomical measurements from high altitudes in space is under way at the University of Wisconsin.

Prof. Arthur D. Code, chairman of UW astronomy studies, said this week that a $104,992 contract between the UW and the National Aeronautics and Space Administration has been signed which will give Wisconsin federal funds to develop space observatories.

The UW is one of five institutions participating in NASA's orbiting observatories program. The others are Harvard, Princeton, the Smithsonian Institution, and NASA's own Goddard Space Laboratories.

Wisconsin's contract is an extension of preliminary NASA-supported investigations of the past year to study the possiblities for carrying out the program.

Dr. Code explained that for the immediate future, in the cooperative effort, work will be concentrated on launching three satellites to carry telescopes of various sizes and to be devoted to problems concerned with ultra-violet light.

At altitudes in excess of 100 miles, the "flying" observatories will escape the problems presented by the earth's atmosphere. They should be able to see the ultra-violet light that comes from the stars and totransmit their measurements to earth by electronic methods.

"The telescopes," Dr. Code pointed out, "should be able to point at a star with more accuracy and precision than earthbound ones."

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Add one--Orbiting Observatories: UW Astronomy

The first of the orbiting observatories will carry a number of small telescopes for UW experiments on the brightness of stars in the ultra-violet. Wisconsin will share this satellite with the Smithsonian Institution which will be doing photography of the skies by television techniques in the ultra-violet. The second satellite will carry an ultra-violet spectrograph for the Goddard Space Labs; the third, a high dispersion ultra-violet spectrograph for Princeton.

Harvard, Dr. Code pointed out, will be working with satellites on a separate solar program.

It is planned to lift the observatories into orbit with Atlas rockets topped with Agena B boosters. A number of these Agenas have already been successfully launched in other space experimentation, Code pointed out, "and there will be many more before ours go up. Successfully launched Pioneers, the Midas, and Tiros satellites all have had Agena boosters, Dr. Code said.

Wisconsin hopes to get the first of the orbiting observatories into space by 1963, Code said. UW scientists hope, also, that once orbited, a satellite will continue to operate satisfactorily for at least a year.

UW astronomers will be responsible for the design of the telescope instrumentation "and for everything necessary to carry out the actual experiments," Dr. Code said. They will construct experimentally some parts in order to test out certain ideas.

Though the first satellite will carry relatively small telescopes for Wisconsin investigations, UW astronomers expect to launch later in the program a single 'scope as much as 36-inches in diameter and "something in the order of a ton in weight."

"We know what we're asking for," Prof. Code stressed, "but we don't know how it will come out," Orbiting observatories, he added, will be the most complicated of any of the satellite vehicles now under consideration.

Dr. Code then explained the advantages which the space observatories will offer astronomers by outlining the problems presented in observing from earth station;

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Ever since the beginning of astronomy, he said, scientists have had to observe from the bottom of a "sea" of air "and this atmosphere, more than any other thing, has limited what we can learn about the nature of the universe." It bends the light, making the images of the stars being measured fuzzy and seeming to move. Measurments in the finest detail are not possible. The blanket of air also scatters the light, thus producing a sky brighter than it would be otherwise. Because of this, the faintest objects cannot be seen. In addition, the atmosphere presents the problem of being opague to most electro-magnetic radiation. "Most light never gets through it, but some visual light and radio light does get through," Dr. Code explained.

"It is possible to escape the bending and scattering of light by making observations from balloons, but only by reaching altitudes in excess of 100 miles (by means of the flying observatories) can we see the ultra-violet light that comes from the stars. So our first programs in space astronomy will be devoted to measuring ultra-violet and radio light."

The preliminary investigations for the astronomical satellites project have been carried out on the Madison campus at 1118 W. Johnson Street, but since this area has become a portion of the site for UW's new Chemistry Research Building, new quarters are being sought for a space astronomy lab.

UW astronomers working on the satellite project include: Dr. Code (in a part-time capacity); Prof. Theodore Houck, as director of the work; Robert Bless and Dan Schroeder, project associates; and a number of graduate students. When we get a place to put people, we'll also have electronic technicians.

Prof. Code indicated that possibly within the next year, NASA will precede the actual launching of the orbiting observatories with astronomical measurements taken in relatively short periods of observation from rockets or from an X-15, manned rocket plane. By the fall of 1961, Code said, the X-15 is expected to reach the heights necessary. Whatever the vehicles, rockets or planes, most of them will carry photo-electric equipment and the records they gather will be radioed to earth.

All of the institutions concerned with the orbiting observatories will ultimately share the use of the "flying" telescopes, Dr. Code pointed out, and astronomers not associated with the project will also have opportunities to make observations with the satellites.

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astronomy Dept.

MADISON NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

8/17/60 vh

RELEASE: Immediately

MADISON--Dr. Rudolph Minkowski, a leading astronomer in his field, will come to the University of Wisconsin this fall as a visiting professor for the academic year 1960-61.

The announcement was made by Prof. Arthur D. Code, chairman of UW astronomy studies.

The scientist is the leading authority on the optical identification of radio sources, Dr. Code said, and is well known for his spectrophotmetric research at Mount Wilson and Palomar Observatories on diffuse nebulae and extragalactic systems.

The Minkowski discovery of faint extragalactic nebulae with redshift velocity of the order of half the velocity of light is the most recent event to bring the scientist's name into the news.

Dr. Code said the visitor will teach a graduate course in astronomy during his stay at Wisconsin and will continue his research, using the new UW facilities at the Pine Bluff Observatory.

A naturalized American citizen, Dr. Minkowski was born in Strasbourg, France, in 1895. His Ph.D. was granted to him at the University of Breslau in 1921, and he joined the staff at the Institute of Physics in Hamburg.

Dr. Minkowski came to the U.S. in 1935 to join the staff of Mount Wilson Observatory. Between 1935 and 1948, his work was carried out at the California observatory and at the Carnegie Institution, Washington, D. C. From 1948 on, the scientist was also a member of the staffs at Palomar and at the California Institute of Technology. In 1944, he joined the Office of Scientific Research and Development and continued to serve there in a civilian capacity during the war period.

His retirement from the staffs of Mount Wilson and Palomar was announced this summer.

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Astronomy Dept.

WASHBURN OBSERVATORY

University of Wisconsin

PLANETARIUM SCHEDULE

Public demonstrations of astronomical phenomena as seen on the indoor planetarium "sky" are again being scheduled during the second semester of the academic year 1960-61. Each demonstration will show the constellations of the season and the changing aspects of the sky as seen from different parts of the earth. In addition, a selected topic will be singled out for more detailed attention.

The demonstrations during the second semester will be given on the following Friday evenings at 7:30 p.m.:

Feb. 3 ..... Winter Skies

Feb. 17 ..... The Conjunction of Jupiter and Saturn

Mar. 3 ..... The Geometry of Eclipses

Mar. 17 ..... Spring Skies

Mar. 24 ..... The Moon and Easter

Apr. 7 ..... Special demonstration for school children

Apr. 21 ..... Observing the Stars with Field Glasses

May 5 ..... Observing the Stars with Telescopes

May 19 ..... Satellites - Real and Artificial

PROMPTNESS IS REQUESTED. It is not practical to admit latecomers, since the effectiveness of the demonstration depends on maintaining a darkened room. The doors will therefore be closed at 7:30 p.m. There is seating capacity for 75 persons. Groups of 10 or more wishing to attend should give advance notice by telephoning the Observatory, ALpine 5-3311, Ext. 2551. Because of large enrollments this year, groups cannot be accommodated at any time other than during the regularly scheduled demonstrations.

The planetarium is located on the roof of the new wing of Sterling Hall. Take the elevator to the sixth floor and follow the stairs directly in front of the elevator to the roof.

VISITORS' NIGHTS, 15-INCH TELESCOPE

The 15-inch telescope on Observatory Hill will continue to be open to the public on the first and third Wednesday nights of each month, providing the sky is clear. The hours are from 7:30 to 9:30 p.m. Visitors will be able to see two or more objects through the telescope. Informal explanations are given regarding each object.

Astronomy Dept.

FEATURE STORY

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

1/30/57

RELEASE: Immediately

By VIVIEN HONE

MADISON--"The Iron Curtain isn't iron--and never has been among astronomers.

"All of us look at the same stars," explained Prof. A. E. Whitford, director of the University of Wisconsin Washburn Observatory, "and in spite of political and linguistic barriers, have always managed to communicate--know what others are doing in the field."

This diffusion of ideas as written or printed across the obstacles set up in totalitarian countries also exists for other sciences, Prof. Whitford said, but for astronomy, "one of the most international of the sciences," it proceeds out of a great tradition.

"In the days before the modern science was organized, they had astronomy societies, and communications between them by letter was the accepted way."

He cited as a modern example of astronomical Curtain piercing the case of Carl von Weizsaecker, German astronomer. During World War II, Weizsaecker formulated some important new ideas about the origin of the solar system--ideas, Whitford said, which ever since have been the keystone for attempts to explain the origin of the earth and other planets. The new theory soon spread from Nazi Germany to astronomers of the world--enemy and ally alike--through neutral countries like Switzerland.

Another dramatic instance of the way new information has streaked around the globe, even in wartime, is the case of the Dutch astronomer working in radio astronomy during the Nazi occupation of The Netherlands. The Hollander predicted

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that a spectrum line of hydrogen at a wave length of eight and one half inches would make great clouds of interstellar hydrogen observable. Though the prediction, now considered a fundamental in radio astronomy, was not verified until 1951, it became common knowledge among scientists soon after formulation.

Further, the Astronomical Newsletter, a Harvard University publication, continued during World War II to carry American information to a round-the-world readership through the help of neutral nations, Whitford said.

And today while nations are nominally at peace but remain separated by conflicting political ideologies, astronomers around the earth are maintaining their sky-searching scholarly exchange.

On the University of Wisconsin campus, foreign mail, including publications from Iron Curtain countries, arrives daily for Washburn Observatory staff men.

"The Russian stuff pours in by the ton," Prof. Whitford pointed out.

Much of the material is in the form of journals and other printed publications, but unlike the procedure for most American periodicals and learned journals, it is frequently registered by the senders and must thus be signed for upon delivery.

Roy Butler, Route 1, McFarland, a mounted U. S. parcel post carrier who for four years now has been toting the extra-heavy mail sacks to Observatory Hill, said it is common practice in many foreign countries to send printed materials by registry.

