GODDARD NEWS
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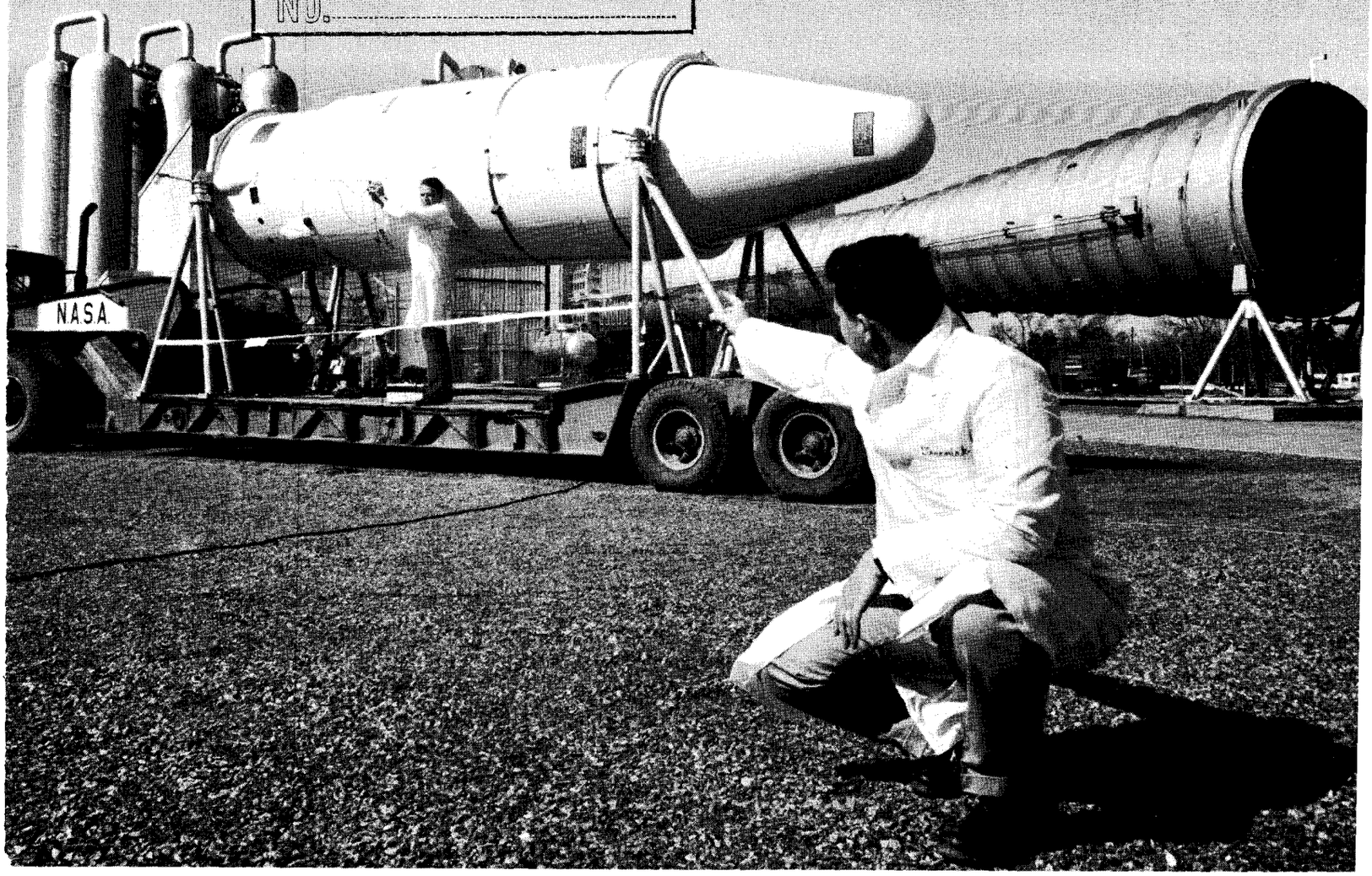


William B. Tereniak (foreground) is a Goddard engineer from T&E's field measurement section who was in charge of instrumentation for the acoustical test. Robert A. Dorian of the same section stands by the OGO test structure.

Test and Evaluation Gives OGO First Acoustical Trials

The Orbiting Geophysical Observatory (OGO) spacecraft was recently subjected to its first major acoustical test by Goddard's test and evaluation division.

Goddard conducted the test to determine experimentally the spectra and levels of high frequency vibration resulting from the launch acoustics environment of the OGO.

A further purpose was to determine the adequacy of the OGO subsystem specifications and to record the effects of the vibrations on the spacecraft.

The test was conducted at Langley Research Center whose 9 x 6 (foot) thermal structures wind tunnel was used as a noise source. The spacecraft under test was positioned in an area adjacent to the exhaust diffuser section of the tunnel. It was not exposed to the high velocity air stream in the tunnel exhaust.

For the tests, Goddard used a full scale model of the OGO spacecraft mounted on an OGO/Agena forward equipment rack and encased in a Nimbus type shroud. This test unit was instrumented to provide data pertinent to vibration at various locations as well as noise characteristics and distributions within the shroud.

This data will be utilized to determine coupling effects, cross correlation between vibration at various locations and the noise transmission loss through the shroud.

Two specific noise levels were generated to simulate the acoustic environment of the two launch vehicles planned for use in orbiting the OGO. A 149 db overall noise level was generated to simulate the acoustic environment of the Atlas/Agena which will be used to launch one version of the OGO spacecraft into an eccentric orbit from Cape Kennedy.

