



lunar AND planetary information bulletin



NUMBER 17

NOVEMBER 1978

TIME FOR THE TENTH!

MARCH 19-23, 1979 - JOHNSON SPACE CENTER

Plans for the TENTH LUNAR AND PLANETARY SCIENCE CONFERENCE are already underway. The first announcement has been mailed to principal and co-investigators.

The Conference will consider the following broad, problem-oriented topics:

1. Constraints on structure, composition, and history of planetary interiors.
2. Characteristics and movements of materials on lunar, planetary and asteroidal surfaces.
3. Characterization and evolution of volcanic landforms.
4. Characterization and evolution of planetary crusts
5. Nature and effects of impact processes.
6. Extraterrestrial materials as solar/interplanetary/interstellar probes.
7. Earliest history of the solar system

In addition to the usual scientific sessions, it is planned to join NASA in commemorating the flight of Apollo 11 (July 16-24, 1969) and the subsequent decade of scientific research. Plans for this celebration are not yet complete, but are likely to include reviews of scientific progress during the last decade and forecasts by the responsible individuals, of missions and science we can expect to see during the next decade. This special commemorative day will probably be Wednesday and will culminate with a banquet that evening. The Conference will end on Friday evening rather than the customary Friday noon.

Some important deadlines:

November 30, 1978

Abstract forms will be mailed to PI's

January 15, 1979

Abstract submission DEADLINE

Mid-February, 1979

Distribution of Abstract volumes

March 19-23, 1979

X LUNAR AND PLANETARY SCIENCE CONFERENCE

April 23, 1979

Proceedings Manuscript DEADLINE

If you have not received the first announcement of the Conference and wish to receive it and subsequent mailings, please contact the Symposia Office at the LPI. NEW TELEPHONE NO. 713-486-2150.

TENTH L&PSC - CALL FOR SPECIAL SESSIONS

As in the past, one half-day will be set aside for small, informal sessions. These sessions may be impromptu or devised and structured by members of the lunar science community as desired. The sessions will not be considered part of the formal program but the Program Committee should be kept informed as plans for such sessions are developed in order to announce them to attendees. Two such sessions already in the formative stages are:

TERRAFORMING: Artificial manipulation of planetary environments in order to facilitate human colonization.

This concept from science fiction and science speculation, can also be a productive topic for identifying unknown factors in climatology, planetology, SETI (detecting alien terraforming activities), solar system energy and mass transport (natural and induced), and other fields. A special evening session on the topic is being considered for the Tenth Lunar and Planetary Science Conference and papers are being solicited on numerous relevant topics such as:

Atmospheric modelling
Solar System Volatile Resources and Transportation
"Eco-synthesis"(a la the Ames Mars study)
Insolation Reduction/Augmentation/Modulation
Biological Tools of Planetary Modification

The May 1978 issue of Astronomy carried a lengthy article on TERRAFORMING by James Oberg who is currently working on a book on the topic.

Individuals interested in participating in this special session should contact JAMES OBERG, Johnson Space Center, Code CF6, Houston, TX 77058. Telephone: 713-483-4171

FUTURE LUNAR EXPLORATION: There is no doubt that lunar exploration will resume and that large scale missions will again take place. They may be manned, unmanned, or both. They may or may not be tied to such practical projects as lunar mining, or to large permanent bases.

You may well have considered what scientific questions you would like to see attacked at that time, and what might be the best experiments for the purpose. Our plan is to discuss them at a special session of the Tenth Lunar and Planetary Science Conference. It seems a good time to start some new thinking. A form for indicating your interest in this special session is included with this BULLETIN. All ideas and recommendations should be sent to Dr. Criswell at the LPI. NEW PHONE NUMBER 713-486-2152. Your cooperation is deeply appreciated.

