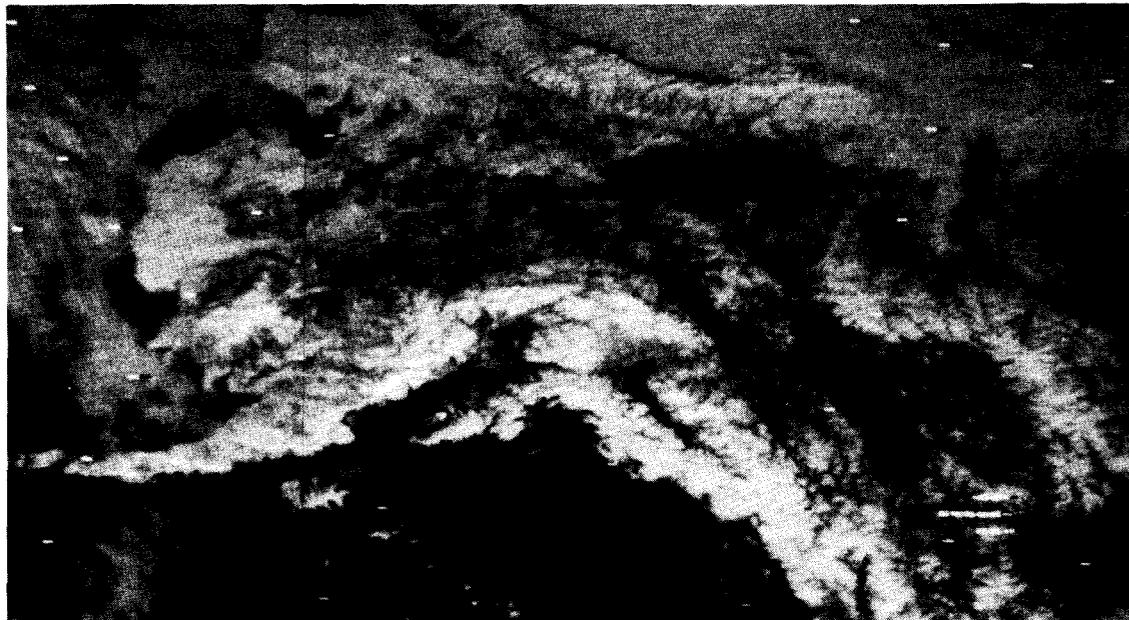


Space View of Alaska Reveals Hidden Faults

Released



THIS RARE CLEAR DAY for Alaska was caught in a picture by the Nimbus 4 Image Dissector Camera System (IDCS) on March 29, 1971. The picture enabled scientists at the U.S. Geological Survey to detect several long straight features that may be the expression of deep fractures in the crust. Snow in the picture still blankets much of the land, and the Bering Straits area is ice filled. Where trees are present, the snow on the grounds is obscured, and these areas appear dark.

A computerized "space view" of Alaska and western Canada, embracing nearly 3 million square miles in area, and obtained from the Nimbus 4 weather satellite orbiting at an altitude of 600 miles, has revealed deep earth fractures and faults not previously known, according to the U.S. Geological Survey, Department of the Interior.

Dr. Ernest H. Latham, USGS, Menlo Park, Calif., a specialist in Alaskan geology, reported that the unusual image of Alaska was based upon the use of a "shutterless" camera similar to a television tube that measures variations in reflected light, and transmits data back to earth by radio.

"The resulting picture," Latham said, "representing a rare cloudless day over much of Alaska and western Canada, shows traces of most of the major earthquake fault systems in this large region as well as traces of many folds and fault breaks in the deformed rock strata that make up the mountain chains in the area."

The image, made on March 29, 1971 — an unusually clear day — shows a heavy snow cover, with lowlands appearing relatively dark because of vegetation; ice-free bodies of water also appeared dark. "We were able to identify major features such as mountain ranges, plateaus, and lowlands," Latham said.

"We discovered several long straight features marked by river valleys or the steep faces of mountain fronts that are not known to be modern faults," Latham reported, adding that "these may be the expression of deep fractures in the crust."

The project is in line with President Nixon's policy, expressed in his 1971 State of the Union Message, of "doing more to apply our scientific and technological genius directly to domestic opportunities."

In commenting on the significance of the image, Latham said that "until now, our general knowledge of the great fault systems and folded and faulted mountain chains of the world has been based on putting together geologic maps of only hundreds of square miles of aircraft and field observations—a very tedious and

(see Page 2)

Satellite Tracks Yacht

✓ GSC
date?

A small electronics device, developed for the space program sailed on the American sailing yawl *Foolscap* in the Newport-Bermuda yacht race to test its potential for permitting precise location of lifeboats by satellite.

Called the Eole Transponder, the 25-kilogram (55-pound), radio receiver/transponder was originally developed for use in conjunction with the French-built weather satellite Eole, launched by NASA in 1971.

During the race to Bermuda, the transponder sent position and weather data to Eole as the satellite passed over the *Foolscap*. Monitoring the transponder on the yacht was electronics engineer William W. Conant from Goddard, sponsor of the test. Conant was signed on the yacht as a member of the crew, with the approval of race officials.

Foolscap was one of 178 yachts taking part in the race, run under extremely rough seas.

The position information transmitted from the *Foolscap* to the Eole during each pass was relayed to ground over a tracking station operated by the French Center for Space Studies (CNES) at Bretigny, France, where the data was also processed. From there the information was teletyped to the Goddard Space Flight Center where *Foolscap's* up-to-date ocean location was plotted. This information was sent from Goddard to the U.S. Coast Guard at Miami, Florida, and to the race committee in Bermuda.

The test proved to be highly successful according to Goddard officials. They foresee the day when small inexpensive transponders similar to the one carried by *Foolscap* may become standard equipment on ship and aircraft lifeboats.

Dr. Adler Honored

DR. ISIDORE ADLER of the Theoretical Studies Branch is one of the eight most recent recipients of NASA's Exceptional Scientific Achievement Medal presented in an awards ceremony on June 22. NASA Administrator Dr. James Fletcher, Deputy Administrator George Low, and the Apollo 16 astronauts met at the Marshall Space Flight Center to honor 50 government and industry employees for their connection with last April's successful lunar landing mission.



Dr. Isidore Adler (left) and Dr. James C. Fletcher, NASA Administrator

LOOKING AHEAD WITH NASA



FIRST SKYLAB CREW. Gathered around the display console of a training model of Skylab are the first three men who will orbit earth under the Skylab program. They are (from left) Charles Conrad, Jr., commander; Joseph P. Kerwin, science pilot; and Paul J. Weitz, pilot.