An additional overall noise level of 154 db was generated to simulate the anticipated increased acoustic environment of a Thor-Agena vehicle. This vehicle will be used to launch another version of the OGO spacecraft into a polar orbit from the Pacific Missile Range.

The test model was assembled vertically similar to its launch position. For testing, however, it was lowered to the horizontal position to simulate as closely as possible the actual launch environment.

Project manager for the test was Paul Alfonsi of Goddard's test and evaluation division.

During a session of the week-long soldering school, instructor John Stokes (front right) discusses a piece of work with John Fitz (seated). Other class members (from left) are: Vincent Arillo, Norman Beard, Maksim Aleksandrov, and William Stewart.

First Class Graduates From Goddard's New Soldering School

The first nine students enrolled in a new in-house training course on reliable electrical connections (alias hand soldering) graduated on April 3. The second group started April 13, and another begins training today.

The school will eventually aim to train all Goddard technicians who do soldering on flight hardware and ground support equipment. Instruction deals with the application of rigid NASA specifications to these critical systems.

Instructor John Stokes of the quality assurance branch said that the 40-hour course (full time for one week) consisted of "primarily practical exercises supplemented by demonstrations and visual aids."

Classes are limited to 10 students to insure individual attention and instruction. James Reese, head of the employee development branch, said that classes will be continued on a periodic basis for as long as there is a need.

The school is a cooperative effort. It was through the technical guidance of the quality assurance branch and the assistance of the systems integration branch, the fabrication division, the Goddard reliability committee and the employee development branch that it was organized and implemented.

The first graduating class included: Vincent L. Arillo, flight R-F systems branch; Nicholas V. Mejia, space power technology branch; William N. Stewart, space electronics branch; John F. Fitz and J. Russell Groves, sounding rocket branch; Julian F. Cottrell, communications satellite research branch; Norman Beard, electronics test branch; Max K. Powers, energetic particles branch; and Maksim Aleksandrov, instrumentation branch.

Russell E. Dorrell, head of the quality assurance branch, indicated that the school's physical facilities are being made available on an afterhours basis to Goddard contractors for the benefit of their personnel who do soldering at the Center.

Success in GT-1 Starts Project Gemini Rolling

The first flight test of the Gemini capsule and the modified Titan II rocket that will launch two-man teams into space later this year was a success.

GT-1 was off the launch pad just one second behind schedule on April 8. The orbit was slightly more elliptical than planned, but was well within satisfactory limits.

204 Miles High

The high point of the GT-1 orbit was 204 miles. It's closest approach to earth was 99.6 miles.

NASA officials stated that the orbit, slightly higher than planned (planned orbit was 186 miles apogee and 101 miles perigee), could have been easily corrected by the on-board propulsion system carried in the complete manned version.

The capsule that was orbited was not equipped with a heat shield, and will probably have re-entered the atmosphere and burned up before this issue of GODDARD NEWS is distributed.

It was the same size and weight as the later versions, but was filled with instruments and ballast during this test. The shell of the Titan's second stage remained attached to the orbiting spacecraft.

GT-1's successful orbiting will be followed in August by a 2,000-mile unmanned flight down the Atlantic Missile Range, followed by a manned flight near the end of the year.

Rendezvous Coming Up

This was the first of 12 scheduled flights in the second stage of NASA's manned flight program. Later missions will test and perfect rendezvous and docking techniques that are necessary for the implementation of the later three-man Apollo lunar missions.

GT-3 Team Named

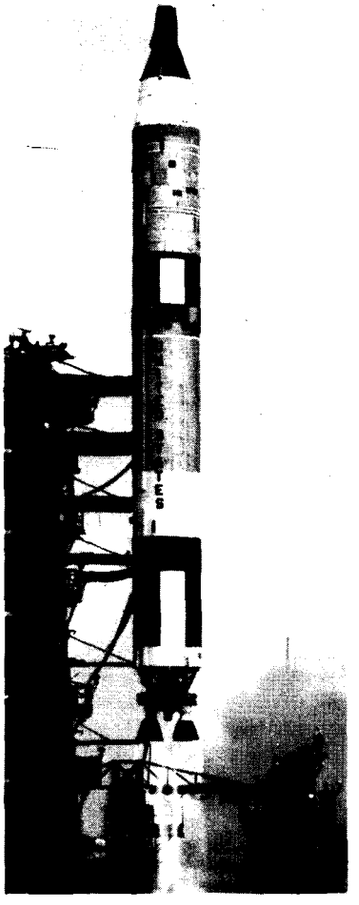
The first men scheduled to orbit the earth in the two-man Gemini spacecraft will be Virgil "Gus" Grissom and John W. Young. Their selection was announced on April 13 after the successful flight test of GT-1.

Grissom was America's second man in space. He piloted Mercury-Redstone 4—Liberty Bell 7—on a suborbital flight July 21, 1961. His was the last in the Redstone program.

"Gus" is 38 years old. He is a Major in the Air Force, and was one of the original seven astronauts assigned to NASA in April of 1959. Grissom was born in Mitchell, Ind.

Young, Grissom's teammate for the first manned Gemini-Titan mission, was selected as an astronaut in September, 1962. He is a Lt. Commander in the Navy.

He is 33 years old and was born in San Francisco, Calif.