"I spent three years as Army mail clerk overseas, "he explained, and offered as his opinion that the mail systems of Iron Curtain countries were inadequate, had no insurance means, but did have registration and this was widely used for all manner of mail.

"By registering, they know a piece of mail will arrive safely," he said. "Whatever it is, it's worth a million dollars to us, gets the same service as a diamond ring or something of great sentimental value...Say, I wonder if the professors at the observatory can read all that Russian stuff."

As a matter of fact, none of the Washburn staff is trained in Russian, but the men are able to transliterate titles sufficiently to know what the articles are about. If they want to study the material further, they can enlist the help of the University's Slavic languages department. Or often the journal or research paper in question presents a brief summary in a second language which is within the knowledge of the Wisconsin scientists.

It is a time-honored practice among scholars to publish bi-lingually: in their native tongue for compatriots, and in a widely used second language for international circulation. One significant thing Prof. Whitford has noticed recently about bi-lingual communications in the foreign mail:

"All the Iron Curtain countries which formerly used French or German or English for their second language now use Russian."

This widening of Russian influence is in keeping with the report which the director made a year ago last fall after returning from Ireland and the meeting of the International Astronomical Union there.

"They (the Russians) were interested in everything. The percentage of national effort that goes into astronomy in Russia is certainly higher than in the U. S...Some of their work has been criticized as being pedestrian--not terribly imaginative, but at the top they have some of the best."

Poland, Czechoslovakia, Hungary and China also contribute their share of the mail arriving at the top of Observatory Hill.

"We don't get much from India or Egypt," Prof. Whitford recalled, but said that Rarotonga in the Cook Islands near New Zealand sends material with regularity. From China comes the incidental intelligence that a new observatory built there is called the Purple Mountain Observatory.

Wisconsin astronomers, who hope to report a completed new research observatory of their own by 1958, say that in their science these days everyone is interested in the investigations of the Milky Way--that giant pinwheel system of stars of which the earth is a part. Everyone is eager to know how the galaxy

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is put together and how it compares with other great star systems in the universe.

Equally absorbing is the subject of radio waves from outer space. Since 1932, the year of discovery by a University of Wisconsin graduate and atmospherics expert, astronomers have known that radiation emanating from the sun and stars and finally reaching our earth includes not only light but also radio waves. All over the world this interest is resulting in the construction of large electronic receivers which are catching the waves and new knowledge of them.

Reports from an observatory in Kootwijk, Holland, are always avidly read by Washburn men, for at this Dutch center, the two great fields of today's investigations have been combined--study of the Milky Way through radio astronomy.

Wisconsin's own searchings of the Milky Way by the more traditional methods of optical astronomy (photographing the galaxy) took a research team to South Africa in 1953 and resulted in new knowledge about the arms and hub of the Milky Way. Study of the Milky Way continues at Washburn--and this is the sort of science learning which Wisconsin in her turn shares with the world. Or it may be a new fact garnered from examination of eclipsing binaries--twin stars, Prof. C. M. Huffer's continuing study; or from the photo-electric measurements of starlight, Prof. Whitford's own field for research.

Personal correspondence between Prof. Huffer and Zdenek Kopal, who heads the department of astronomy at the University of Manchester, England, is frequent. Kopal and the Wisconsin astronomer have collaborated on eclipsing binaries. And in a two-way flow of thinking and probing, letters go out from Wisconsin's Milky Way researcher, Theodore Houck, to South Africa and Australia. They find their complement in correspondence from Her Majesty's Astronomer Dr. R. H. Stoy, Royal Observatory, Cape of Good Hope; and from Drs. A.D. Thackeray and M. S. Feast, Radcliffe Observatory, Pretoria.

Recorded by pen or in print, the news astronomical wings in and out of Washburn. This may mean not-so-winged feet for the postman, but it spells 20th-century health for that astronomers' tradition: freedom to read and write, to share new discovered truths as widely as the stars are flung.

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U. W. NEWS

Astronomy Dept'g

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

8/23/57 vh

RELEASE: Immediately

MADISON, Wis.--Amateur astonomers in the capital city are having a field-day? with Mrkos 1957d, the newly discovered comet, University of Wisconsin professionals say.

For the past 12 days or more they've been gathering in backyards or at vantage points like the University of Wisconsin's Observatory Hill and searching the northwest sky, have found the light with the bushy tail.

Those fortunate enough to own telescopes have had an enlarged view of the comet, first discovered Aug. 2 in Czechoslovakia, but telescopes haven't been necessary--it can be seen with the naked eye.

Comet 1957d will still be around for awhile, indicated Prof. A. E. Whitford, director of the University's Washburn Observatory. "Because it is mov ing across our line of sight rather than away from us, it is fading slowly."

"People with sharp eyes--anywhere in north temperate latitudes--can probably see it for another two weeks," he said.

Look toward the northwest as soon as the sky is well darkened, he directed. At approximately 9 p.m. now the comet will lie directly below the end of the handle of the Big Dipper about two-thirds of the way to the horizon. The tail, projecting straight upward, is measured as two or three degrees in length, approximately half the distance between the pointer stars of the Dipper.

1957d will swing downward and toward the north until it sets about 11 p.m., Prof. Whitford said. Each night until it passes from sight it will appear at a point slightly west of the position occupied at the same time the night before.

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Comets generally are enormous bodies composed of solids and gases--and when one nears the sun and is heated a tail of volatilized material develops. The tail always points away from the sun because of radiation pressure.

It is too soon for astronomers to calculate the exact shape of the comet's orbit. With more observations it may be possible to determine when the comet will return to view. A period of a thousand years is enitrely possible. However some facts are established:

The plane of the comet's orbit around the sun is almost at right angles to our own. The new discovery is only a little less remote than the sun--is now about 80 million miles away. It was at it brightest when nearest the sun--a position called perihelion, reached early this month. It is fading as it moves away from the sun and away from us.

At any rate, "there's no future in being a comet," Prof. Whitford suggested. Each time a comet nears the sun it loses some of its mass because of solar influences, he explained. "And it may get sucked in by Jupiter, or pitched out of the solar system completely to wander around in interstellar space."

Comet Mrkos 1957d is the second new naked-eye comet to be seen in the northern U.S. area this season. Comet Arend-Roland, discovered in November, 1956, was viewed by Madison astronomers last April. At their most brilliant, both are rated first magnitude brightness.

"Two unpredicted comets this bright in one year are unusual," Prof. Whitford pointed out. "There are six to ten each year, but most are too faint to be seen except with a very large telescope."

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FEATURE STORY

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

RELEASE:

4/19/57

Sunday, April 21

Astronomy Dept.

By VIVIEN HONE

MADISON -- Grandpa viewed Halley's Comet, but 1957 citizens of Wisconsin will soon see a newly discovered comet, University of Wisconsin astronomers said today.

Like Halley's, it will carry a tail.

Comet Arend-Roland, or Comet 1956-h, as it is called, was first sighted Nov. 8, 1956, in photographs taken at the Royal Observatory, Uccle, Belgium. Astronomers in the northern hemisphere have had to wait for a first good peak at the newcomer until the latter part of April--until 1956-h had approached the sun and earth in a path between the two and passed beyond them.

UW Astronomy Prof. C. M. Huffer said today that, weather conditions being favorable, the comet will be at its brightest and best point for Wisconsin viewers on Tuesday (April 23).

"Look for it first with a pair of field glasses shortly after sunset," he directed. "It will appear near the horizon, a little above and to the right of where the sun went down--19 degrees north of west."

From night to night it will move northward until May 1 when it will set about three hours after the sun, the scientist pointed out. During the late April days, while nearest to the earth, it will be some 52 million miles distant from us.

Though predictions are for a magnitude zero brightness--that of bright stars-- Prof. Huffer has taken the precaution of suggesting the use of field glasses first, then a switchover to naked eye-viewing if the object is found and is in easy evidence.

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The predictions of a comet's magnitude or brightness are notoriously uncertain in fulfillment, he stressed, and cited a recent statement of Prof. George van Biesbroeck of Yerkes Observatory, Williams Bay, Wis., that Comet Arend-Roland is about five times fainter than original expectations and therefore may not be visible to the naked eye.

The degree of brightness is not the only thing which scientists have still to learn about the newly-apparent Comet 1956-h. They also don't know how large the comet is, whether it will re-occur; nor can they be certain of the shape of the orbit it travels. However, about three-quarters of all known comets have parabolic orbits and astronomers are calculating Comet Arend-Roland's movements on the assumption that the path of 1956-h is this shape. If this is the case-- and providing its motion is not altered--1956-h will travel beyond the vast limits of our solar system, never to appear again.

At any rate, "it's a good bet it will not be seen again during the lifetime of anybody now living," Prof. Huffer said.

Whatever its shape, this comet's orbit is known to be on a plane inclined at 60 degrees to the orbit of the earth. With the earth traveling counter clockwise around the sun, the comet traveling clockwise, the path of the comet crossed through the plane of the earth and sun on April 15. Comet Arend-Roland reached a point nearest to the sun--a distance of 30 million miles still lying between--on April 8. It crossed the sun's path at a point five degrees west of the sun and was not visible because it sank below the horizon before the sun had set.

But by next Tuesday, the lesser luminary, approximately 25 billion times fainter than the sun, will have a more favorable stage. The sun will already have set when it appears, and though Comet 1956-h is now and will be traveling away from the sun and earth, it will still be near enough for maximum viewing advantage.

"Its brightness depends partly on distance from the sun," Prof. Huffer stated. "While it is near the sun there is a heating and therefore a brightening effect."

But brightness also depends on relation to the earth--the nearer the object the more easily seen. Comet Arend-Roland, when viewed in Wisconsin, will still be near enough to the sun to have brightened thereby, but how much is anybody's guess. And because brilliance is a question mark, it is also impossible to say how long the comet will continue in sight.

As the nights roll on, the ever-more-distant object will grow fainter. It may be visible to the naked eye for as much as a week beyond April 23, but viewed through telescopes, may be around for months longer. Predictions for its disappearance range from June 1 to several weeks thereafter.