Skylab Missions Set for 1973

Three Skylab missions are scheduled to follow the final Apollo Moon landing mission in December. The Earth orbital Skylabs in 1973 will log more than 9,000 manhours in space.

Skylab will be the first U.S. space station in orbit. The spacecraft and launch vehicles are elements of the Apollo program which became surplus after several Apollo test flights in 1967 and 1968 proved that the equipment was qualified to carry out lunar landing missions. The largest segment is the workshop or space laboratory, the size of a six-room house. It is a third stage of a Saturn V launch vehicle made habitable for a crew of three men. Attached to the workshop will be an airlock, docking adapter and a large solar telescope. These will be launched into Earth orbit with the first two stages of the Saturn V rocket from the Kennedy Space Center, Florida.

About one day later, three astronauts will be launched in an Apollo spacecraft by a smaller Saturn IB vehicle. They will maneuver the spacecraft to dock with the Skylab laboratory for missions ranging from 28 to 56 days.

The workshop will be outfitted with equipment to carry out more than 50 scientific, biomedical and technical experiments in Earth orbit. The solar telescope will be man's first opportunity to study the Sun's activity outside of Earth's atmosphere which filters out some of the solar phenomena and prevents ground based telescopes from recording important scientific events.

Extensive biomedical studies will be conducted to study the effects of long duration space flights on the human body and test possible methods of preventing deconditioning of the muscular, skeletal and cardiovascular systems in the weightless environment.

Earth resources sensing systems aboard Skylab will survey crops, vegetation, geological formations, underground water and minerals, and global wind, sea and weather conditions. Skylab technology and engineering experiments will investigate the possible use of space for processing materials and testing equipment which may enable man to maneuver and perform more effectively in space.

Launch of the unmanned workshop is planned for April 30, 1973. If all goes well, Astronauts Charles Conrad, Jr., Dr. Joseph P. Kerwin (a medical doctor), and Paul J. Weitz will be launched and will dock their Apollo spacecraft to the laboratory on May 1 to begin their four-week mission.

Late in July the second Skylab crew, Astronauts Alan L. Bean, Dr. Owen K. Garriott (an electrical engineer) and Jack R. Lousma will enter the Skylab laboratory for a visit of up to eight weeks. The third crew, Gerald P. Carr, Dr. Edward G. Gibson (a physicist), and William R. Pogue will carry out the last Skylab mission of eight weeks beginning late in October.

Alaska. . . From Page 1

time-consuming process, perhaps requiring many years to accomplish what this one space photo shows us in an instant."

"In a sense," he explained, "our general knowledge has been dependent on our ability to describe the whole 'forest' by knowing a lot about each individual tree, and inferring its relation to its neighbors. Now, we can observe directly the character of fault systems and mountain chains over areas of thousands of square miles, and can begin to look at the forest as a whole — as it really is — and thus check or test our previous interpretations."

"This is another step forward in showing the feasibility of assessing and monitoring a variety of earth resource and environmental features from space," Lathram said, noting that "very soon, NASA will launch the first experimental ERTS (Earth Resources Technology Satellites) satellite into a near-polar orbit to make repetitive conventional and other remote sensing images of large parts of the earth's surface."

"Such data," Lathram said, "to be used by the Interior Department's EROS (Earth Resources Observation Systems) program, administered by the USGS, will provide a revolutionary new dimension in geologic thinking."

In preparing for the wealth of data that will be forthcoming from ERTS satellites, the USGS is managing an EROS Data Center at Sioux Falls, S.D. where receipt, processing, interpretation, storage, handling, and retrieval of data will be accomplished.

Raytheon to Support STDN

NASA has announced the selection of Raytheon Service Company, Burlington, Mass., for contract negotiations to provide continuous logistics support for the tracking, data acquisition, and communications facilities of Goddard's Spaceflight Tracking and DATA Network (STDN).

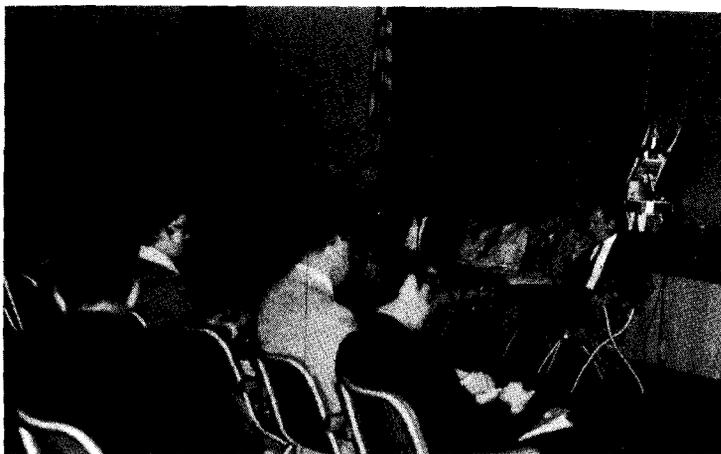
The cost-plus-award-fee contract is for a period of 3 years commencing Jan. 1, 1973 (with a 30-day phase in period commencing Dec. 1, 1972). There are provisions for two one-year extensions. Cost of the contract for the 5 year period is approximately \$42.5 million. Three firms submitted bids to NASA.

Under the provisions of the contract, the Raytheon Service Company would provide logistics support services to the GSFC project control centers; communications switching centers; and network tracking stations, training centers, test facilities, instrumented aircraft, and calibration and repair facilities. Services will consist of all material, personnel, services, utilities, automatic data processing, systems modifications and program modifications required to manage and operate a depot near Baltimore, Md. to support the equipment and facilities of the worldwide network.

The STDN is managed by the Goddard Space Flight Center under the direction of NASA's Office of Tracking and Data Acquisition.



SAFE AWARD. George Griffin (left) is congratulated by John C. New, Chief of the Test and Evaluation Division, on winning T&E's SAFE award for the month of June. Mr. Griffin, an employee in the Structural Dynamics Branch, submitted a number of safety suggestions concerning the operation of the Launch Phase Simulator to win the award. The award includes a month's reserved parking in front of Building 7.



ERTS PRESS CONFERENCE. Major newsmen from Washington, Baltimore and New York attended a press conference on June 20 at Goddard. They were briefed on the mission of the first Earth Resources Technology Satellite (ERTS) by Goddard and Headquarters officials (left picture), and received a tour of the Ground Data Handling System in Building 23 and the ERTS tracking station at the Network Test and Training Facility. At right, ERTS Project Manager Wilfred E. Scull (center) tours the tracking station with the group.

Proposals Invited for International Scientific Satellite

Scientists in this country and abroad have been invited to propose investigations to be conducted with a small astronomy satellite called International Ultraviolet Explorer that would be built and operated jointly by NASA, the Science Research Council (SRC) of the United Kingdom, and the European Space Research Organization (ESRO).