This launch picture shows the first firing of the modified Titan II launch vehicle with a Gemini capsule attached. The flight was a success. Goddard's manned spacecraft tracking network tracked the mission.

News About Space & Aeronautics

● A Space Age "Gatling gun" is being used by Marshall Space Flight Center engineers to shoot for the Moon.

The "gun" has 10 large tubes clustered in a revolving circle, but it doesn't shoot anything.

Instead, it's a novel approach used to test non-metalic materials to be used in rockets for extended space journeys. Each tube is actually a vacuum and temperature chamber.

The "gun" can be loaded with specimens for varying tests in each tube. And, because of the "Gatling gun" cluster, the tests can be conducted simultaneously. It will simulate space conditions up to 500 miles from Earth.

It's built of stainless steel and sheer ingenuity. The device has a spark plug looking arrangement on the side of each muzzle that heats materials and records their temperatures. At one end of each tube, steel bellows capture the vacuum and assist in the pressure and tensile tests.

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● "The United States space program in al' its aspects accounts for only about one percent of the national economy. It's potential, however, for generating beneficial applications far exceeds the efforts and funds being invested in it. Many of the practical applications evolving from the space program are already beginning to be realized . . .

"Planned studies on fluoride feeding of animals and humans will provide medical data on the effects of flourine on bone and teeth, possible substitution in bones to prevent decalcification, and safe dosage and toxicity levels of flourine. . . .

"Further satellites with multiple access capability will make it possible to employ one satellite transponder for simultaneous communication between several pairs of ground stations. This will enable us to provide communications to under-developed areas and to where geography now precludes adequate conventional communications.—*Dr. Homer E. Newell to the House Space Committee*

• • •

● An instrument which will permit precise detection of the effects drugs may have on heart action of unborn babies has resulted from technological research in the space program.

The Food and Drug Administration and NASA's office of technology utilization report that preliminary experiments just completed by the FDA's division of pharmacology indicate that a piezo-electric transducer invented at NASA's Ames Research Center can, for the first time, monitor the heartbeat of a chicken embryo quickly, continuously, quantitatively and without egg damage that could affect experiments.

The instrument produces minute electrical signals when activated by exceedingly small pressures. It was invented by Vernon L. Rogallo of Ames to measure the impact of micrometeoroid dust in space. It is capable of measuring 1/1000th the impact of a grain of salt falling three-eights of an inch.

For the past four years the FDA has conducted research using the chick embryo technique, correlated with tests on animals, to study the effects of drugs, pesticides, and food additives. Until now, the research has yielded only gross information because the minute momentary changes in chick embryo hearts were not precisely detected.

When Rogallo suggested and subsequently demonstrated the potential application of the space device to chick embryo research, technology utilization officers at Ames brought it to the attention of Hdqs. technology utilization office which informed FDA.

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Goddard Postage Stamp Announced

Postmaster General Gronouski announced earlier this month that one of four new stamps to be issued in the near future will be a commemorative in honor of Dr. Robert H. Goddard in recognition of his pioneer role in the development of rocketry.

Issuance of the Goddard stamp is planned for the 50th anniversary of his first patents, granted in July 1914, which developed his idea of multi-stage rocket boosters and liquid propellants.

Dr. Goddard is generally regarded as the father of modern rocketry. His experiments began in 1914, and in 1926 he launched the first non-munitions rocket.

Munitions rockets had been used in the United States during the Revolutionary War—but Goddard pioneered the use of liquid fuel and the concepts upon which todays space boosters are built.

Dr. Goddard died in 1945. This Center was named in his honor. Now the Post Office Department has added a further tribute.

Details are not yet complete on designs, issue dates, or places of first-day ceremonies.

DELTA-OSO ACCIDENT:

Third Stage Ignition Probed

A 10-man NASA fact-finding committee was appointed by Goddard's director, Dr. Harry Goett, immediately after the accident last Tuesday at Cape Kennedy when a Delta third stage motor (X-248) ignited for no apparent reason.

The incident occurred in an assembly room where the motor and Goddard's Orbiting Solar Observatory had been mated in preparation for spin testing.

Eleven personnel were injured, and three were in critical condition as the GODDARD NEWS went to press. The only Goddard employee injured was John W. Fassett of the field projects branch.

The other ten involved were from Douglas Aircraft Co. and Ball Brothers Research Corp., the booster and satellite contractors, in that order.

"Project Fire" Launched

NASA Administrator James Webb lauded the Goddard launch operations group at the Cape for their successful count down and launch of "Project Fire" after the tragedy Tuesday morning.

On Tuesday afternoon the "flying thermometer" blazed a 20,000-degree path through the atmosphere to measure the heat that will sear spacecraft reentering from lunar missions.

Goddard Coming Events

Goddard Colloquium Lecture:

- **April 22, 4:15 p.m., Rm. 431, Goddard Institute for Space Studies, 475 Riverside Dr., New York N. Y.—Prof. Donald J. Newman, Mathematics Department, Yeshiva University, "Polynomial Approximation on Cartesian Product Spaces."**

Films:

- **April 23 and 30, 12:30 p.m., Bldg. 3 Auditorium—"Orbiting Solar Observatory." *The functioning of the orbiting solar observatory in gathering data concerning the sun's effects on the earth and its inhabitants is described. The first orbiting solar observatory was launched March 7, 1962 to study the sun from above the earth's atmosphere since the atmosphere filters out many of the sun's rays before they reach the earth.***

GODDARD NEWS

"It is difficult to say what is impossible, for the dream of yesterday is the hope of today and the reality of tomorrow."
—DR. ROBERT H. GODDARD

The Goddard News is a bi-weekly publication of the National Aeronautics and Space Administration's Goddard Space Flight Center, Greenbelt, Md., suburban Washington, D. C.