Comets have enormous dimensions, Prof. Huffer reported, and said this one may be as much as 8,000 miles wide. Loosely composed of solids and gases, they each possess a nebulous mass surrounding a bright nucleus, the whole called the head--and also a tail when near the sun. The tail of Comet 1956-h, as all others, will be pointing away from the sun and will be composed of material from the head volatilized by the sun's radiation and driven away from the sun by radiation pressure.

"All of the comets which have been observed--some 1,000 have been recorded--have passed comparatively near the sun," Prof. Huffer pointed out and said there are comets which have remained visible for years, others which vanish in weeks or days, some appearing once, then vanishing forever, and some which are periodic.

Halley's Comet, last seen as a 1910 wonder, belongs to the periodic variety. Traveling a huge elliptical orbit, it is expected to appear again in 1984 and in all likelihood will fulfill expectations.

"Except for the 163 B. C. appearance, records have been found for every appearance of Halley's Comet since 240 B. C.," Prof. Huffer concluded.

However, that lesser solar-system body which Messrs. S. Arend and M. Roland first sighted last November is too new to history, has no such chronicle of encores. Stargazers had better take a long look next week while Comet 1956-h is in greatest evidence. As Prof. Huffer has said: "It's a good bet it will not be seen again during the lifetime of anybody now living."

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Astronomy Dept

CUT LINES

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

4/30/57

RELEASE:
Immediately

MADISON-- With tail flaming, Comet Arend-Roland made this brilliant display Monday night for University of Wisconsin astronomers--and other Madison watchers.

The recently discovered luminary was first sighted in November in Belgium. It is so new that astronomers don't know whether it will return periodically or make this single appearance.

When the skies have not been overcast, good viewing has been possible in the Madison area since Tuesday, April 23. Look for it first about 9 p.m. in the direction north northwest and about 20 degrees above the horizon, Washburn Observatory staff members said. "It will probably be around for a few more nights--and will be visible all night."

The photograph of Comet Arend-Roland was taken at 9:30 C.D.T. by John Bahng, UW teaching assistant in astronomy. He used a Leica camera strapped to the eye-end of Washburn's 15-inch scope and made a 15-minute exposure at F 3.5.

Note stars visible through the tail. In silhouette are the telescope tube and sides of the Washburn dome opening.

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WIRE NEWS FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

4/21/59 eda

RELEASE: Immediately

MADISON--Top U.S. Army research and development officers arrived here Tuesday night for ceremonies Wednesday dedicating the new quarters of the Army Mathematics Research Center in the Sterling Hall addition on the University of Wisconsin campus.

Among the distinguished guests present are the Army's director of research and development, Dr. William H. Martin, and Lt. Gen. Arthur G. Trudeau, chief of research and development.

The group also includes Col. George F. Leist, chairman of the Army Mathematics Steering Committee and 11 committee members.

Gen. Trudeau will give the main address at the dedication which begins at 11 a.m. on the third floor of the Sterling addition.

University President Conrad A. Elvehjem will give the second address.

The new quarters, a $1,200,000 gift to the University from the Wisconsin Alumni Research Foundation, house part of the physics department, and the Numerical Analysis Laboratory, in addition to the Mathematics Research Center. The astronomy department will move into the sixth floor of the addition in June.

Prof. Rudolph E. Langer, director of the Mathematics Research Center, will preside at the dedication ceremony.

The University Men's Glee Club, led by Prof. Samuel M. Jones, will provide music.

The building will be presented officially to the University by Thomas Brittingham, president of the Wisconsin Alumni Research Foundation. Wilbur Renk, president of the Board of Regents, will make the acceptance.

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Offices of the Army Mathematics Center are on floors two, three, and four of the new addition. Facilities include office space for a staff of 40 mathematicians, conference room, discussion room, library, lounge, kitchen, and a 100-foot long room where an electronic computer system will be installed within the next year.

Furnishings for the center, which was established in temporary quarters on the campus two years ago, have been provided by the Army.

The center is maintained by the Army but operates as a unit of the University.

Its goals, according to Director Langer, are:

(1) "To testify to the Army's concern with, and stake in, mathematics;

(2) "To foster among research mathematicians a community of interests with the Army; and

(3) "To support basic research in the field of mathematics upon which the maintenance of the country's primacy in science and technology will depend."

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U. W. NEWS FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

RELEASE:

4/16/59 jl Immediately

MADISON, Wis.--Dedication ceremonies for the U.S. Army Mathematics Research Center and for the center's new quarters in an addition to Sterling Hall on the University of Wisconsin campus are to be held Wednesday, April 22.

The Sterling Hall addition constructed with $1,200,000 provided by the Wisconsin Alumni Research Foundation, will house in addition to the Mathematics Research Center, the University's Numerical Analysis Laboratory, astronomy department, and part of the physics department.

At the ceremonies, to begin at 11 a.m. Wednesday, the building will be presented officially to the University by Tom Brittingham, president of the Wisconsin Alumni Research Foundation. The official acceptance of the new structure will be made by Wilbur Renk, president of the UW Board of Regents.

Two addresses are scheduled for the dedication ceremony, the first by University Pres. Conrad A. Elvehjem and the second by Lieut. Gen. Arthur G. Trudeau, chief of research and development, U.S. Army.

Gen. Trudeau holds an advanced degree in engineering from the University of California and honorary doctorates from Seattle University and Manhattan College. During the Korean War he was a division commander and following the armistice was ordered to Washington as assistant chief of staff for intelligence. Two years later he returned to Japan as deputy chief of staff for the Far East and United Nations Command, and he assumed his present position as chief of Army research about a year ago.

The University Men's Glee Club, led by Prof. Samuel M. Jones, director, will provide music at the dedication.

Presiding at the dedication ceremony will be Prof. Rudolph E. Langer,

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director of the Mathematics Research Center and professor of mathematics at the University of Wisconsin.

Among the distinguished guests at the ceremony will be Dr. William H. Martin, director of research and development, U.S. Army.

Other guests will include:

Maj. Gen. B. P. Johnson, Commanding General, XIV United States Army Corps; Maj. Gen. Ralph J. Olson, Adjutant General, Wisconsin; Brig. Gen. William J. Ely, Director of Research, Office of Research and Development, United States Army;Brig. Gen. Gilbert W. Embury, Commanding General, 84th Infantry Division, United States Army; Brig. Gen. Waldemar F. Breidster, Commanding General, 32nd Division, Wisconsin National Guard; Col. George F. Leist, Commanding Officer, Office of Ordnance Research, United States Army, Chairman, Army Mathematics Steering Committee;

Col. C. L. P. Medinnis, Commanding Officer, Chicago Ordnance District, United States Army; Dr. Ivan R. Hershner, Jr., Chief, Physical and Engineering Service Branch, Research Analysis Division, United States Army Research Office; Dr. Richard A. Weiss,Scientific Director, United States Army Research Office; Dr. H. W. Bode, Bell Telephone Laboratories: Army Scientific Advisory Panel; Dr. W. J. Nungester, University of Michigan Medical School, Army Scientific Advisory Panel; William J. Negley, Chicago Ordnance District; and Joseph E. Walker, Chicago Ordnance District.

The offices of the Army Mathematics Center are on floors two, three, and four of the new addition to Sterling Hall. Facilities include office space for a staff of 40 mathematicians, conference room, discussion room, library, lounge, kitchen, and a 100-foot long room where an electronic computer system will be installed within the next year.

Furnishings for the center, established in temporary quarters on the University campus two years ago, have been provided by the Army.

In explaining the purposes of the center, Prof. Langer points out that in its day-to-day operations the Army leans upon mathematics as a necessary tool

for the design of weapons and structures, for the compilation of maps and tables, for the organization and analysis of systems of communication, transportation, and logistics.

"Naturally, therefore, the continual perfection of mathematical methods," he adds, "and the rounding out of applicable theories may open avenues to improvements of efficiency, to better procedures, designs, and organizations, and to more dependable bases for predictions about mechanical systems."

###

WIRE NEWS FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

4/11/59 jl

RELEASE: Saturday, April 11

MILWAUKEE--Eight contracts for research and educational services to be provided by the University of Wisconsin to agencies of the federal government were approved by the UW regents Saturday.

The contracting agencies and funds involved in the contracts are as follows:

Wright Air Development Center, $35,333.25 for research in the department of chemistry; Atomic Energy Commission, $10,068 for research in the department of zoology, and $8,810 for research in the department of bacteriology; Office of Naval Research, $7,912 for research andthe Department of zoology and $7,344 for research in the department of astronomy; U.S. department of Health, Education, and Welfare, Office of Vocational Rehabilitation, $2,000 additional for a training course conducted by the speech department.

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MADISON NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

4/10/59 vh

RELEASE: Immediately

MADISON--Dr. George H. Herbig, astronomer of the Lick Observatory, will present a public lecture Wednesday, April 15, at the University of Wisconsin.

His talk on "The Origin of Stars" will begin at 8 p.m. in Room 165, Bascom Hall.

Herbig carries out his research at the Mount Hamilton campus of the University of California in an investigation of the spectra of stars. He has been working on a type of star known as T-Tauri which is believed to be still in process of formation by contraction of gas clouds.

In 1955, the astronomer won the Helen B. Sawyer Award of the American Astronomical Society for outstanding work done by a young astronomer (under 35 years of age). He is author of an International Astronomical Union Symposium volume on non-stable stars and has been the invited participant in several international astronomical meetings: at Dublin, Moscow, and the Vatican.

He will lecture under auspices of the UW department of astronomy and the Committee on All-University Lectures.

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U. W. NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

Bldg folder

RELEASE:

3/7/59 vh

March 7, 1959

MADISON--The student observatory which has aided University of Wisconsin astronomy studies for 79 years may become the property of Madison's young stargazers if a Board of Regents request is granted.

In a resolution Saturday, the Regents asked the State Legislature to empower them to give the 45-foot, domed, wooden building, situated just east of Washburn Observatory, to the Madison Astronomical Society. The gift would benefit the junior members, known as the Madison Junior Astronomical Society.

Both amateur groups have enjoyed close ties with the University's astronomy department and Washburn Observatory. The department has encouraged and actively helped their interests. Prof. C. M. Huffer has been the long-time secretary of the senior society.

The Regents pointed out that the building must be vacated soon when the astronomy department moves out of Washburn and into new quarters on the sixth floor and roof of the new Sterling Hall wing. A new student observatory and also the Planetarium, removed from Journalism Hall, will go into operation on the Sterling Hall roof, probably within the next few weeks.