*Prof. J. Arnold
University of California, San Diego*

*Dr. David R. Criswell
Lunar & Planetary Institute*

NEW "DIMENSIONS" AT LPI - See new telephone numbers page 24

Please return this form to Dr. David R. Criswell, Lunar and Planetary Institute.

FUTURE LUNAR EXPLORATION - PROPOSED SPECIAL SESSION AT THE TENTH L&PSC

I am interested in the Special Session and list some of my ideas and recommendations below.

I will not be able to attend the Special Session but would like to submit some ideas and recommendations for consideration.

NAME _____ ADDRESS _____
(Please print)

PHONE _____

RECOMMENDATIONS

BOLDNESS IS NOT INAPPROPRIATE. ADDITIONAL PAGES WELCOME

RECOMMENDATIONS FOR "FUTURE LUNAR EXPLORATION" SPECIAL SESSION (continued)

CIS/LUNAR INDUSTRIAL WORKSHOPS

A series of informal two-to-five-day workshops are presently being planned and will be co-hosted by the Space Studies Institute (Princeton, NJ), the Lunar and Planetary Institute, University of California San Diego, and the Jet Propulsion Laboratory. Attendance will be limited by invitation to maintain a workable group size. Topics to be considered include:

1. Future Lunar Research (March 1979)

See Page 2 and 3 this BULLETIN for information

2. Guidance and Capture

a. Study of non-gravitational forces that will affect the trajectories of packets of soil ejected from the Moon and aimed at the lunar L2 point. (Planned for JPL)

b. Study of various techniques for the capture of packets of soil at the L2 point (West Coast, January 1979)

3. Materials Processing

Review results of the various programs and personal efforts presently underway to identify means for the processing of lunar materials and to identify common developmental problems requiring immediate attention. (Planned for the LPI, July 1979)

4. Scaling

It should be possible to improve the program's early benefit/cost position by an early demonstration of the use of lunar resources. Two early-use strategies will be explored:

- What can be done with a one-ton payload of remotely controlled equipment.
- What can be accomplished with a manned expedition (i.e. 10 people, 500 to 1000 tons of equipment)? (January 1979)

5. Wrap-Up Meeting

Prepare a summary report on the recommendations and conclusions of the workshop series. (West Coast, August 1979)

Suggestions of possible attendees are needed. All written suggestions of specific research topics and recommendations will be appreciated and referenced to you if utilized in the final documents. Additional information or conversation on these respective workshops can be obtained by contacting:

WORKSHOPS 2,4,5 Prof. G.K. O'Neill or Dr. B.J. O'Leary
Jadwin Hall, Princeton University, Box 708
Princeton, NJ 08540

WORKSHOPS 1,3,4,5 Dr. David R. Criswell, Lunar and Planetary Institute
3303 NASA Road One, Houston, TX 77058

WORKSHOP 1 Prof. J. Arnold, Dept. of Chemistry, Univ. of California San Diego,
Box 109, La Jolla, CA 92037

WORKSHOP 2 Mr. J. Burke, Jet Propulsion Laboratory, Code 180-800,
4800 Oak Grove Drive, Pasadena, CA 91103

EUROPEAN SPACE AGENCY INVESTIGATES LUNAR POLAR ORBITER MISSION

ESA has circulated a letter to approximately 100 scientists in 50 institutes in Europe attempting to find out what instrumentation for a lunar mission is likely to be forthcoming from European scientific institutes in support of a low-altitude lunar polar orbiter mission. The letter requested interested individuals to submit the following information:

1. An instrument description: Scientific purpose; Scientific performance characteristics; technical description
 2. Technical interface parameters
 3. Statement of relevant expertise in one's institute in the design and development of instrumentation for space.

A POLO consultant group consisting of seven European scientists is starting a three-month study to assess the feasibility of such a study. Only if European scientists want to build and use the instruments, does it make sense for ESA to spend money on the spacecraft, etc.