Phone—Ext. 4141 or 4142

Bruce Brough, *Editor* Shirley Deremer, *Inside Goddard*

Moon Harvest...

A close look at the surface features of this rock from the Iowa loess beds may determine that it is definitely of earthly origin—or, if certain signs are found—it may be subjected to more rigid testing here at the lab.

The first fruits of "Project Moon Harvest" arrived at Goddard from Iowa on April 6. The stony harvest whetted the appetites of Goddard scientists and technicians who are now analyzing the samples.

"Moon Harvest" is the designation of an unusual joint endeavor of Goddard and the Department of Agriculture. It was conceived by Dr. John O'Keefe of the theoretical division (see center spread story in the March 23 issue).

Beginning March 10, before spring plowing, the residents of a six-county area were asked to join hands with the space agency in a project to discover lunar fragments. These particles are theorized to have been chipped off by meteorite impact and attracted to earth by gravity.

The area chosen is almost entirely free of native stone due to thick natural blankets of loess, a fine wind-blown deposit of soil.

Less than a month after the project began, the first large number of "Moon Harvest" samples arrived via Spacemobile. Lloyd George, one of two space science lecturers assigned to the program by NASA headquarters, brought a truckload of "suspicious" rocks with him when he returned to the Washington area on the 6th. Prior to his delivery, only a trickle of rocks had arrived by mail.

The compact Spacemobile display truck used by the lecturers was unloaded at the laboratory area in building 4. "Now," according to Dr. O'Keefe, "the waiting is over and we can begin analysis."

Some of the samples will prove themselves earthly in origin by visual signs apparent to the eyes of trained scientists.

Others, which appear unusual, will be subjected to various tests.

Test Processes Described

Dr. Louis Walter, theoretical studies branch, who is working on the analysis, described the test process: "Samples will be crushed and the fragments examined under the microscope to determine the minerals present. Where this test is not decisive they will be sent to the microprobe to obtain a determination of the chemical constitution with special reference to the heavier elements."

The microprobe is an instrument for electron analysis of a very small area of a specimen. The principal is that electrons emitted from a filament are focused into a parallel beam which is directed onto a tiny (1 micron) spot on the sample being tested.

The electrons impinge on the surface of the sample, causing X-rays to be produced which are characteristic of the elements present. The X-rays are then spectroscopically analyzed for wave length and intensity.

(Cont'd on p. 5)

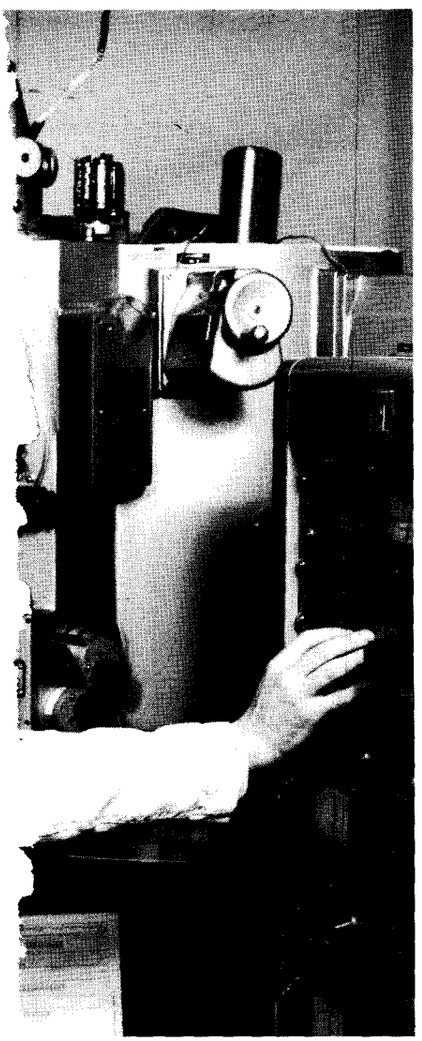
Results Come fr

Dr. Louis Walter and Dr. Joh some of the samples brought i. George (right). The Spacemot ground.

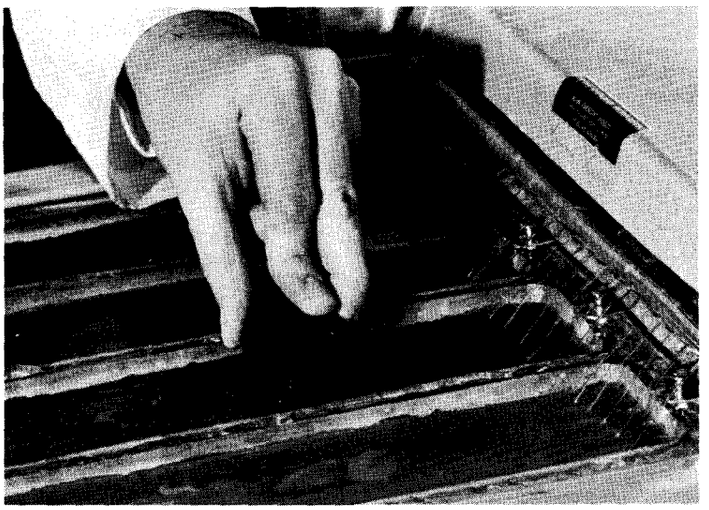
Frank Wood, Jr. is performing suspected moon rock using the

'om Iowa Farms

ın O'Keefe (from left) examine
n by space science lecturer Lloyd
ıile panel truck is in the back-



u chemical analysis on another
electron microprobe analyzer.