If the request is granted, the old student observatory will be removed at the society's expense to a site at the grounds of the Bjorksten Research Laboratories on the Fish Hatchery Road. The building will be used for a clubhouse, workshop and observatory. The young astronomers, all under 18 years of age, already have a small building there with both a four-and one-half inch and a 10-inch 'scope.

"We would be pleased to have the building given to the society," Prof. Huffer, speaking for the University, said.

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He indicated that the helping hand which his department has tried to give to amateur groups is of general benefit to the science of astronomy, and in the case of the juniors, "we believe future generations of astronomers and students of astronomy will come from such organizations."

Washburn Observatory was constructed in 1878, and the student observatory a year or two later. Prof. James Craig Watson, first director of Washburn, undertook its construction in 1880 at his own expense so that students might have an observatory for their own use and the major instrument at Washburn might be free for more advanced purposes, especially research.

He died before it was completed and ex-Gov. Cadwallader C. Washburn, who had donated funds for the main observatory, saw to it that the student building was completed and equipped with a transit and a six-inch refracting instrument.

Later the six-incher was replaced with a 12-inch' 'scope. Both of these instruments will be installed at Sterling.

The 79-year-old building was modernized somewhat in recent years. As it stands today it includes a transit room, an entrance way, and the metal-covered dome.

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WIRE NEWS FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

RELEASE:

9/7/57 hfr

Immediately

MADISON--Award of contracts for a $1,200,000 addition to Sterling Hall on the Madison campus was confirmed by University of Wisconsin regents Saturday.

The six-floor addition to be attached to the east side of Sterling Hall, will house work of the physics department in the basement and first floor; the Army Mathematics Center on the second, third and fourth floors; the Numerical Analysis Laboratory on the fifth floor; and the astronomy department on the sixth floor and roof.

The Wisconsin Alumni Research Foundation has provided funds for the addition which will be devoted mainly to research. The physics department will locate a nuclear reactor in the basement of the structure. Two domes for astronomical telescopes and a planetarium will be constructed on the roof for use by University astronomers.

Low bidders on the addition included:

J. P. Cullen and Son, Janesville, $658,741 for general construction;

Hyland-Hall and Co., Madison, $113,446 for heating and ventilating;

Welch Plumbing Co., Madison, $67,788 for plumbing and fire protection;

R. J. Nickles Electric Co., Madison, $110,824 for electrical work;

Kiekhefer Elevator Co., Milwaukee, $29,719 for elevators;

Milwaukee Equipment Co., Milwaukee, $11,646 for laboratory furniture and equipment, and $5,800 for library shelving.

In other actions on University buildings and grounds, the regents Saturday:

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1. Transferred the loan indebtedness on the University of Wisconsin-Milwaukee Student Union from the Wisconsin State Colleges/Building Corp. to the Wisconsin University Building Corp.;

2. Authorized their Executive Committee to award contracts for the Camp Randall Stadium addition; for repair of roofs of the Main Building and Gymnasium at the University of Wisconsin-Milwaukee; and for curbs, gutters and grading at the University Hill Farms;

3. Allotted $5,500 to construct a beef cattle research barn at the Hancock Branch Experiment Station;

4. Approved transfer of some four acres of land to the Dane County Highway Department for $9,175.60 to permit widening of County Highways M and S;

5. Established a $10,000 budget for 1957-58 for operations of the University Hill Farms development office and appointed Dale Nordeen supervisor of the office on a part-time basis to take over work previously done by Prof. R. U. Ratcliff who has requested return to full-time teaching in the Commerce School.

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U. W. NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

RELEASE: Immediately

11/12/58 vh

Dept. of Astronomy

MADISON, Wis.--University of Wisconsin expectations of carrying on important research in astronomy with the largest solar telescope ever conceived progressed to certainty with recent announcement by the National Science Foundation of a $4-million allocation to the Association of Universities for Research in Astronomy (AURA).

The funds will be used to construct a 60-inch reflecting solar telescope at the national observatory soon to be built on Kitt Peak in the Quinlan Mountains, Arizona, and to be shared by all astronomers in the U.S.

AURA was incorporated in October, 1957, and includes as members the following universities: Wisconsin, California, Chicago, Harvard, Indiana, Michigan, Ohio State, and Yale. All have strong programs of research and graduate instruction in astronomy. To date, $7,545,000 has been allocated by NSF for the new facility to be built on Papago Indian lands in southwestern Arizona.

The $4-million dollar solar telescope will be several times larger than any solar instrument now in existence. An 80-inch flat mirror will catch the sunlight at the top of a solar tower, and will reflect it to a 60-inch mirror. The 60-inch measurement refer to the diameter of the telescope's image-forming mirror. The 'scope's focal length, approximately 300 feet, will be twice that of the famous 150-foot tower telescope on Mount Wilson, California. The image of the sun at focal plane, will be approximately 32 inches.

Other stellar instruments at the observatory will include a 36-inch 'scope of the reflector type and an 84-inch ultra-modern, relatively high speed''scope with auxiliary instrumentation.

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The Corning Glass Works will deliver a pyrex blank, the base for what will ultimately be giant image-forming mirror. A contract in the amount of $115,000 calls for delivery sometime during the summer of 1959.

Construction of the observatory will begin as soon as all legalities for leasing of the lands from the Papago Indians have been cleared. The lease permits NSF the use of 2,400 acres on and surrounding Kitt Peak for "as long as the lands is used for astronomical study and research and related scientific purposes."

It is expected that as the work of AURA develops, other universities and individuals will be added to the organization's membership.

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WIRE NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

10/18/58 jfn

RELEASE: Oct. 18, 1958

Dept. E

MADISON--Two Atomic Energy Commission research contracts totaling $18,598 were among contracts and leases with the U.S. government for research, educational programs, and services totaling $90,747 approved Saturday by University of Wisconsin regents.

University divisions involved include departments of psychology, chemistry, mathematics, medicine, geography, astronomy, and meteorology, School of Pharmacy, College of Engineering, and Extension Division.

In addition to the Atomic Energy Commission, government agencies participating include the Wright Air Development Center, Army Chemical Center, Chicago Ordnance District, Naval Bureau of Ordnance, Office of Naval Research, Air Force Institute of Technology, Fifth Army, Armed Forces Institute, Department of Agriculture--Forest Service, and Department of Commerce--Weather Bureau.

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MADISON NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

RELEASE: Immediately

10/13/58 vh

A Visitor's Night scheduled for 7-10 p.m. Wednesday (Oct. 15) will give everyone in the Madison area an opportunity to see the University of Wisconsin's new Pine Bluff Observatory and its "big eye."

Arthur D. Code, director of UW astronomy studies, said, "The astronomy department extends a cordial invitation to the public to visit the new country station."

Visitors' Nights at the UW's Washburn Observatory have been customary for years--every first and third Wednesday of the month when skies are clear. However, since the Pine Bluff Observatory is normally used exclusively for research purposes, no such regular guest nights are planned.

The opening of Wisconsin's country observatory, which took place with a formal dedication last June, heralded new opportunities with new tools for astronomy studies at the UW. The red brick, domed building, the hilltop it crowns, and a new 36-inch reflecting scope, are a $200,000 gift from the Wisconsin Alumni Research Foundation.

The big telescope will be trained on several sky objects on Visitors' Night, providing the night is clear, Prof. Code said, but cloudy or bright, the observatory open house will be held on Wednesday.

The 13-mile route to the station is as follows: drive west on Mineral Point Road to the village of Pine Bluff and junction with County Trunk P; turn right on P, traveling approximately one half mile to intersection with country road (which will be marked for observatory route); turn left on this road and follow winding route to a bend and steep hill. The observatory is left of the road at the hilltop.

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FEATURE STORY

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

RELEASE:

9/29/58 vh

Immediately

Astronomy Dept.

By VIVIEN HONE

MADISON, Wis.--An expanded program of study is off to a flying start this semester with the highest enrollment in astronomy which the University of Wisconsin has ever known.

The number of students in one beginner's course alone--Astronomy Survey 17--stood at 120 according to a count made last week, a 28 per cent increase over the highest enrollment ever before reached.

In one course of graduate studies in astronomy involving a smaller group, the enrollment increase was even more impressive--close to 400 per cent.

Prof. Arthur D. Code, new chairman of the department of astronomy, said the heightened interest is "a reflection of our entry into the space age, but it is due more to the improved facilities and support which Wisconsin now provides."

This past summer the University dedicated a new $200,000 research observatory at Pine Bluff. The country station with its 36-inch reflecting telescope, located 13 miles west of the Madison campus, is the greatest single boost for Wisconsin astronomy since old Washburn Observatory on Observatory Hill, equipped with a 15 and one half inch lens, opened its dome for observations in 1878.

Another large step forward was Wisconsin's entrance, approximately a year ago, into the cooperative organization known as AURA. Member institutions in the Association of Universities for Research Astronomy will share facilities of a $3-million dollar national observatory to be constructed in the ideal climate for observation at Kitt Peak near Tucson, Ariz.

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add one--Astronomy

Finally, before the academic year is out, the UW department of astronomy will move out of historic old Washburn into larger and more modern quarters on the top floor of Sterling Hall. Student telescopes and the Planetarium will take over the rooftop on Sterling's new wing.

The director of the new program, Prof. Code, resigned from the California Institute of Technology staff to head the Wisconsin astronomy department. He is no stranger to the Madison campus. Known as "one of the most versatile young scholars in astronomy," the University of Chicago-trained scientist taught classes here from 1952-56 and carried out important research on the Milky Way both here and in Africa. At the present time he is conducting research in the absolute energy distribution of stars.

With the photo-electric equipment of the new Pine Bluff station, Prof. Code is making comparisons of the energy radiated by some of the brightest or naked eye stars with energy radiated by standard light sources mounted on towers adjacent to the observatory. He is also working on the energy distribution of extra-galactic nebulae--star systems outside our own system, the Milky Way, to learn the structure, materials and evolution of the stars within them..

Also recruited from the staff of Cal Tech is Prof. Donald E. Osterbrock. His special area of investigation is in the properties of diffuse gaseous nebulae.

Code and Osterbrock join Prof. C. M. Huffer and Instructor Theodore Houck to complete the major astronomy staff. Dr. Huffer has long been known for his work in eclipsing binary or twin stars and for pioneer efforts in developing photo-electric methods for astronomy studies. Amateur astronomers in the Madison area hold him in affection for his continuing help and guidance.