Mr. G.P. Haskell, ESA/Science Planning Department, 8-10 rue Mario Nikis, F-75738 Paris Cedex 15 France, invites all interested scientists to contact him for additional information or to submit proposals.

SECOND INTERNATIONAL COLLOQUIUM ON MARS

The Jet Propulsion Laboratory and the California Institute of Technology will host the Second International Colloquium on Mars in Pasadena, California, January 15-18, 1979. Sponsoring organizations are NASA, The Division for Planetary Sciences of the American Astronomical Society, and the American Geophysical Union. Invitations have been mailed to approximately 800 American and foreign scientists who are active in or interested in planetary science. Participation by other interested scientists is welcomed.

The Conference will focus on the findings of the Viking Mission and provide a timely opportunity for planetary scientists to meet, to be brought up-to-date on the data that exist, to explore the questions raised by these new results and to discuss the analyses that now need to be done.

The co-chairmen of the Colloquium are Professor Thomas A. Mutch,
Dept. of Geological Sciences, Brown University, Providence, RI 02912
and Dr. Conway W. Snyder, Jet Propulsion Laboratory, Pasadena, CA
91103. Requests for further information should be directed to
either of the co-chairmen.

*NEW TELEPHONES AT LPI - Magic numbers are 713 488-5200 and 486-21XX
See page 24 this BULLETIN*

NEW . . .
PUBLICATIONS



FROM THE NASA PRESS

Voyager--Journey to the Outer Planets

This booklet is your introduction to the Voyager project, discussing in plain language the spacecraft, the planets and the mission, and providing plenty of color photos and illustrations to help explain the concepts it uses. It's a great way to make sure that you'll get the most from the Voyager photos and results you'll be seeing. 1977. 16 p. illustrated. NAS 1.12/6:43-39

ORDER: from GPO S/N 033-000-00705-1 90¢

Spinoff 1978

Designed to answer some of those questions "Is the space program worth it to me?", SPINOFF 1978 selects from thousands of examples those technology transfers representing important advances of significant public benefit, discussing their new-found uses and their development from the original aerospace applications. These spinoffs range from designs for more efficient aircraft to increased resonance guitars, from capsized-proof life rafts to burglar alarms, from body-building equipment to a jet propulsion system for boats, from foam filters for cars to five-year flashlights, from a device for extending lightbulb life to "foil" wall paper, and many, many more. Copiously illustrated with color photographs. 1978. 124 p. illustrated. NAS 1.1/4:978

ORDER: from GPO S/N 033-000-00712-4 \$3.25

Apollo Over the Moon: A View from Orbit

This beautifully-produced volume presents nearly 250 of the Apollo missions' most striking photographs of the Moon's surface and offers the best available photointerpretive and experimental explanations of the eerie landscapes they depict. The photos are arranged into studies of the major types of lunar features, and their informative but nontechnical captions provide fascinating established and speculative interpretations of the origin, history, and composition of various important examples of these features. 1978. 255 p. illustrated. NAS 1.21:362

ORDER: from GPO S/N 033-000-00708-6 \$9.25

On the Shoulders of Titans: A History of Project Gemini

Gemini was the intermediate manned space flight program between America's first steps into space with Mercury and the unprecedented accomplishments achieved during the manned lunar expeditions of Apollo. This book chronicles the Gemini program from its inception to its final splash-down. It provides the design, development, qualification, and operations histories of this complex project.

1977-650 p. illustrated. NAS 1.21.4203
ORDER: from GPO S/N 033-000-00643-8 \$8.25

===== PLEASE DIRECT ORDERS FOR THE ABOVE PUBLICATIONS TO THE SOURCE INDICATED. THE LPI DOES NOT PROCESS ORDERS FOR ANY OF THESE PUBLICATIONS. SEE PAGE 8 THIS BULLETIN FOR SOURCE ADDRESSES. Thank you. The editor.