Rock surfaces are polished to test their reflective qualities and other properties on this grinding apparatus in the lab.

Dr. Louis Walter (right) and Joseph Bishop probe some surface indentations of a possible "moon rock" with a metal stylus. Visual examination precedes chemical or microprobe studies. Every rock received is examined.

Harvest Analysis

(from p. 4)

The most difficult specimens at this point are glasses which lack any crystalline structure at all and must always go to microprobe.

"In studying the results from the microprobe," Dr. O'Keefe said, "we are especially interested in unusually high abundances of elements which would tend to lower the melting point of glass. This is the ordinary indication of an artificial glass, cinder or slag.

"For example, blast furnace slag contains anomalous amounts of lime; the slag of various metallic ores contain anomalous amounts of the corresponding metal such as copper or lead."

The hopeful materials are those whose chemistry corresponds in general to what scientists believe to be the relative abundances of the elements throughout the universe. Glass of such a composition is very unlikely to be produced by man.

This is especially true if the glass resembles a terrestrial rock in containing a large amount of aluminum.

In the latter case, Dr. O'Keefe and others involved in the analysis would request a full analysis, both major elements and minor elements, usually from the U. S. Geological Survey.

If still in doubt, the final test is to request a search for the radioactive isotop Al^{26}, which is formed in interplanetary space by the action of primary cosmic rays, and is the surest known mark of an extra-terrestrial origin.

It is expected that some of the samples will make a real contribution to the understanding of the lunar surface where astronauts may land within five years. They should give some clues useful in the design and operation of the landing gear for the Apollo module schedule to place men on our natural satellite.

In addition, they should give data on the chemistry and geology of the moon, which will help to decide whether it is a fragment of the Earth or a stray body captured by the Earth.

In any event, the citizens of six counties in Iowa can feel a bit of extra pride when Apollo lands and sends the first message from the moon—for they will have had a hand in the venture.

Bank Branch Office Opens Soon at Goddard

Starting Thursday, April 30, all "banking problems" will be solved for employees here at the Center.

A full-service branch office of the Citizens Bank of Maryland will open for business in building 17. The bank will be open Monday through Friday from 8:30 a.m. to 3:30 p.m.

Full Service Offered

All banking services will be provided, including checking, savings, loans, travelers checks, utility bill collecting and other transactions.

Another advantage to having a branch office here at Goddard is that all patrons can use other branches located throughout Montgomery and Prince Georges Counties at other times.

Some branches are open daily until 8:00 p.m. All are open on Saturdays until noon. You can do your banking at any one or all offices of the Citizens bank — daytime — night-time — and Saturday too!

Last August, the Citizens Bank achieved a first in the field of banking when they opened three new offices in one day. According to Alfred H. Smith, president, a repeat performance will be made on April 30.

Two other Citizens offices will be opened on the same day. One is located at University blvd. and Riggs road and the other at the intersection of Greenbelt and Branchville roads in Branchville.

French-U.S. Project Advances

A joint meeting earlier this year between French and U. S. scientists will result in a cooperative project for launching a satellite to investigate the characteristics of Very Low Frequency (VLF) electromagnetic wave propagation in the ionosphere. As in other international programs, Goddard will manage the project for NASA.

The satellite project was provided for in a Memorandum of Understanding dated February 18, 1963, between the French National Center for Space Studies (CNES) and NASA which set forth a two-phase flight program.

Phase I, two suboribtal launchings of the French experiments by Goddard-supplied Aerobee sounding rockets, was successfully completed last year.

The launching of a French satellite into orbit was conditioned upon agreement that the results of Phase I demonstrate the feasibility of the scientific experiments to be performed with the satellite.

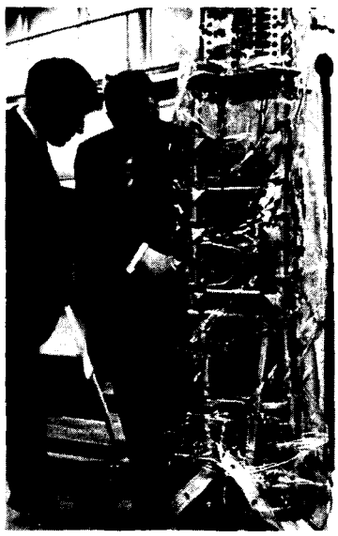
Following a study of these results at the March 4 meeting, NASA and CNES agreed on the scientific importance of moving ahead with the second phase, with the goal of launching a satellite in 1965.

The launch will take place from the Pacific Missile Range using a Scout vehicle provided by NASA.