The astronomy staff also includes Project Associate Robert Bless, Gainesville, Fla.; and four young men holding fellowships and teaching and research assistantships: Clarence Daub, Ingleside, Neb.; Donald Taylor, Whittier, Calif.; John Neff (2443 N. 69th St.) Wauwatosa; and Ralph Stockhausen (9337 W. Malvina), Milwaukee.

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MADISON NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

8/28/58 vh

RELEASE: Immediately

Dyke Astronomy

MADISON, Wis.--The University of Wisconsin's new Pine Bluff Observatory is the subject of a feature article in the September issue of Sky and Telescope.

The monthly, leading magazine for amateur astronomers, is published at Harvard College Observatory, Cambridge, Mass.

The Wisconsin Alumni Research Foundation (WARF) provided the $200,000 for the new station, its 53-acre site 15 miles west of Madison, and its key instrument--a 36-inch reflecting telescope. When the observatory was dedicated in June, the UW was lifted to a point equal with any other Midwest university in the matter of modern astronomical research tools.

Sky and Telescope publishes five photographs of the Wisconsin facility and tells how it is uniquely equipped for photo-electric and photo-spectrographic studies of difuse nebulae and extragalactic systems.

The feature also includes historical details on Wisconsin's still functioning first observatory, Washburn, on the Madison campus.

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U. W. NEWS FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

RELEASE:

6/28/58 vh Immediately

MADISON, Wis.--State and University of Wisconsin officials in the company of some 150 to 200 professional astronomers will formally launch operations at the University's new research observatory at Pine Bluff on Monday (June 30) in a twilight dedication.

The formal opening of the $200,000 country station with its 36-inch modern telescope, some 15 miles west of Madison, marks new opportunities for astronomy at Wisconsin and points to a record of Wisconsin work in the field now 80 years long.

Planned to coincide with the national meeting on the Badger campus of the American Astronomical Society, June 29-July 2, the event will give not only the public but many of the nation's top minds in [astronomy] an opportunity to inspect the station and 'scope. The latter is uniquely designed and equipped to fit the needs of Wisconsin research.

Gift funds from the Wisconsin Alumni Research Foundation supported the construction of the station and auxiliary buildings, purchase of the reflecting telescope, and acquisition of a 53-acre hilltop site near County Trunk P, one and one half miles northwest of the village of Pine Bluff. Ground was broken in April 1957, the installation was largely ready to function by early spring of this year, and finishing touches have been in progress to the present.

The dedication will open at 8 p.m. with remarks by Prof. A. E. Whitford, chairman of the UW department of astronomy and director of Washburn Observatory. UW President-Elect Conrad A. Elvehjem will speak for the University, Walter A.

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Add one--Dedication to Take Place Monday--Pine Bluff Observatory

Frautschi for the Wisconsin Alumni Research Foundation, and George E. Watson, state superintendent of public instruction, for the UW Board of Regents.

Joel Stebbins, UW emeritus professor of astronomy, will deliver the dedicatory address: "Washburn Observatory, 1878-1958." The former Wisconsin faculty member pioneered studies on the Badger campus in the photo-electric measurement of starlight. Today's department carries on in this tradition and is well-known for its work in the field.

Final event of the program will be the presentation of a key for the country observatory to Prof. Arthur D. Code who will succeed Prof. Whitford to the directorship of Wisconsin astronomy studies on July 1. Prof. Whitford leaves the UW campus to assume directorship of Lick Observatory, California, one of the nation's largest astronomical facilities, after 32 years at Wisconsin.

The new station at Pine Bluff is the first major improvement for advanced astronomical studies at Wisconsin since studies began in 1878. In that year Washburn Observatory, the gift of a former early governor, Cadwallader C. Washburn, was completed. It housed another gift from Washburn, a 15-and one-half inch refracting telescope, then considered one of the most up-to-date instruments of its kind and in size exceeding Harvard University's 'scope by one half inch. Ever since then, this workhorse of the skies has been in operation at Wisconsin but today it is no longer the envy of other schools.

WARF's gift extends Washburn activities into the country where city lights and haze are no barrier to observation, and begins a significant new era of astronomy studies for Wisconsin.

The modern equipment places the Badger school among the better equipped Midwestern institutions offering graduate astronomy studies.

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WIRE NEWS FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

3/14/58 vh RELEASE: Immediately

MADISON, Wis.--Kitt Peak, a 6,875-foot elevation near Tucson, Arizona will be the site of the new national observatory in which the University of Wisconsin has a stake, the UW astronomy department confirmed today.

Announcement of the final site selection came from the National Science Foundation which made a $3-million dollar grant last December for construction of the observatory, purchase of large telescopes and a site, and for operation of the new facility.

The grant was made to the Association of Universities for Research in Astronomy (AURA). Wisconsin is a charter member of AURA, a non-profit corporation of learned institutions organized to forward astronomy studies through the sharing of funds, personnel, and up-to-date facilities.

Other members include Indiana University, Ohio State, Harvard, Yale, and the Universities of Chicago, Michigan, and California. All have had experience in operating observatories and have strong programs in research and graduate instruction in astronomy. New members are expected to join the organizations as the project develops.

Choice of the site for the national observatory some 40 miles southwest of Tucson in the Quinlan Mountains is the result of a three-year survey which considered some 150 possible locations in the southwest. Prof. A.E. Whitford, director of Wisconsin's Washburn Observatory, has been an advisory panel member of AURA and has been active in site survey planning.

Earlier in the search he explained: "If this observatory can be placed in the finest site remaining in the U.S., it will offer to astronomers anywhere

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in the country the opportunities thus far existing only in the far west."

He said today that the national facility is now assured of construction on a 70-acre flatland at the summit of Kitt Peak.

The Papago Indians on whose reservation the mountain is located have given their consent to use of the site for scientific purposes. The peak is sacred to the Papagos.

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U. W. NEWS

[Astronomy Dept. ajs]

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

RELEASE:

2/26/58 vh Immediately

By Vivien Hone

MADISON, Wis.--The University of Wisconsin's new country observatory, high on a hilltop near Pine Bluff, was being readied to explore a space age as well as familiar stars as technicians fitted a new telescope into place in its dome today.

Placement of the 36-inch reflecting instrument, which arrived by truck from the West Coast Tuesday, is the last step in making the research observatory, 15 miles west of Madison, ready for business.

Ground for the $200,000 modern astronomical facility was broken last April. With completion of the circular red brick building with its steel dome and new equipment, the University has gained the largest single boost for astronomy research since Washburn Observatory, now 80 years old, was given to Wisconsin by an early governor, Cadwallader C. Washburn. The new observatory was made available largely through a $200,000 gift from the Wisconsin Alumni Research Foundation.

The money provided also for purchase of the 53-acre site, free of city smoke and lights, and the 36-inch 'scope. The instrument, also under construction for the past year, was made by Boller and Chivens of South Pasadena, Calif., and will provide five times the light-gathering power of the old Washburn equipment.

The new facilities lift Wisconsin to a point equal with other Midwestern universities possessing modern research tools for astronomy study, A. E. Whitford, chairman of the UW astronomy department, has pointed out.

-more-

Add one--New Research Station in Operation: Astronomy

Early in the planning for the new station, the Wisconsin staff faced a choice of telescopes: it could have a wide-angle instrument which would cover a vast portion of the sky field, or it could order one limited to a narrow field but capable of bringing into view some of the most distant stars and portions of very far away galaxies. The department chose the latter. By a set of mirrors--most modern 'scopes are reflecting instruments--the Pine Bluff 36-inch model can gather in light rays and fold them back on themselves, producing a view equivalent to that of a 40-foot-long 'scope.

The crew which flew to Madison from Pasadena to assemble the 'scope parts and adjust them on their pilon base is the second to come to Wisconsin in the course of the station's construction. Last November a group of workers from Astro-Dome, Inc., Canton, Ohio, spent two weeks erecting the nine-ton, 25-foot wide steel dome. Steel ribs including two arch girders went up first and were followed by sheet metal "skin" placed on the framework in gored sections.

The dome has two main mechanisms: one for revolving it and another for opening and closing the slit or shutter through which the telescope is trained on sky points. The 'scope mountings are also mechanized to give smooth action in adjustment, and the dome area is equipped with an electrical hoist to bring supplies through a trap door from the basement.

On the first floor of the observatory there are darkrooms, a lounge-library for visitors, an office, and wardrobe and bunkrooms for use of night workers. Resident quarters for student caretakers have also been provided. The basement includes a shop area. The UW astronomy department will continue to maintain its headquarters on the campus at Madison, Prof. Whitford stressed. The country station is mainly for observational research.

Formal dedication of the Pine Bluff station will take place in June and is planned to coincide with meetings of the American Astronomical Society on the campus.

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MADISON NEWS

Astronomy Dept 7

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

RELEASE: Immediately

12/20/57 vh

MADISON--Russia's second earth satellite will make some afternoon appearances in the Madison area beginning Saturday, according to Prof. C. M. Huffer of the University of Wisconsin Washburn Observatory.

He said that if the weather is clear, Sputnik II will appear approximately at the following times calculated by the Smithsonian Institution Observatory at Cambridge, Mass.:

Saturday, Dec. 21----------6:49 p.m.

Sunday, Dec. 22----------6:28 p.m.

Monday, Dec. 23----------6:07 p.m.

Tuesday, Dec. 24----------5:46 p.m.

Wednesday, Dec. 25----------5:25 p.m.

Thursday, Dec. 26----------5:04 p.m.

In the afternoon appearances the satellite will be traveling from the southwest to the northeast, passing directly overhead at an angle of 31 degrees on Monday, Dec. 23. Before the 23rd, it will pass west of overhead and after the 23rd east of overhead.

Prof. Huffer cautioned that there may be some slight variation in the time for appearance as calculated.

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Astronomy Dept.

U. W. NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

3/10/60 vh

RELEASE: Immediately

MADISON, Wis.--If the sky is clear, Wisconsin residents will be treated to a total eclipse of the moon beginning in the very early morning of Sunday, March 13, University of Wisconsin astronomers said Thursday.

The total lunar eclipse occurs when the earth passes between the sun and the full moon and completely shadows the moon. It is the first visible generally in the United States and Canada in more than three years, Robert Bless, project associate of the UW astronomy department, pointed out.