Full approval of the flight project has not yet been obtained, but planning by the three organizations is proceeding with an expected launch in 1976 of a 313-kilogram (669-pound) spacecraft intended to make both high- and low-resolution ultraviolet observations of stars, planets, and other celestial objects.

Scientists whose proposals are chosen will form a user group of "guest observers" to help NASA, SRC, and ESRO plan the mission and to conduct the initial observing program.

The International Ultraviolet Explorer (IUE) will carry a 97-kilogram (213-pound) instrument package that includes a 45-centimeter (18-inch) ultraviolet telescope and spectrograph. Three television cameras will be used to observe the star field and record the spectra for transmission to Earth. Solar-cell arrays and rechargeable batteries provide electrical power.

The three-axis stabilized spacecraft will be launched by NASA on a three-stage Delta rocket into a geosynchronous orbit and have a design life of several years. It will transmit to ground stations in both the United States and Europe and conduct observations 24 hours a day.

An observer will normally be present at one of the control centers during his allotted observing period, much as he would at a conventional ground-based observatory. He will be able to direct his own program, monitor the observations in real time, and can alter his plan to enhance its scientific value.

The planned IUE is one of a number of astronomy explorers in the NASA program. Explorer 42, also known as SAS-A, has acquired significant data on X-ray sources since its launch in December 1970. SAS-B, scheduled to fly in October this year, will search for gamma ray sources; and SAS-C, scheduled for 1974, will investigate at the time variability of x-ray flux from a number of sources.

IUE's ultraviolet observations will continue a branch of astronomy opened up with sounding rockets and the current Orbiting Astronomical Observatory program. The IUE will also develop operating experience applicable to the Large Space Telescope being planned for launch and servicing by the Space Shuttle in the 1980s.

The IUE project is managed for NASA's Office of Space Science by the Goddard Space Flight Center.

Proposals for the satellite's use are due to NASA, SRC, or ESRO by August 15, 1972. Copies of the Announcement of Flight Opportunity may be obtained from the Office of Space Science, NASA Headquarters, Washington, D.C., 20546, attention of Leon Dondey, Code SG.

Dr. Andre Deprit Receives NAS Award

Dr. Andre Deprit, a fellow of the National Research Council here in the Trajectory Analysis and Geodynamics Division, has been awarded the James Craig Watson Medal from the National Academy of Sciences. The presentation was made in April during the academy's annual meeting in Washington, D.C.

The Belgian scientist was honored for his "adaptation of modern computing machinery to algebraic rather than arithmetical operations." He received a gold medal and a honorarium from the Watson fund.



DR. ANDRE DEPRIT

Dr. Deprit, a Postdoctoral Resident Research Associate at Goddard since 1971, has been working on a new theory to predict the moon's orbit around the earth to an accuracy comparable to the precision of the lunar rangings. He has reduced the gap that has existed for 100 years between analytical theories and the current ephemeris. He has expanded and automated the work of the French astronomer Charles Delaunay.

Delaunay spent 20 years (1847-1867) working on the theoretical orbit of the moon. He published an 800 page book of formulas of the moon's orbit, all done by hand, "which contain amazingly very few errors," said Dr. Deprit.

As a result of Dr. Deprit's work, astronomers are now using his new formulas to improve the constants of the lunar orbit. "The first part of my work has been done," said Dr. Deprit. "But, I will continue to refine the lunar orbit, because it is essential for geophysicists who are attempting to more accurately determine the rate of continental drift."

Prior to coming to the United States in 1964, Dr. Deprit was Professor of Celestial Mechanics at the University of Louvain, Belgium. From 1964 to 1971 he was a staff member of the Boeing Scientific Research Laboratories in Seattle, Washington.

Dr. Deprit will leave Goddard this summer to become Professor of Astronomy at Cincinnati Observatory. He will also teach graduate school at the University of Cincinnati.

His specialization has been analytical mechanics/non-linear mechanics; celestial mechanics/dynamical astronomy; and computer science/algebraic manipulations by computer.

The Craig Watson Medal was established in 1874 to recognize contributions in astronomical research.



HAPPY TRIO. Bill Vetter (from left), Frank Broedel and Gil Gates, all of the Graphic Arts Branch, prepare to open gifts during their retirement party at the Recreation Center on June 6. Bill and Frank are photographers whose jobs at Goddard included taking pictures for the *Goddard News* since the early days of the paper. Gil was a management presentation specialist in the Management Conference Center and a well-known member of the Goddard Radio Club.



KURT EVANS shows the form that won him first place in the first annual Sam La Barbera Memorial Golf Tournament.

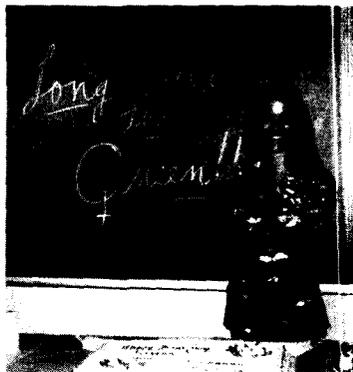
Memorial Golf Tournament

On June 8, 1972, the Management Services and Supply Division held the first annual Sam La Barbera Memorial Gold Tournament.

Sam had served the Center faithfully for five years until his untimely death last year. He was most enthusiastic about golf, and his co-workers felt that a tournament in his memory would be fitting.

Herb Fivehouse, Chief of the Management Services and Supply Division was at the tournament and presented to Mrs. La Barbera and her children a check made out to the American Cancer Society. In addition, Mrs. La Barbera was shown the commemorative plaque which will hang in the MS&S Division Office.

GODDARD QUEEN Linda Veitch, Secretary of the Network Simulations Branch in the Network Procedures and Evaluation Division, turned 19 years old on Sunday, June 18. Members of her branch office helped her celebrate the occasion at a special party held on the following day.



Tennis, Anyone?

The Goddard Tennis Club operates and maintains eight tennis courts (four Har-Tru and four clay) adjacent to the Recreation Center. Membership in the club is open to all on-site Goddard employees, both Civil Service and contractor.

Annual dues are \$12 which also entitles family members to play. Paid membership is currently about 200 and on the increase. A ladder system for competitive play is optional for members and their families for an additional charge of \$6 per person. The club also provides tennis balls and equipment at reduced rates.

Tennis lessons taught by a professional, Dr. Mil Richter, are available to members and their families at the beginners, intermediate, and advanced levels. Lessons cost \$14 for eight one-hour sessions, with each session limited to eight students.

The club is sponsoring nine tournaments this season, the next being an intermediate singles elimination on August 19 and 20.