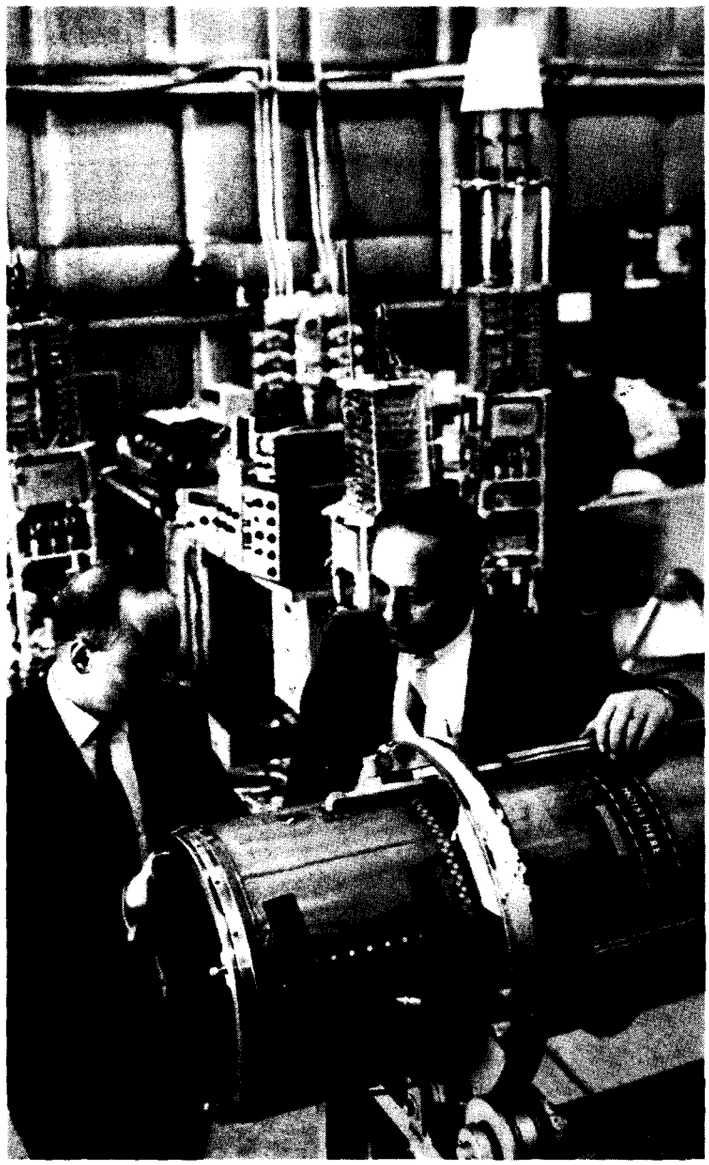
The satellite will be entirely funded and constructed by France under the supervision of CNES. The French National Center of Telecommunications Studies (CNET) will be responsible for the scientific experiments.

The U.S.-French satellite program will have an American project manager and project scientist from Goddard. Their roles, as their counterparts in other international cooperative programs, will be coordination and liaison.

Goddard's project manager is Samuel Stevens, mechanical systems branch. Robert Rochelle, flight data systems branch, has been named project scientist.



Transmitting equipment aboard the FR-1, a cooperative space probe successfully initiated last fall as a stepping stone to the satellite program is examined here by (from left); CNET technical director C. Fayard and CNES satellite division head J. P. Causse.



Goddard's project coordinator Sam Stevens (left) and Robert Clauvel, French project manager for FR-1, launched last fall, discuss the Aerobee vehicle interface between the Goddard rocket and the French payload. After the success of the joint sounding rocket program, France and the United States have announced plans for a satellite.

Recent Technical Publications Authored by Goddard Staff

T. E. Michels, "The Backward Recurrence Method for Computing the Regular Bessel Function," NASA Technical Note D-2141, March 1964.

E. I. Powers, "Thermal Radiation to a Flat Surface Rotating About an Arbitrary Axis in an Elliptical Earth Orbit: Application to Spin-Stabilized Satellite," NASA Technical Note D-2147, April 1964.

R. A. Cliff, "Coding an Analog Variable for Constant Percentage Error," NASA Technical Note D-2257, March 1964.

S. M. Neuder, "Proposed Mechanism for Thermophototropic Behavior in Perovskite-Structured Titanates," NASA Technical Note D-2258, March 1964.

An interested audience and a Spacemobile lecture seem to go hand-in-hand. Here lecturer Robert Perry presents his program for Goddard employees. He also talked to area mathematics teachers Saturday during the Joint Board Conference here (see story on p. 8).

news from the Institute

Goddard Institute for Space Studies
475 Riverside Drive, New York, N.Y.

Where Do Meteorites Come From?

Although the science of meteoritics is very young, man's experience with meteorites dates back to the very dawn of human history. Ancient records are full of accounts of "stones falling from heaven," a "fall of stars like rain," and "skybolts."

And as long as meteorites have been known, scientists have been searching for the answer to the question, "Where do they come from?"

Last month, at a seminar at the Goddard Institute for Space Studies, Dr. J. R. Arnold of the University of California at San Diego suggested a possible explanation to one of the biggest difficulties standing in the way of the most prominent theory of meteoritic origins.

The common thought today is that meteorites are the result of collisions between asteroids, occuring perhaps every few million years. The collision results in a scattering of debris into space, some of which eventually crosses the orbit of a planet and collides with it.

In 1959, a reliable orbit for a meteorite was obtained when one fell between two tracking cameras in Czechoslovakia. The cameras had been waiting for this to happen for seven years.

Dr. J. R. Arnold of the Univ. of Calif., at Institute seminar in New York.

From the velocity and angle, scientists were able to derive the orbit of the meteorite and found that it was highly elliptical, with one end at the asteroid belt and the other passing between Earth and Venus.