The eclipse will begin shortly after midnight on the eastern edge of the moon and the earth's shadow will appear curved, he said. As the eclipse progresses, the shadowed parts of the moon deepen in color. In total eclipse the earth's satellite will appear dark and reddish.

The astronomer supplied the following timetable of the event for Wisconsin residents:

12:39 a.m.----------eclipse begins

1:41 a.m.----------total eclipse is achieved

3:16 a.m.----------total eclipse ends

4:18 a.m.----------eclipse ends

Bless said that the period in which the moon is entirely covered by the shadow of the earth--total eclipse--is very close to being the longest possible. It will last for one hour and 35 minutes.

The weather being clear, there will be good opportunities for camera fans to make shots in either black and white or in color, according to the Wisconsin astronomer.

-more-

add one--moon eclipse

The spectacular deep red of the eclipsed moon was explained by Bless as follows:

"During eclipse a direct ray from the sun cannot strike the moon because the earth is in the way. However, because of the earth's atmosphere, rays of sunlight are bent into the shadow of the earth and strike the moon. The earth's atmosphere filters out most of the blue light. The light that is left is reddish."

One interesting phenomenon that occurs on the moon during eclipse is the rapid temperature change. Deprived of the direct rays of the sun, the moon goes through a temperature drop from about 212 degrees Fahrenheit--the boiling point of water--to about 100 degrees below zero. This cooling occurs very rapidly, Bless pointed out, all within the approximate hour and one half of total eclipse.

Binoculars and small telescopes are the best instruments for viewing in detail the progress of the eclipse over the surface of the moon, Bless suggested. However, for many the naked eye is enough to view the dramatic event.

Bless said 1960 is marked by two total lunar eclipses. The second one will occur on the morning of Sept. 5. It also will be visible over most of the United States, including the Midwest.

##

associations

MADISON NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

3/10/60 rf

RELEASE: Immediately

MADISON--The spring meeting of the University of Wisconsin chapter of the American Association of University Professors will be held at 4:30 p.m. Monday, March 28 in Room 20, Commerce Building.

Committee reports will be made at the meeting, and results of the annual election of officers of the UW campus chapter of AAUP will be announced.

##

MADISON NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

Astronomy Dept

RELEASE:

3/2/60 vh

Immediately

University of Wisconsin guests at the Friday (March 4) lecture demonstration in the Planetarium will "see" and hear about "Eclipses."

Myron Bergenske, UW teaching assistant in astronomy, will present the 8 p.m. lecture. He will tell of both solar and lunar eclipses in general and give specific details of the total moon eclipse which will take place March 13 and be visible in the Madison area.

The Madison public is invited to attend the Friday evening performance. The program is the second in six such public service features offered during the second semester.

The Planetarium is located on the roof of the new wing in Sterling Hall. It can be reached by taking the elevator to the sixth floor and following the stairs directly in front of the elevator to the roof.

Parties of 10 or more wishing to attend the Planetarium lectures should give advance notice by telephoning the UW astronomy department, AL 5-3311, extension 2551.

##

Astronomy Dept.

MADISON NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

2/5/60 vh

RELEASE: Immediately

MADISON--Six Friday evenings during the second semester have been scheduled at the University of Wisconsin for the general public to benefit from the UW's Planetarium.

The Friday lecture-demonstrations of astronomical phenomena employing the projector and indoor "sky" will begin at 8 p.m., Prof. Arthur D. Code announced. He said "each demonstration will show the constellations of the season and the changing aspects of the sky as seen from different parts of the earth. In addition, a selected topic will be singled out for detailed attention."

The Friday dates and lecture topics are as follows:

Feb. 19, "The Moon"; March 4, "Eclipses"; March 23, "Motions in the Sky"; April 8, "Planets"; April 29, "Comets and Meteors"; and May 13, "Spring and Summer Constellations."

It is not practical to admit latecomers--the light disturbs the effectiveness of the demonstration--and therefore promptness in attendance is necessary. Doors will be closed promptly at 8 p.m.

The Planetarium is located on the roof of the new wing of Sterling Hall. It can be reached by taking the elevator to the sixth floor and following the stairs directly ahead to the roof.

Prof. Code also said that Visitors' Nights at Washburn Observatory will continue to be held on the first and third Wednesday nights of each month on all occasions when the night is clear. From 7:30 to 9:30 p.m., visitors will be able to see two or more objects through the 15-inch telescope.

Groups of 10 or more wishing to attend the Planetarium demonstrations should give advance notice by telephoning Al 5-3311, extension 2551.

##

U. W. NEWS FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

1/27/60 ml

RELEASE: Immediately

MADISON, Wis.--Prof. Charles M. Huffer of the University of Wisconsin Astronomy Department has gone to Arizona to start a research project at Kitt Peak National Observatory near Tucson.

Prof. Huffer's research will be on the double stars that revolve about each other, which astronomers call eclipsing binaries.

He has a National Science Foundation grant for the study and will be on three months leave from Wisconsin.

He will be among the first astronomers to use the facilities at Kitt Peak. This equipment, some of it still being installed, is provided by the National Science Foundation and administered under AURA, the nine-member Association of Universities for Research in Astronomy. AURA extends the use of Kitt Peak equipment to any competent researcher in the country, whether or not his university is an AURA member. Wisconsin has been a member since AURA's organization in 1957.

Prof. Huffer will make photo-electric observations of several binary stars that can be seen in this hemisphere only during winter and spring. Arizona's clear atmosphere means better viewing and more unclouded observation time.

Prof. Huffer's studies involve measuring the variations in brilliance that occur when one star of the two-star binary system moves in front of the other, dimming the light that reaches the light-sensitive instruments in the telescope on earth.

From these studies, astronomers find out something about the size, surface temperature, and mass of the twinstars.

-more-

add two--Huffer research

The best known eclipsing binary that can be seen in Wisconsin is Algol in the constellation Perseus. The Arabs called it the Demon's Eye because of its winking changes in brilliance over several days.

Scientists, who studied Algol as Prof. Huffer now studies other eclipsing binaries, know that the hottest of Algol's stars has a surface temperature of about 27,000 degrees Fahrenheit, nearly three times as hot as the sun. They have found that Algol is about 100 light years away, 25 times as distant as earth's closest star.

The first accurate light curve showing Algol's behavior was done by Prof. Joel Stebbins at Washbourn Observatory here. Prof. Stebbins is a UW emeritus professor now living in California.

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Astronomy Dept

MADISON NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

12/3/59 vh

RELEASE: Immediately

In the last lecture-demonstration before the Christmas holidays, C. R. O'Dell will present "The Galaxies" to the public Friday evening at the University of Wisconsin Planetarium.

The research astronomer will talk about and demonstrate the workings of these star systems, especially those of the earth's own system--the Milky Way, and those of the Andromeda nebula, nearest galaxy resembling the Milky Way.

There will be two Planetarium shows on Dec. 4, the UW astronomy department has announced. A special 7 p.m. performance is scheduled for a group of 50 school children and seats will be available at this first show for 20 to 30 additional persons.

The usual 8 p.m. performance will follow.

Since early fall, the Planetarium has been located on the roof of the new Sterling Hall wing. The public is directed to find it by taking the elevator in the wing to the sixth floor and proceeding from there to the roof by way of the stairs directly in front of the elevator.

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Astronomy Dept.

MADISON NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

11/18/59 vh

RELEASE: Immediately

MADISON--The audience will hear about and view the moon at the Friday evening (Nov. 20) lecture-demonstration in the University of Wisconsin Planetarium.

Friday's program will be presented by Myron Bergenske, teaching assistant.

Bergenske will include discussion and illustration of the recent attempts to reach the moon as well as to photograph the side which persons on earth cannot see. He will also tell of the motion and surface of the earth's planet as well as of the craters on it.

Planetarium performances start promptly at 8 p.m. Persons wishing to attend should take the Sterling Hall elevator to the sixth floor of the new Sterling wing and proceed up the stairs directly in front of the elevator to the roof.

Planetarium shows are open to the public without charge.

Latecomers are not admitted since effectiveness of the projection upon the man-made sky is lost when light is admitted.

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FEATURE STORY

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

9/30/59 vh

RELEASE: Immediately

By VIVIEN HONE

MADISON, Wis.--University of Wisconsin students in man's oldest science are attending classes in one of the University's newest buildings.

Student astronomers are finding their way to the top floor of Sterling Hall's new wing either by super-sturdy Shank's ponies or by elevator. It's a leg-testing climb to the sixth floor where the UW astronomy department has officially opened its doors this fall. It's another flight up when you count the roof, also astronomy's bailiwick.

The move to new department and classroom quarters is a second important step forward for UW astronomy studies since the summer of 1958. A year ago this past June, Wisconsin dedicated a new research observatory 13 miles west of the campus at Pine Bluff. Gift of the Wisconsin Alumni Research Association, the $200,000 country station includes a 36-inch reflecting telescope and a 53-acre site.

Washburn Observatory with its 15-inch 'scope had been the sole seat of Wisconsin astronomy teaching and investigations. Old Washburn first turned a big eye upon starry spaces in 1878.

Prof. Arthur D. Code, department chairman, and director of the Pine Bluff Observatory, described astronomy's new Sterling Hall home as "about 6,000 feet of space, slightly larger than at Washburn, and put to much better use." The quarters include nine offices, a classroom capable of holding 40 students, teaching laboratory, seminar room, library, darkroom, optical lab, electronics lab, and machine shop.

The Planetarium has been installed on the roof above. This is the large canvas shell and projector mechanism capable of creating an artificial starry sky for an audience of 60 persons. Formerly housed in the east wing of Journalism Hall,

-more-

the teaching device now "is far better than the arrangement we had before," Prof. Code said, "and it is right here, handy."

Two observation domes also have been constructed on the roof and are expected within the year, to hold telescopes "of comparable size but better quality than what we had at Washburn for student use," Code reported. Meantime students will continue to use the 15-inch instrument at the old observatory. The Institute for Research in the Humanities now occupies Washburn, but the dome and the telescope are still used by astronomy.

Code said Visitors' Night at Washburn will be resumed, probably sometime in October. The program is offered when nights are clear, on the first and third Wednesday evenings of each month.