Anyone desiring additional information about the Tennis Club may contact any of the club officers or chairmen. To join the club, contact Tom Kelsall on ext. 5272. Club President Bill Hoggard may be reached on ext. 6598. Other club officials are Nelson Potter, Vice President; Tom Kelsall, Treasurer, Claire Zufall, Secretary, Bruce David, Grounds Chairman, Joel Mashbaum, chairman for tennis ball sales; Pete Smidinger, Lessons Chairman, Chuck Neff, Tournament Chairman, and Bill Wildes, Ladder Chairman.



DR. MIL RICHTER conducts an intermediate tennis class.



MRS. LA BARBERA holds the plaque that will be placed in the Management Services and Supply Division Offices in memory of her husband. With her are Dan Pendleton (center) and Herb Fivehouse, Division Chief.

Butcher Receives Silver Beaver

David F. Butcher, a Project Support Specialist for the ATS Project, recently received the Silver Beaver Award for his work as Boy Scout Assistant District Commissioner in Sterling Park, Virginia.

The Silver Beaver Award is the highest award given to adult Scout leaders by a local council. The National Capital Area Council consists of Washington, and 17 counties in Maryland and Virginia. It has approximately 80,000 boys and 23,000 adult leaders.

Mr. Butcher is a long-time Scoutleader whose career spans over 12 years of work with both Cub Scouts and regular Boy Scouts. In addition to his post as Assistant District Commissioner, he is presently a Roundtable Commissioner for Cub Scout leaders, Explorer Adviser for Post 958 specializing in photography, and a leader in the Boy Scout and Cub Scout training program. In his four years as Assistant District Commissioner, he and his service team have more than doubled the number of scouts in his local chapter of the Blue Ridge District.



DAVID F. BUTCHER

1972 Summer Programs Part 1

Stories on pages 5, 6-7, and 8

Summer Institute in Public Administration

This year Goddard is sponsoring its Fifth Annual Summer Institute in Public Administration. This is a program which brings thirteen outstanding college juniors and seniors from around the country to Goddard to work on a management research project. For this year's program, over 130 applications were received. Selection was based on grade point average, scholastic background and career goals.

The program consists of four main areas, one of which is the management research project. The others are an academic class in public administration, a speaker series, and field trips. The class is taught by Dr. Eugene Bill McGregor, from the University of Maryland School of Government and Politics. This is a non-credit course that will give the students an understanding of the theoretical aspects of public administration. The speaker series, featuring both Goddard and non-Goddard managers, will attempt to show the students what an actual public administrator does. Field trips are also planned to such places as the Kennedy Space Center and the National Oceanographic and Atmospheric Administration so that the students can see other R & D organizations in action. Field trips are also planned to other government agencies and to Capitol Hill where the students will meet with Senator Howard Cannon.

Thirteen students are participating in this summer's institute. They are Mark Bisnow, Sherry Brown, Darcie Bundy, Ross Dembling, Daniel Dunham, Valerie Etingger, Timothy Finn, Ron Henry, Renee Higginbotham, Kim Howie, Laurence Hummer, Jeffrey Merritt, and Leslie Seeman. Their advisors are Neal Chalofsky, Employee Development Branch; Charles Boyle, Special Programs Office; John Wolfgang, Data Techniques Branch; George Vaughn, Placement Branch; Peggy Scurry, Data Operations Branch; Richard Sade, Networks Directorate; Stanley Kovell, Administration and Management Directorate; Jim Graalman, Program Support Division; Beverly Lewoc, Placement Branch; Susan Burrowbridge, Space and Earth Sciences Computing Division; Marjorie Townsend, Explorer Projects Office; William Mecca, Program Support Division; and Howard Ottenstein, Classification and Organization Branch.



SIPA PARTICIPANTS. Students and faculty members are (seated, from left) Darcie Bundy; Dr. Eugene B. McGregor, lecturer from the School of Government and Politics at the University of Maryland; Kim Howie; Mark Bisnow; Jeff Merritt; Sherry Brown; Renee Higginbotham; Ross Dembling; and Valerie Etingger. Standing are (from left) Dan Dunham; Ron Henry; Timothy Finn; and Larry Hummer. Not pictured are Leslie Seeman; Carl Mohrwinkel, Program Coordinator; and Advisors Neal Chalofsky, Charles Boyle, John Wolfgang, George Vaughn, Peggy Scurry, Richard Sade, Stanley Kovell, Jim Graalman, Beverly Lewoc, Susan Burrowbridge, Marjorie Townsend, William Mecca and Howard Ottenstein.

Engineering Students Arrive for Another Summer of Research

On June 9, Wayne Chen of Goddard's Technology Utilization Office and Dr. Eugene DeLoatch of Howard University welcomed the fourth annual Summer Institute for Biomedical Engineering. The ten participating students combine NASA's vast resources of technology with their own Engineering experiences and native intelligence in attempting to resolve biomedical engineering problems experienced in Washington's Freedmens Hospital.

The institute, sponsored jointly by NASA and Howard University, lets the student "project managers" formulate tangible answers to their assigned problems and make those answers testable and, hopefully, marketable.

The five teams are working on a wide variety of projects. Judy Kosovich and Joe Meyer are trying to point up sensory devices or controls that will overcome the problem of anesthetic gases escaping into operating rooms. Studies indicate that long term exposure of hospital personnel to the gases can be harmful, and the team members hope to find a way of solving the difficulty.

A better method for obtaining blood pressure readings from infants and children is the topic of study for Clifton Cole and Larry Hum. While the present blood pressure cuff is acceptable for adults, it exhibits drawbacks during pediatric usage. With that in mind, the boys are experimenting with ultrasonic techniques of pressure recording.

The third team is concerned with the handling of Iridium 192 seeds used in the treatment of many cancers which can not be removed and which are not radiosensitive enough to be cured by external radiotherapy. Walt Carpenter and Dave Wodicka are working on the development of a semi-automatic sorter and gun-like mechanism which can be used to inject seeds from a magazine either directly into a patient or into nylon tubing.

The last two teams are dealing with blood-related areas of study. Delma West and Charles Smoot are trying to design a method for rapidly measuring the relative viscosity of blood samples. Because blood disorders are often detectable by the effect they have on blood fluidity, early recognition of abnormalities is important. Irvin Hirsch and Judy Reddick, meanwhile, are working to find a way to rapidly perform mass screening for sickle cell anemia based on electrophoresis.

Goddard Technical Advisors for the institute are Leonard Kleinberg of the Communications and Navigation Division; Joseph Silverman of the Earth Observations Systems and Systems Engineering Division; Maksim Aleksandrov of the Laboratory for High Energy Astrophysics; and Lawrence Kobren, Frederick Gross, Joseph Colony and Joseph Epstein of the Engineering Physics Division.