It would thus appear that the meteorite came from the asteroid belt, and scientists concluded that perhaps all meteorites come from this belt.

However, a meteorite thrown off as the result of an asteroidal collision would have insufficient velocity to cross the orbit of the Earth, Dr. Arnold pointed out.

He suggested that Mars, which has a highly elliptical orbit, could pick up and accelerate the meteorite, providing the added velocity required to cross the orbit of the Earth.

A major difficulty to the asteroidal theory of meteoritic origins is the difference between the cosmic ray exposure ages of stony meteorites and those of iron meteorites.

The mean lifetime of iron meteorites has been calculated to be one hundred million years; that of stony meteorites, ten million years. If stony meteorites come from the asteroid belt, one would expect a greater age.

Dr. Arnold concluded that the easiest way to account for the difference is to suggest a lunar origin for the stony meteorites, and an asteroidal origin for the irons.

According to this theory, a comet branches into the moon, resulting in a huge collision and a chipping off of debris that scatters into space. Some of the pieces are trapped in the Earth-Moon system and come to Earth in a relatively short period of time.

Goddard Speech and Paper Presentations

(Technical presentations approved as of April 10, 1964 for period through May 4. Requests for copies of speeches and papers should be made directly to the author.)

SPEECHES

Wilmot N. Hess, AGU Visiting Scientists Program, April 6-10, and 17, 1964, St. Louis, Mo., Condord, Calif., and Durham, N. H., ***"Exploration of Space,"*** and ***"Space Physics Research on and about The Moon."***

A. G. W. Cameron, New York University, Sigma Pi Sigma, National Physics Honor Society, New York, New York, April 10, 1964, ***"Neutron Stars and Celestial X-Ray Sources."***

Bertram Donn, Space Science Seminar, University of Maryland, April 14, 1964, College Park, Md., ***"The Origin of Cosmic Dust."***

John A. O'Keefe, Franklin and Marshall College, April 18, 1964, Lancaster, Pennsylvania, ***"Origin of the Moon."***

Norman F. Ness, URSI-AGU-AAS Joint Symposium, April 15-24, 1964, Washington, D. C., ***"Initial Results of the IMP-I Magnetic Field Experiment."***

A. G. W. Cameron, The Explorers Club Annual Dinner, New York, N. Y., April 17, 1964, ***"Some Mysteries of Celestial X-Rays."***

R. E. Bourdeau, Westinghouse Electric Corporation, April 23, 1964, Pittsburgh, Pa., ***"Recent Studies of the Ionosphere."***

Eleanor C. Pressly, Erskine College, April 28, 30, 1964, Due West, South Carolina, ***"Sounding Rocket Program."***

PAPERS

M. P. Thekaekara, Meeting on Solar Simulation Research and Technology, April 7-8, 1964, NASA Headquarters, Washington, D. C., ***"The Solar Constant and Spectral Distribution of Solar Radiant Flux."***

John Rogers, Meeting on Solar Simulation Research and Technology, April 7-8, 1964, NASA Headquarters, Washington, D. C., ***"Simulation of Albedo and Earth-Emitted Radiation."***

E. J. Kirchman, Technical University of Rome—Lecture Series, April, 1964, Rome, Italy, ***"Vibration Testing & Associated Recording & Analysis Techniques."***

David Stern, American Geophysical Union, April 21-24, 1964, Washington, D. C., ***"The Interpretation of the Flux Invariant,"*** and ***"The Cosmic Ray Anisotropy."***

S. I. Rasool, American Geophysical Union, April 21-24, 1964 Washington, D. C., ***"The Ionosphere of Jupiter."***

L. R. Davis, American Geophysical Union, April 21-24, 1964, Washington, D. C., ***"Observations of Protons Trapped Above 2 Earth Radii,"*** and ***"Time Variations of Electrons Trapped Between 2 and 3.7 Earth Radii."***

R. A. Hoffman, American Geophysical Union, April 21-24, 1964, Washington, D. C., ***"Magnetic Effects of the Quiet Time Proton Belt."***

K. Maeda, American Geophysical Union, April 21-24, 1964, Washington, D. C., ***"Diffusion of Auroral Electrons in the Polar Atmosphere."***

W. E. Daniels, American Geophysical Union, April 21-24, 1964, Washington, D. C., ***"An Evaluation of the Confidence Levels of the Spherical Harmonic Coefficients for the Geomagnetic Field."***

Masahisa Sugiura, American Geophysical Union, April 21-24, 1964, Washington, D. C., ***"Longitudinal Variation of the Equatorial Electrojet,"*** and ***"Universal-Time Variation of Global Auroral Electrojet Intensity During the Magnetic Storm of February 11, 1958."***

John A. O'Keefe, American Geophysical Union, April 21-24, 1964, Washington, D. C., ***"Tektites and the Moon."***

P. M. Nakada, American Geophysical Union, April 21-24, 1964, Washington, D. C., ***"Spectra of Protons in Outer Radiation Belt and Violation of Third Adiabatic Invariant,"*** and ***"Parker Mechanism and Protons in Outer Radiation Belt."***

W. N. Hess, American Geophysical Union, April 21-24, 1964, Washington, D. C., ***"On Fluxes of Outer Belt Protons."***

Julius A. Kaiser, Illinois Institute of Technology Spring 1964, Control and Computing Systems Symposia, April 24, 1964, Chicago, Ill., ***"Passive Automatic Direction Finder."***