Public lecture demonstrations at the Planetarium will also be resumed soon. These shows have been presented on six or seven Friday nights each semester since the Planetarium went into operation in 1953.

Research will be helped by UW membership in the cooperative organization known as AURA. Institutions within the Association of Universities for Research Astronomy, will share facilities of a $3-million national observatory being constructed at an ideal observational site on Kitt Peak near Tucson, Ariz.

The major staff for the UW's expanded program in astronomy includes Director Code, Prof. C. M. Huffer, Assoc. Prof. Donald Osterbrock, Asst. Profs. Theodore Houck and John Mathis, and Edith Flather, project assistant. Others on the staff include Robert Bless, Gainesville, Fla., project associate; Harland Epps, Oceanside, Calif., and Myron Bergenske (2017 Mifflin) Madison, both teaching assistants; Clarence Daug, Ingleside, Neb., a WARF fellow; and research assistants Donald Taylor, Whittier, Calif.; Eugene Capriotti, Natrona Heights, Pa.; Gerald Davidson, Harlem, Mont.; Charles R. O'Dell, East St. Louis, Ill.; Donald West, Providence, R.I.; and George Collins, Waukegan, Ill.

Lloyd McElwain (22 N. Hancock St.), Madison, serves the department as machinist and Mrs. Beatrice Ersland, Middleton, as secretary.

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Astronomy Dept.

U. W. NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

11/2/59 vh

RELEASE: Immediately

MADISON, Wis._The University of Wisconsin will be host to the Midwest Astronomers Neighborhood Group for a one-day meeting, Saturday, Nov. 7.

The informal group of astronomers, largely from educational institutions of the Midwest, will make a morning tour of Wisconsin's research observatory at Pine Bluff and new astronomy department quarters in Sterling Hall. In the afternoon they will meet to hear papers at the Wisconsin Center, and they will hold their banquet session Saturday night at the center.

Universities represented will include Wisconsin, Indiana, Illinois, Chicago, Minnesota, Michigan, Ohio State, Northwestern, and Vanderbilt, Beloit College, and Case Institute of Technology.

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Astronomy Dept

MADISON NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

11/2/59 vh

RELEASE: Immediately

MADISON--Madison people are viewing the stars again on the University of Wisconsin's man-made "sky."

The Friday night public lecture-demonstrations at the UW Planetarium have been scheduled for the first semester, 1959-60, Arthur D. Code, chairman of the department of astronomy, announced this week.

Members of the Madison public who wish to attend the 8 p.m., Nov. 6, lecture on "The Planets" should take the Sterling Hall elevator to the sixth floor of the new wing, then follow the stairs directly in front of the elevator to the roof, Dr. Code pointed out.

The Planetarium, formerly housed in Journalism Hall, and other astronomical equipment were installed on the roof when the astronomy department opened new quarters this fall on the sixth floor of the Sterling wing.

Each demonstration shows on the indoor "sky" the constellations of the season and the changing aspects of the sky as seen from different parts of the earth. In addition, a selected topic is singled out for more detailed attention.

Code also announced that Visitors' Nights at Washburn Observatory have been resumed and are being held the first and third Wednesday nights of each month, providing the sky is clear. From 7:30 to 9:30 p.m. on these evenings, the Madison public can see two or more objects through Washburn's 15-inch telescope, and hear informal explanations of each object viewed.

more---

The dates and subjects for the first semester Planetarium program are as follows: Nov. 6--"The Planets"; Nov. 20--"The Moon"; Dec. 4--"Galaxies"; and Jan. 8--"Orion and the Winter Constellations."

Prof. Code suggested that persons planning to attend the Planetarium shows arrive in good time for the 8 p.m. performances. It is not practical to admit latecomers, he said, since the effectiveness of the demonstrations depends on maintaining a darkened room. Doors are closed at 8 p.m.

Planetarium capacity is 75 persons. Code suggested that groups of 10 or more wishing to attend should give advance notice by telephoning the observatory: AL-5-3311, Ext. 2551.

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U. W. NEWS FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

9/30/59 vh

RELEASE: Immediately

MADISON, Wis.--University of Wisconsin students in man's oldest science are attending classes in one of the University's newest buildings.

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Washburn Observatory with its 15-inch 'scope had been the sole seat of Wisconsin astronomy teaching and investigations. Old Washburn first turned a big eye upon starry spaces in 1878.

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Two observation domes also have been constructed on the roof and are expected, within the year, to hold telescopes "of comparable size but better quality than what we had at Washburn for student use." Code reported.

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Astronomy Dept

U. W. NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

RELEASE:

7/23/59 eda Immediately

By ED AEBISCHER

MADISON, Wis.--Cosmology is the study of the universe as an orderly system.

One of its most exciting tasks is to explain observations by astronomers that our universe is expanding at a rapid rate--that the great galaxies are being driven farther and farther from each other by an unknown force.

The latest theory to account for the spreading universe was explained this week at the University of Wisconsin by its author, Prof. Raymond A. Lyttleton, distinguished mathematical physicist from Cambridge University, England.

Lyttleton is on a two-month tour in this country to attend a celestial mechanics institute at Yale University and to visit leading observatories.

The British scientist has postulated a "simple mechanical force" in the cosmos to account for expansion. His notion is based on the delicate electrical balance in nature between the "building blocks" of matter which have positive charges--like the proton--and those which are negatively charged, such as the electron.

Both proton and electron are unit electric charges. They are thought to carry equal amounts of charge, though the proton is nearly 2,000 times more massive.

The simplest atom, hydrogen, contains one proton and one electron. Like all atoms, hydrogen is considered to be electrically neutral since it is made up of equal and opposite charges.

In advancing the new theory, Prof. Lyttleton questions how exact the equality between positive and negative charge really is. He asks what would happen if more sensitive measurements were to show that the charges are almost--but not quite--equal, the protron having an infinitesimally greater charge.

-more-

add one--Lyttleton

This would be a clue, he says, to the force which spreads out the universe. For by the basic electrical law that like charges repel, hydrogen atoms--now not quite neutral--must repel each other.

He uses the phrase "smoothing out" to describe this continued expansion by repulsion which parallels the expansion of the universe.

Lyttleton believes that matter--the "stuff" of the cosmos--is being created constantly. And that the "new" matter is in the form of hydrogen atoms.

The rate of creation sounds less significant than the proverbial drop in an ocean. In a room the size of a college classroom, about one hydrogen atom would be created in 50,000 years, Lyttleton notes.

But in the vast cosmos, the number is significant. Lyttleton says electrical repulsion keeps spreading out the new atoms as fast as they are created.

The real universe is not such a smoothed out gas, however. It contains galaxies and clusters of galaxies, each made of billions of stars and surrounded by clouds of gas.

These galactic units were formed from matter being pushed outward, Lyttleton has suggested. And for this reason, the galaxies must also push away from one another, causing the universe to expand.

The key assumption in the new theory is Lyttleton's idea that there could be a tiny difference between the charge of the proton and that of the electron.

To date the finest scientific tools cannot measure the charges on atomic particles with great enough precision to show whether this interesting possibility may be true.

And so for the present, Lyttleton rests his case with a challenge to physicists to devise more sensitive experiments for measuring the charge on protons and electrons.

He reports that one of his fellow scientists may have a solution within a month.

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Astronomy Dept.

U. W. NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

12/29/60 ml

RELEASE: Immediately

By MACK LAING

NEW YORK--For 10 years, University of Wisconsin astronomy Prof. C. M. Huffer has been interested in the possibility of using a high-speed digital computer for solving an equation which would represent the changes in the light of eclipsing stars.

This week, Prof. Huffer announced that he and UW graduate student George W. Collins have succeeded.

Prof. Huffer explained their method at joint meetings here of the American Astronomical Society and the American Association for the Advancement of Science. The mathematical workhorse that made the solution possible was the IBM 650 electronic computer in UW's Numerical Analysis Laboratory.

As far as the UW astronomers know, theirs is the first completely satisfactory solution for such an equation. Dr. Huffer pointed out that Dr. Salah Hamid was successful in New York in 1950, using photoelectric data furnished by the UW department of astronomy, but that his solution was not satisfactory since it was achieved on now-outdated computing equipment.

The Wisconsin astronomers hope their method--successful in explaining light changes from one star--may open the door for other scientists to use modern computers in the investigation of other eclipsing stars. Prof. Huffer told the scientific meeting he plans to complete the work on the first star and go on to the study of two more, for which there are enough telescope observations to apply the method.

-more-

In an interview before the meeting, Prof. Huffer said the equation's solution has implications for theoretical astronomers, because the variation of light from these stars has a bearing on the atmosphere of the stars. For years, theoretical astronomers have been steadily adding to the store of evidence about star atmospheres in an attempt to explain the birth, life and death of stars.

The Wisconsin method involved the solution of 275 equations, each with six unknown elements. Prof. Huffer told the meeting that astronomy student Collins, who is from Waukegan, Ill., had written a successful program, or set of directions, for UW's IBM 650 digital computer, using a simple machine "language" called Fortran.

Changes in machines and operators had frustrated previous solution attempts. he said, but Collins' program can be transferred for use by the CDC 1604 computer, soon to replace the University's IBM 650. The difficult equation was solved by the method of least squares, fitting a theoretical curve to a curve of photoelectric observations.

Prof. Huffer made light measurements of the star early this year at Kitt Peak National Observatory in Arizona and supplemented these with telescopic observations at UW's Washburn and Pine Bluff Observatories and at the McDonald Observatory in Texas.

The star chosen for study is a dim star named S Cancri in the star-group called Cancer the Crab, near what is known as the "beehive cluster." It cannot be seen without a telescope. It is one of the kind of stars which have drawn Prof. Huffer's academic interest for years--an eclipsing binary star, or twin-star. These are double stars which revolve about each other, alternately blocking and freeing each other's light for the long journey to earth.

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MADISON NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

9/20/60 1k1

RELEASE: Immediately

MADISON---Star-gazers will have an opportunity to increase their knowledge of the heavens at 7:30 p.m. Friday, Sept. 23, when the University of Wisconsin department of astronomy presents the first in a series of six public lectures.

Prof. Arthur D. Code announced Tuesday that the lectures will be given in the UW Planetarium, located on the sixth floor of Sterling Hall. The opening lecture is entitled "Autumn Skies."