BIOMEDICAL INSTITUTE participants. Seated are Program Coordinators Dr. Eugene DeLoatch and Wayne Chen. Standing (from left) are Irvin Hirsch, Walter Carpenter, Charles Smoot, Clifton Cole, Delma West, Dave Wodicka, Larry Hum, Judy Kosovich, Judy Reddick, and Joe Meyer.

GSFC/Mo Summer Rese



DR. TROY L. STORY (right) of Howard University is shown with his technical monitor, **Harry E. Peters** of the Laser Data Systems Branch. Dr. Story is working on the detection of hydrogen atoms in a hydrogen atomic beam by using a chemiluminescent detector. Sensitive hydrogen beam detection has direct application for the hydrogen atom beam frequency standard work at Goddard.

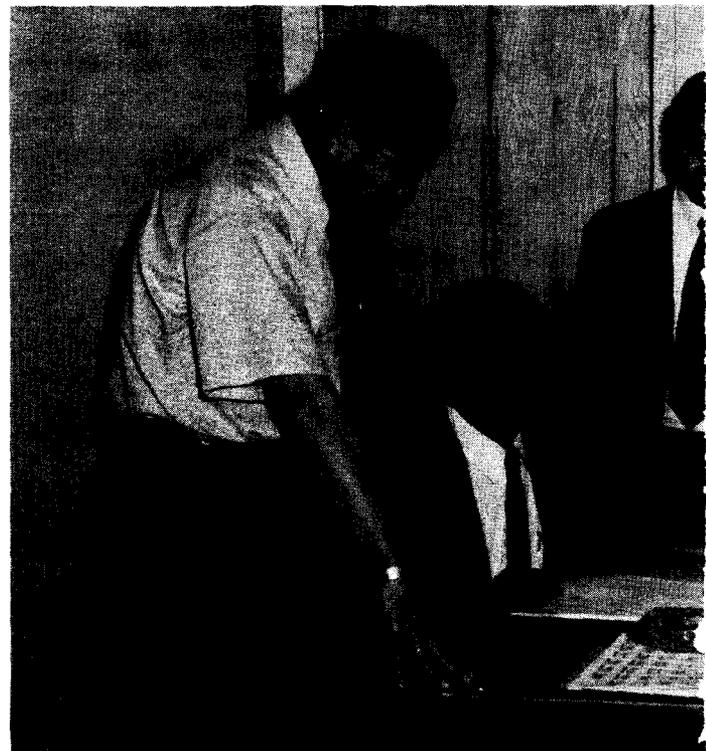
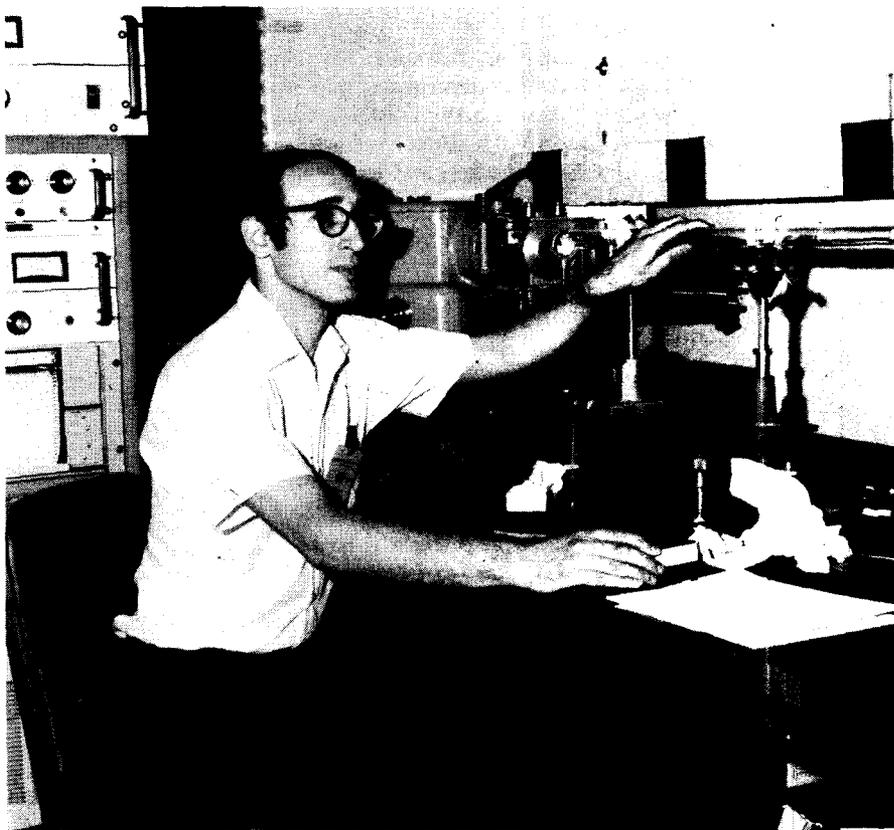
DR. MICHAEL L. GOLDMAN of Washington Technical Institute is conducting investigations of the spectroscopic and thermal properties of a large molecule reportedly detected in interstellar space. The molecule, bispyridyl magnesium tetrabenz porphine, has been suggested as the source of several diffuse bands in the visible and infrared regions of the interstellar spectrum. His technical monitors are **Dr. Bertram Donn** and **Emmett Chappelle** of the Astrochemistry Branch.

Nine faculty members from colleges and universities in Maryland, Delaware, Pennsylvania and the District of Columbia are conducting intensive research here this summer as part of a special program sponsored jointly by Goddard and Morgan State College. The ten-week program, which began its second season on June 5, allows the faculty members to work on practical problems under the direction of technical monitors from the Goddard staff.

The GSFC/Morgan State summer research program is designed to: make available the research and educational opportunities of Goddard to educational institutions in the area, strengthen the scientific and technological competence of colleges and universities, and stimulate cooperative participation in NASA research by the faculties of Negro colleges and universities. **Dr. Nathaniel K. Proctor**, Professor of Biology at Morgan State, is coordinating the program.

James R. Mundy, Goddard EEO and Contract Compliance Coordinator, says, "The program conducted during the summer of 1971 received favorable response from both faculty and technical monitors. We anticipate increased involvement of students and faculty from the predominately Black colleges and universities in NASA research as a result of this summer activity."