M. Levinsohn, SAE/ASME Aerospace Production Forum, New York, N. Y., April 27-30, 1964, ***"Economic Manufacturing Method for Bonded Structures."***

D. E. Guss, American Physical Society, April 27-30, Washington, D. C., ***"Modulation of Low Energy Galactic Cosmic Rays."***

D. A. Kniffen, American Physical Society, April 27-30, 1964, Washington, D. C., ***"A Search for Gamma Ray Point Sources."***

Aaron Temkin, American Physical Society, April 27-30, 1964, Washington, D. C., ***"Partial Wave Theory of Two-Electron Homonuclear Diatomic Molecules."***

L. Schmid, American Physical Society, April 27-30, 1964, Washington, D. C., ***"Spinor Alternative to Euler's Equation."***

M. Fibich, American Physical Society, April 27-30, 1964, Washington, D. C., ***"Phonon Assisted Tunneling in Superconductors."***

Paul A. Lantz, IEEE Meeting, April 28, 1964, San Francisco, Calif., ***"NASA Space Data Acquisition Antennas."***

Bernard Rosenbaum, AGARD Fluid Dynamics Panel Specialists Meeting, April 20, 1964, Marseilles, France, ***"Plasma-Electromagnetic Wave Interaction During Super-Orbital Re-Entry."***

Goddard Hosts Conference on Mathematics

The Center was host for a conference on mathematics education last Saturday, April 18, sponsored by the Joint Board on Science Education. The board is a group established by the Washington Academy of Sciences and the D. C. Council of Engineering and Architectural Societies to cooperate with science teaching in area schools.

Mathematics teachers and others who attended were welcomed by Dr. John K. Taylor, the Joint Board's director of science projects. Dr. Michael J. Vaccaro, Goddard's assistant director for administration, keynoted the conference with an address on "The Space Age and Its Challenges to Education." Dr. Joseph Siry spoke about the mathematics of orbital calculations.

Interwoven through the activities of the day were tours of building 3 and the satellite room in building 1.

The afternoon session began with a talk by Dr. Joseph Hilsenarth, National Bureau of Standards, titled "Computer Assisted Instruction in Mathematics."

Two Goddard space science lecturers participated in the conference. John Bannister presented the NASA Spacemobile lecture as given to school children around the Center's five-state area of responsibility. Robert Perry illustrated methods of relating high school mathematics to problems in space exploration.

But just what is the Joint Board, and what are its functions?

It was established in 1955 when the need for a more intensive thrust was seen in the field of science education by the two sponsoring organizations. Some of its activities include: school contacts, career counseling, sponsoring science fairs, and a program in which technical personnel visit schools to lecture on their fields of interest as unpaid replacement teachers. The latter service allows teachers to attend technical meetings or other activities of like nature.

The Joint Board provides each secondary school in the metropolitan area with a "contact member" or technical advisor. This person serves without remuneration, rewarded only by the knowledge that he is furthering the careers of a new generation of scientists.

Some of his services may be to obtain speakers for science clubs or career day, consultants for science workshops, or judges for science fairs. He may also help to secure professional people to help science students with career selections.

The Joint Board maintains a roster of people willing to give this sort of assistance to the schools through the contact member.

Three Goddard scientists appeared in the 1963-64 Joint Board directory as contact members. They are: Mrs. Marjorie Townsend, John A. Maskasky, and Harold J. Peake.

Many other Goddard scientific personnel are serving the young people in our area school systems in other ways, usually through the Joint Board contact members.

There are many opportunities to serve the youth in this area that cannot be taken care of due to the lack of technical persons able to spare the time and make the effort to cultivate tomorrow's leaders in the field.

The education office of public affairs here at Goddard (ext. 5572) or one of the contact members can put interested persons in contact with the Joint Board for service to the academic community.

Here is one example of the type of activity which the Joint Board on Science Education encourages and coordinates. These two Goddard men volunteered as area science fair judges. They are Gail Smith (far left) and Raymond Wescott (far right). The two students, Betty Chin and Steve Karlin, tied for first place in the ninth grade physics competition at Alice Deal Jr. High School in Washington, D.C. Miss Chin's display deals with the polarization of sugars. Karlin's entry was on ultra-violet light. This science fair was held early in April.

MANAGEMENT SYMPOSIUM:

Federal Council for Science and Technology Meets Here

A symposium concerned with broad issues in the management of the federal scientific and engineering establishment met at Goddard on April 13-14 under the auspices of the Federal Council for Science and Technology.

Nearly 100 members of the scientific community attended the meetings, which were planned by a board of seven led by Dr. A. V. Astin, Director, National Bureau of Standards, who is Chairman of the Standing Committee of the Federal Council.

The six who assisted in symposium planning included: Dr. Harry J. Goett, Director of this Center; Dr. Thomas B. Nolan, Director, Geological Survey, Dept. of Interior; Dr. Dillion Ripley, II, Secretary, Smithsonian Institution; Dr. James A. Shannon, Director, National Institutes of Health; Dr. Bryon T. Shaw, Administrator, Agricultural Research Service, Dept. of Agriculture; and Dr. F. Joachim Weyle, Deputy Chief and Chief Scientist, Office of Naval Research.

After a welcome and introductory statement, the two-day symposium included panel discussions and reports in addition to case studies.

On the final day, a tour of Goddard facilities was provided for those who desired to take part.