Each demonstration will depict on the indoor planetarium "sky" the constellations of the season and show the changing aspects of the sky as seen from different parts of the earth.

The UW Planetarium was moved to the roof of the new wing of Sterling Hall last year. To get to the Planetarium, visitors should take the Sterling Hall elevator to the sixth floor, and follow the stairs directly in front of the elevator to the roof.

Prof. Code also announced that Visitors' Nights at the Washburn Observatory on Observatory Hill are the first and third Wednesday nights of each month, providing the sky is clear. The public is invited to view two or more objects through the 15-inch telescope and hear informal explanations about the objects seen. The observatory will be open from 7:30 to 9:30 on these evenings.

The remainder of the lecture program announced by Code is as follows: Oct. 7 "The Planets"; Oct. 21 "The Milky Way"; Nov. 4 "The Moon"; Nov. 18 "Galaxies"; and Dec. 2 "Winter Skies."

-more-

add one--star gazing

Persons who wish to attend the lectures should arrive before the 7:30 starting time. Because effectiveness depends upon maintaining a darkened room, the doors are closed promptly at 7:30 p.m., and latecomers are not admitted.

Since the Planetarium seats only 75 persons, Code suggested that groups of 10 or more who wish to attend the lectures should give advance notice be telephoning the onservatory: AL 5-3311, Ext. 2551.

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MADISON NEWS

FROM THE UNIVERSITY OF WISCONSIN NEWS SERVICE, MADISON 6, WISCONSIN

1/8/59 vh

RELEASE: Immediately

MADISON--The last public show of the first semester at the University of Wisconsin Planetarium will present "Orion and the Winter Constellations."

Instructor Theodore Houck will give the lecture portion of the performance at 7:30 Friday evening (Jan. 9).

Some six or seven lecture-demonstrations under the indoor "sky" will be scheduled again for the second semester. They will show the constellations of the seasons and the changing aspects of the sky as seen from various parts of the earth.

Staff members of the UW astronomy department have planned and presented these performances, especially for the Madison public, each year since the Planetarium was installed on the UW campus in 1953. Used primarily as a teaching device to aid astronomy Dept. of students, the modern Planetarium equipment creates a starry "sky" by means of a large inverted canvas shell and a photographic projector.

Friday night guests will find the Planetarium in the east wing of Journalism Hall. Entrance is on Observatory Drive.

###

MADISON After the meet, Leaguers will want to see more of the Midwestern capital. With its tree-lined avenues, lakes, beaches, parks, and pleasure drives, it is one of the nation's fairest cities.

Leaguers may also want to see more of Wisconsin. The state is generously studded with historic and scenic points of interest. A few within 50 miles driving distance of Madison are here suggested:

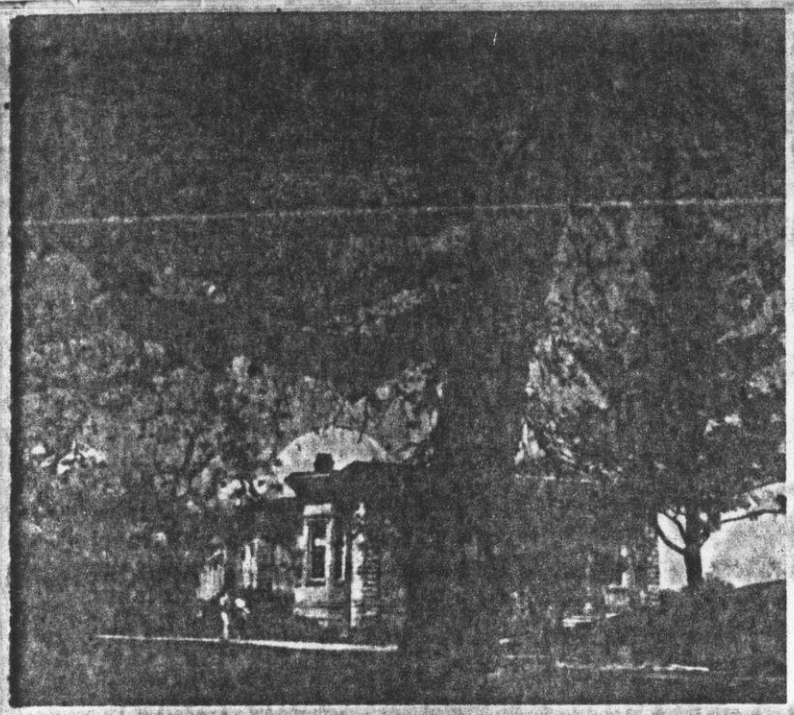
THE DELLS The Wisconsin River has cut deep gorges in the sandstone here to make a winding scene of water, rock walls, and lush greenery. Excursion boats follow the twisting channel and stop at scenic landings. A drive of 54 miles north on US Highway 12 will bring the visitor to this favorite tourist area.

DEVIL'S LAKE During the glacial age ice tore away huge blocks of quartzite from the Baraboo Range, deposited moraines, and created this deep jewel like water lying in a bow of pine-rimmed purple cliffs. North on US Highway 12 to State Highway 159, right on 159 to State Highway 123, right on 123 for a total distance of 41 miles, and the entrance to Devil's Lake State Park is at hand. Swimming at the lake is excellent.

PENDARVIS HOUSE A restoration of Cornish miners' homes at Mineral Point recalls the domestic picture in the early 19th century when southwestern Wisconsin was busy mining lead. Overnight accommodations and meals with Cornish specialties may be had by reservation. 52 miles on US Highway 151 lie between Madison and Mineral Point.

AGENCY HOUSE John Kinzie, Indian agent, built and lived in this house after fur trading in Wisconsin came finally under the American flag and when Portage was "the place between" in the Fox-Wisconsin waterway. Completely restored by the Colonial Dames, the house is open during the daylight hours. Portage is 37 miles north of Madison on US Highway 51.

BLUE MOUNDS and CAVE OF THE MOUNDS So called for the blue haze which frequently veils it, Blue Mounds, one of the highest elevations in Wisconsin, is a favorite point for looking down upon the woods, fields, valleys, and streams of five Wisconsin counties . . . . Cave of the Mounds, with spectacular formations of stalactites and stalagmites, was opened to the public shortly after its discovery in 1939 . . . . Both points may be found in the area of Mount Horeb, approximately 20 miles west of Madison on US Highways 18 and 151.



[Astronomy, Dept of.]

The ASTRONOMICAL LEAGUE

meeting July 3-5

1954

on the campus of

THE UNIVERSITY OF WISCONSIN

at

Madison, Wisconsin

It's too early to announce the program, but for those three delightful days next summer

HERE'S THE SETTING

ECLIPSE Many League members will arrive on the Madison campus fresh from watching a total eclipse of the sun, June 30. The 1954 solar blackout will begin at sunrise in Holt County, Nebraska, the shadow passing across Minneapolis and St. Paul, out over Lake Superior, and across Rupert House at the foot of James Bay in Canada. Observers in the Madison area will see an eclipse 95 per cent of totality at maximum. The sun will be already partially eclipsed at sunup. In northern Wisconsin and the Upper Peninsula of Michigan where astronomers will travel to vantage points, the entire eclipse will take place after sunrise and the duration of totality on the central line will be 82 seconds with the sun and moon at an altitude of 10 degrees . . . At the meeting, Leaguers will be among friends, encouraged to swap notes and talk to their hearts' content on sun, moon, and stars.

UW CAMPUS Wisconsin's largest institution of learning contributes largely to Madison's great fame for beauty. The home campus, often called "the most beautiful in the world," stretches for miles along the southern shores of Lake Mendota, a colorful architecture of old buildings and new among flower beds, arching trees, and green hills. Leaguers, driving or wandering afoot over the grounds, may want to discover their own favorite spots, but if directions are needed, they can be had at the Information Booth, Park Street entrance, the Wisconsin Memorial Union. The following not-to-be-missed sights are only a few among the hundreds which the UW greater campus provides:

Bascom, North, and South Halls, oldest and best loved of Wisconsin's ivied halls of learning; Memorial Library, $5-million-dollar new home for Wisconsin's books, opening for service in the fall, 1954; Camp Randall Stadium, the pigskin world of the UW; Agricultural Hall, the seat of College of Agriculture administration; Babcock Hall, modern dairy industry teaching and research center; Elizabeth Waters Hall, largest residence hall for women; Wisconsin Memorial Union with its lakeside terrace and theater, student-owned recreation and cultural center; WHA, oldest radio station in the nation and key station for the only state-wide educational broadcasting network in America; Langdon Street gold coast, the fraternity and sorority row at Wisconsin.

WASHBURN OBSERVATORY The home of astronomical study and research at the University of Wisconsin will have special interest for League members. One of the world's better known small observatories, the venerable structure, built in 1878, rises from the crest of Observatory Hill to command the finest lake-lawn-and-woods panorama seen at Wisconsin. Research at Washburn presently includes study of variable stars and the structure of the Milky Way. The 15½ inch refractor telescope, once third largest in existence, will be supplemented with a new 36-inch reflecting instrument when suitable quarters have been provided. Astronomy department members include Director A. E. Whitford, Prof. C. M. Huffer, and Prof. A. D. Code.

PLANETARIUM A classroom planetarium, primarily a teaching aid for astronomy students, was installed in the former Art Education Building at the UW in the summer of 1953. The indoor "sky" and projector, though smaller, less complex than major installations in places like Chicago and New York, are capable of demonstrating most of the phenomena of the heavens. The "sky" canopy permits 50 people to sit comfortably in concentric circles beneath it. League members will see the planetarium in operation during hours set aside for the public and coordinated with events in the real sky.

ACCOMMODATIONS Board and room at approximately $5.50 per day per person will be available in the Kronshage units, modern UW residence halls on the shores of Lake Mendota. All accommodations will be double rooms with two single beds in each and with maid service and linens furnished. All meals will be served cafeteria style in Kronshage Hall dining rooms.

RECREATION Courts and piers on the grounds make tennis and swimming everyday pleasures at the Kronshage units. Additional recreational facilities on the campus include canoes and sailboats for rent from the UW Boathouse, motor launches offering excursion trips on Lake Mendota, cinema and summer stage productions at the Wisconsin Memorial Union, and a Union lakeshore terrace for relaxation and refreshments under the leaves. Guest privilege cards may be obtained without charge from the Personnel Office at the Union.