This year's research projects range from an administrative study to highly technical investigations. All projects concern areas of practical interest to Goddard. For example, **Timothy Wilson** of Morgan State College is working with **J. Edward Baden**, Assistant Chief of the Financial Management Division, to develop a 40-hour seminar on budgeting and accounting operations. This seminar could be made available to administrative and technical personnel requiring



PARTICIPANTS in the second Morgan State College summer research program coordinator. Standing are (from left) **Dr. Elgy Johnson** of L. Institute, **Lorenzo Hilliard** of Coppin State College, and **Dr. Archer S. M.**

Morgan State Research Program

knowledge of budget and accounting policies and procedures.

The technical projects include the work by Dr. Robert R. Kasten of the Washington Technical Institute and Dr. Robert Hobbs of the Laboratory for Solar Physics on processing and analyzing solar spectrometer data obtained from the new multichannel spectrometer located at the Sacramento Peak Observatory in New Mexico. The spectrometer is operated by the Laboratory for Solar Physics in collaboration with the Sacramento Peak Observatory.

Faculty members taking part in the second summer research program and their institutions are: Ernest Hammond and Timothy Wilson, Morgan State College; Dr. Michael Goldman and Dr. Robert Kasten, Washington Technical Institute; Dr. Archer S. Mitchell and Dr. Troy Story, Howard University; Lorenzo Hilliard, Coppin State College; Dr. Elgy Johnson, D. C. Teachers College; and Marian C. Johnson, Federal City College. These participants are devoting full-time to problems in one of the following disciplines: mathematics, computer science, physics, chemistry, management systems, and mechanical, electrical and electronic engineering.

Goddard technical monitors are: Dennis C. Evans of the Laboratory for Optical Astronomy; J. Edward Baden, Assistant Chief of the Financial Management Division; Dr. Bertram Donn and Emmett W. Chappelle of the Astrochemistry Branch; Dr. Robert Hobbs of the Laboratory for Solar Physics; Dr. Keith Ogilvie of the Space Plasma Physics Branch; Harry E. Peters of the Laser Data Systems Branch; Dr. August Buffalano of the Advanced Plans Staff; Euel R. Lancaster of the Trajectory and Dynamics Branch; and Dr. Grace Lee Picciolo of the Earth Observations Systems and Systems Engineering Division.

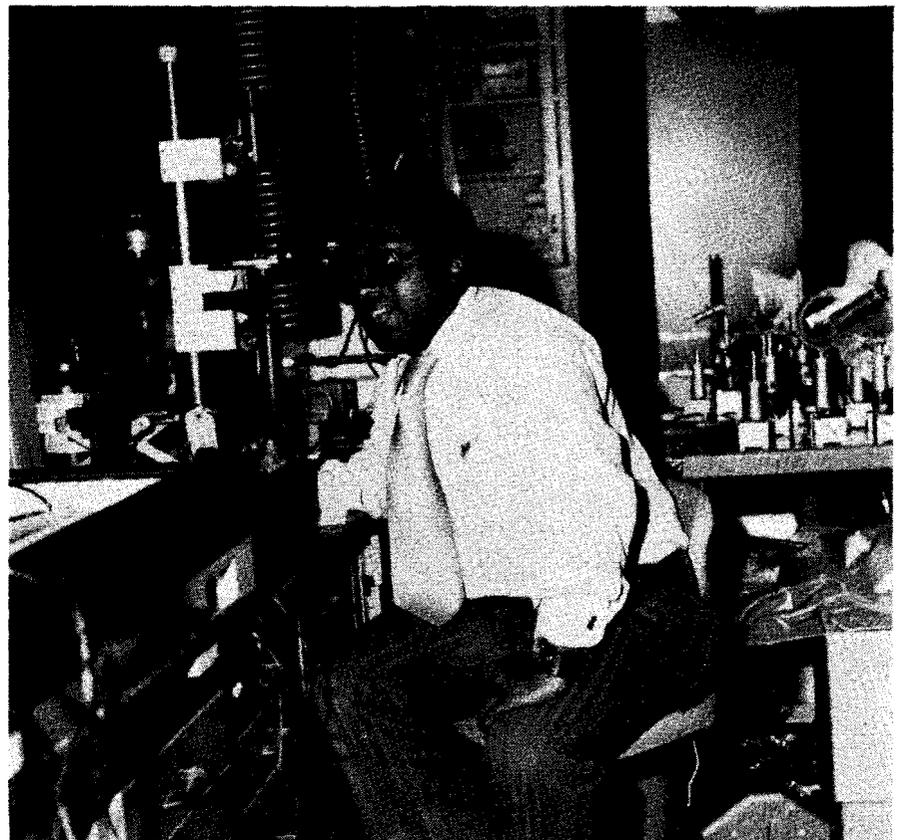


MARIAN C. JOHNSON (left) of Federal City College and Elaine Budd, a Goddard Medical Technologist, read biological samples in a photometer. Miss Johnson is working this summer with Dr. Grace Lee Picciolo on the FLASH (Fast Luciferase Automated Assay of Specimens for Hospitals) method for detecting bacteria in biological materials. The method is being applied to the rapid detection of bacteria in urine and spinal fluids for use in hospitals. It utilizes the reaction of bacteria ATP with the bioluminescent enzyme luciferase from the firefly.

ERNEST C. HAMMOND, JR., of Morgan State College is developing a method and device to calibrate spectroscopic film according to certain spectral-photometric characteristics used in ground-based and rocket launched instruments by the Laboratory for Optical Astronomy. This research is being conducted jointly by Dennis C. Evans, D. A. Kinglesmith and A. K. Stober, all of Goddard, and Mr. Hammond.



h project discuss their projects with Dr. Nathaniel K. Proctor (seated) of D. C. Teachers College, Dr. Robert R. Kasten of Washington Technical Institute, and Dr. Archer S. Mitchell, Jr., of Howard University.



Summer Institute in Computer Applications

The third season of the Summer Institute in Computer Applications began on June 12. The ten-week program is being conducted in conjunction with Bowie State College and will combine work experience with courses taught by Goddard personnel in computer utilization, programming and basic job control languages.

Dr. Peggy Bannister Scurry, of Bowie State College, is Program Director. Hans Bremer, Head of Goddard's Computer Management Section, is chairman of the Ad Hoc Committee for the Institute.

The students receive a fellowship and four credit hours from their respective schools. To qualify for the program they must have at least a 3.0 average and have completed their sophomore year.

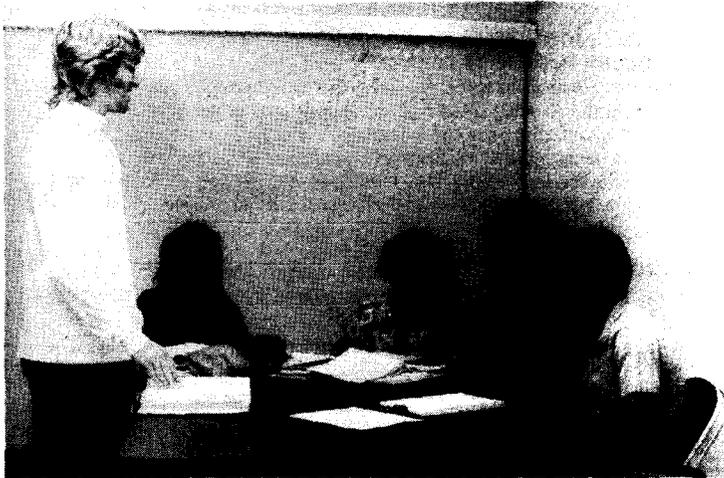
Nineteen undergraduate students from predominately Black colleges and universities in the area are taking part this year. They come from: Bowie State College, Cheyney State College, Coppin State College, D.C. Teachers College, Delaware State College, Federal City College, University of Maryland-Eastern Shore, and Washington Technical Institute.

Prime goals of the Institute are to: provide students with first hand knowledge and experience in working with large scale

computers; provide Goddard personnel with the stimulation that comes from working with young students; help Goddard get some of its smaller projects out of the way; and provide a better liaison between the center and participating schools.

The Institute is divided into two areas — formal instruction and on-the-job training experience. The first area involves teaching FORTRAN to 11 new students using the IBM Programmed Instruction Manuals under the guidance of Goddard instructors for three weeks. In addition, six students have returned for a second season to take a one-week refresher course in FORTRAN plus two weeks of programmed instruction in Assembler Language. The second area involves work on a computer project for seven weeks under the guidance of Goddard advisors, James Andary, Curtiss Barrett, Sue Burrowbridge, Oliver Clark, Dennis Giblin, Daniel Kirk, John Morton, Bob Nelson, Lloyd Purves, Barbara Putney, Irving Salzberg, Jacqueline Sorenson, Walt Truszkowski, and Fred Whitlock. Each student must write a paper summarizing and analyzing their group's research project at the end of the summer.

In addition to course work and job training, the student will participate in seminars and take field trips to other government facilities.



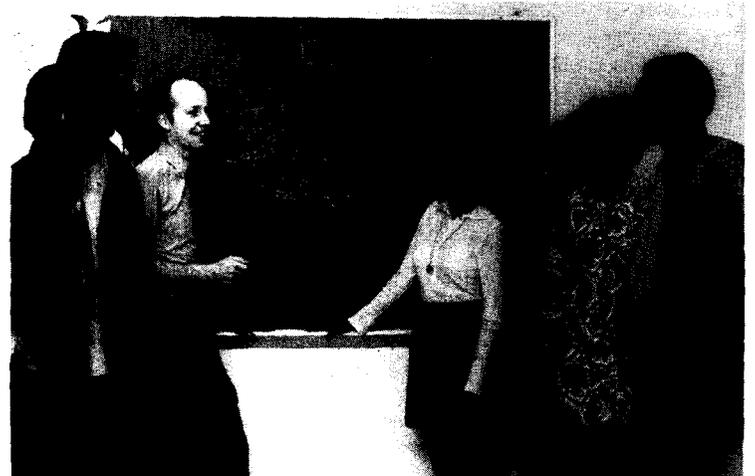
VALERIE WARD (from left, seated), Shirley Jones, Barbara Hollis and Lamont Murphy use FORTRAN IV to write computer programs and solve problems under the supervision of C. Wrangle Barth (standing), instructor.

LARRY HULL (left), teaches a class in FORTRAN IV computer concepts to the new students in the Summer Institute. Seated are Thomas Bradley, Windell Williams, Betty Herring, Brenda James, Robert Uhl, and Anthony Walker.



PROGRAM DIRECTOR Dr. Peggy Scurry (from right), Ronald Sharps, Sue Burrowbridge, advisor, and John Worthy discuss plans for a computer program to be used for the University Without Walls Project.

STUDENT RETURNEES learn operations of the IBM 360 as part of their training in Assembler Language under the instruction of Dennis Giblin (not shown). From left are Roland Wilson, Raymond Witley, FORTRAN instructor, Bob Nelson, Paula Spears, Cherrill Bradshaw, Nellie Howard and Hugh Williams.





BILL WATSON, of the Special Programs Office guides a tour through the Test and Evaluation facilities.

Goddard 'Milestone' Tours

For the past year, special tours of the Center have been conducted for employees who have reached milestones in their Federal careers. Invitations to take the tour are issued monthly to employees who, in the current month, have attained career Civil Service status, or have completed any increment of five years as career Federal employees.

The Milestone Tours were instituted by Goddard management in recognition and appreciation of the contributions that each employee makes to the center's total effort. The tour provides an opportunity for employees to visit areas beyond their normal scope of activities and to see the center from a broader perspective.

To date, approximately 450 employees have taken the Milestone Tour and have found it both informative and enjoyable.



SHEILA DUCK, of the Manpower Utilization Division, gives a demonstration in the Goddard Planetarium during a recent Milestone Tour.



LOCKE STUART, of the Special Programs Office, discusses Goddard's programs in the Satellite Room of Building 1.

Lightning

By David G. Lewoc and Arthur W. Alberg

The lightning season is upon us. We have already experienced about a dozen storms and can expect at least another dozen or two. The purpose of this article is to allay some possible fears about the nature of lightning by clearing up some commonly held misconceptions.

The electrical effect of a summer thunderstorm strike, 99.9 percent of the time, is a voltage drop, or as we call it, a "dip" in the power system. It lasts for only a few milliseconds and is evidenced by the blinking of lights. It may also cause hold-in relays to drop out, thereby requiring a re-start of some equipment. The dip is caused by circuit breakers opening at the PEPCO main power station after detecting a lightning hit on a power line. At the same time, lightning arrestors on the line shunt the high voltage to ground. These breakers close back in immediately after the hit. Between the action of the lightning arrestors and the breakers at the main station, very little, if any damaging lightning gets to us.

This is not to say that Goddard never experiences power surges due to storms. There definitely are times when a power surge occurs; however, it is usually slight and does not cause extensive damage.

You may have heard stories about lightning getting into equipment and burning out a transistor. Our trouble is in trying to find out why lightning chooses one little transistor out of millions (no exaggeration) and leaves all the others alone. It's been heard said, "Perhaps just a little bit of lightning got into the equipment." But just a little bit of lightning is like being just a little bit pregnant. It can't be. If lightning hits, there will be absolutely no doubt as to what was hit. It will literally blow things apart where it passes; there will be smoke, burned wires, and, in general, a big mess.

Lightning usually hits the highest point or the best conductor. For example, every few years, newspapers run pictures of lightning striking the Empire State Building. The reported number of times that the Empire State Building is hit a year is fantastic — somewhere up in the hundreds! Look at your own experience with regard to lightning strikes on buildings or homes. When did you last see such an occurrence? Have you actually ever seen lightning strike a house?

Incidentally, it is well to consider the fact that many other things besides lightning strikes can cause voltage surges or short duration pulses. For example, the simple act of turning on a fluorescent desk lamp can cause a voltage pulse of up to 300 volts or more on the power line. This pulse can be just as damaging to a piece of voltage-sensitive equipment as the aftermath of a lightning strike.

If anyone suspects that their equipment is troubled by voltage surges or transients, devices are available which can correct the condition. One such device, called a transector, turns on an SCR if the voltage exceeds a preset value. This shunts the overvoltage to ground. Another device, a metal oxide varistor made by General Electric, employs two zener diodes to accomplish the same basic purpose. Logically, they should be installed directly on the equipment they will protect. Get in touch with D. G. Lewoc or A. W. Alberg (on extensions 5186 or 4644 respectively) for more information about over-voltage protection.

Conservation Notes

Goddard's Conservation Officer "Sufferin Sam" Tarlton notes that closing the blinds on the sun-side of Goddard buildings can save \$50,000 per month in air conditioning costs during the hot months of summer.

Since many people on center are remiss about closing these blinds, Goddard has bought some solar protection material for windows on the south side of buildings. The material, which can block out 89 percent of the solar energy, is being installed

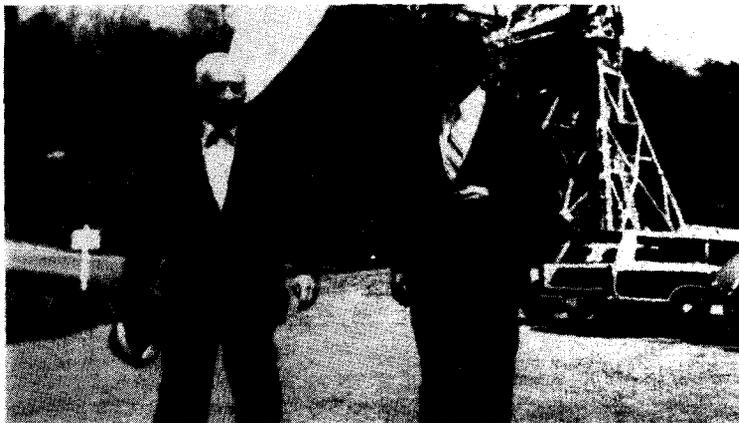
experimentally in Building 16 by the Plant Operations and Maintenance Division.

If you go by the building around mid July, take a look at it and see what you think. Go on in and see what you think of it from the inside, too. Give the POMD representatives a call on extension 5186—they would appreciate your comments. If the experiment works, we'll not only save dollars, we'll make people more comfortable. Hopefully we will soon see more solar protected windows at Goddard.

GODDARD AROUND THE WORLD



HONEYSUCKLE CREEK, AUSTRALIA. Astronaut John Swigert is welcomed to the Honesuckle Creek station recently by Station Director Don Gray. Watching are United States Ambassador Walter L. Rice (left) and Alex Meldrum, President of the Australian-American Association Canberra. Astronaut Swigert was in Australia for the Coral Sea celebrations at the invitation of the Australian-American Association.

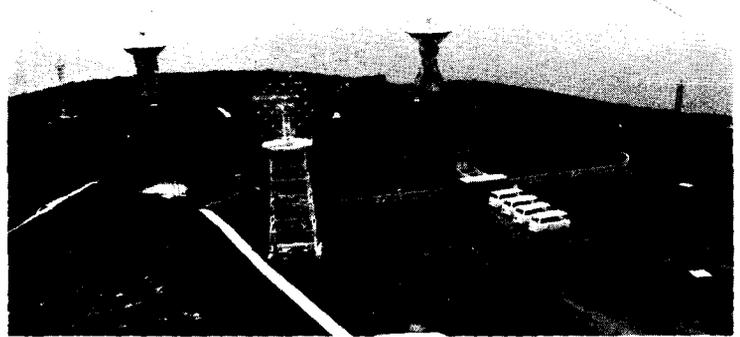


ROSMAN, NORTH CAROLINA. Dr. Louis T. E. Thompson, a former friend of Dr. Robert H. Goddard for whom this center was named, chats with Station Director James C. Jackson during an informal visit to the station. While seeing the station sights, Dr. Louis said that he worked with Dr. Goddard at Clark University from 1914 to 1920, and related a number of interesting stories about some of Dr. Goddard's early work and launches from his Aunt Effie's farm. Dr. Louis, a retired physicist, said he was Technical Director of the China Lake Facility from 1945 to 1951. He recently purchased a summer home in Tryon, N.C., and normally resides in Clinton, Mass.

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DEVIL'S ASHPIT. The NASA station on Ascension Island is located on the crest of an extinct volcano overlooking the sea. Shown is the Operations Building. Large antennas in back are the JPL Deep Space Network antenna (left) and the USB antenna. In front is an Acquisition-Aid antenna.

Devil's Ashpit Site Lives Up to Its Name

by John Nastopka
Network Facilities and Services Division

The Ascension Island Facility is used in supporting all phases of Apollo missions and other deep space programs. Because of its strategic location in the South Atlantic Ocean some 5,000 miles downrange from Cape Kennedy, Ascension Island is a critical station in filling the gaps that exist between the several 85-foot antenna facilities which cover the lunar phases of the mission.

The island could not have been designed better to keep men's minds on their work. With its 17 volcanic cones, its craters, and so-called Green Mountain surrounded by ridges, it is similar to some of the widely-publicized photographic views of the moon. Purely volcanic in origin, Ascension Island is one of the peaks of a submarine volcanic ridge. It is generally circular and has a diameter of less than seven miles. The land area is approximately 34 square miles. The soil consists principally of volcanic rock, cinders, ash and slaggy lava. The surface deposits around the volcanic cones are almost entirely ash and cinders.

The NASA tracking facility is at Devil's Ashpit, a well-named site located on the south east portion of the island at an elevation of 1761 feet. The area, which overlooks the ocean, is fairly level and is situated on the crest of an extinct volcanic cone.

The 350 Americans working on the island and 300 permanent residents obtain their drinking water from a sea water distillation plant north of Wideawake Field. Domestic water is supplied to the NASA site by truck.

The site uses 12,000 gallons of water per week at a cost of 5¢ per gallon as compared to .0385¢ per gallon of water in Prince George's County. Using 12,000 gallons of water at Ascension costs \$600, while in Prince George's County, Maryland, it would cost \$4.62.

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