NEW NASA PUBLICATIONS (continued)

The Planet Venus

Intended as a curriculum supplement for high school science and math classes, this booklet presents a fascinating summary of what is known about Venus and outlines the areas scientists find more puzzling. Three student projects incorporating astronautical problems are included. 1978 8 p. illustrated
NAS 1.20:NF 86

ORDER: from GPO S/N 033-000-00714-1 70¢

Atlas of Mercury

This atlas is a fine compilation of the high quality photographs taken of the surface of Mercury by the Mariner 10 spacecraft and is a tribute to the skill and high-productivity of the Television Science Team on this mission. The atlas is logically arranged with pictures being grouped by the indexed regions of Mercury. The text includes a brief description of the mission and general information about the planet, its history and topography. The photographs contained in this atlas will be used by scientists the world over to study and understand the processes that have shaped the surface of Mercury.

1978. 128 p. illustrated.

ORDER: from GPO S/N 033-000-00695-1 \$6.00

BOOKS ON REVIEW

French, Bevan M. THE MOON BOOK. NY, Penguin, 1977. 287 pp. \$4.95 paperback

This is a very thorough account of what has been learned about the moon from detailed analyses of the moon rocks that the astronauts brought back from their six visits to the surface of the moon between July 1969 and December 1972. In a highly readable style, requiring only a minimal scientific background by the reader, Dr. French has succeeded in presenting a review of the history of our knowledge of the Moon before Apollo and the expansion of that knowledge with the findings of Apollo. As a basic introduction to the science of the Moon it is first-rate and fills a void which has long existed in the literature concerning the Moon.

Hartmann, William K. ASTRONOMY: THE COSMIC JOURNEY. CA, Wadsworth, 1978.

536 pp. \$16.95

A beautifully illustrated textbook whose very appearance tempts the reader to look inside. Its approach differs from many astronomy texts which are largely mathematical or lists of facts. This book attempts to present astronomy in its context to man's relationships to the rest of the universe. The inclusion of supplementary material, suggested projects and glossary make it a useful book for teacher and student alike.

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EDITOR'S NOTE: Please do not write the LPI to order any of the publications listed

in this Bulletin. We do not distribute any publications accept those listed as being LPI Publications. Any good book store should be able to get the books by Dr. French and Dr. Hartmann for you. The GPO requires prepayment for orders sent to them. The address of the GPO is: U.S. Government Printing Office, Superintendent of Documents, Washington, DC 20402.

The listing of publications, government documents, etc., in this Bulletin does not indicate any endorsement of the materials by the Lunar and Planetary Institute.

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LPI SUMMER INTERN PROGRAM

The Lunar and Planetary Institute's 1978 Summer Undergraduate Intern Program (June through August, 1978) provided students from the U.S. and Great Britain an opportunity to work with LPI and JSC scientists active in lunar and planetary research. Of the 138 applicants, 14 under-graduate or newly-graduated students were selected to participate in the Summer Intern Program. 15 scientists from the LPI and JSC directed the interns in the projects listed below:

STUDENT	ADVISOR	PROJECT
Victor Bajlalgeon U. of New Hampshire	Dr. D. Blanchard NASA/JSC	Work on geochemical investigations of trace elements in lunar regolith and meteorites using atomic absorption
Gilles Bussod U. of Washington	Dr. T. McGetchin LPI	Theoretical investigations of terrestrial and martian lavas at low pressures
Gary Clow U. of California	Dr. J. Minear NASA/JSC	Modeling thermal histories of asteroids
James Conca Brown University	Dr. N. Hubbard NASA/JSC	Interpretation of chemical data obtained in Apollo orbital x-ray and gamma ray spectrometers in terms of stratigraphy and regional variations in chemical composition
Jacklyn Green U. of Arizona	Dr. C. Pieters NASA/JSC	Definition of phase effect on spectral reflectance data for the lunar highlands
Charles Hansen U. of Colorado	Dr. D. Anderson Dr. D. Phinney NASA/JSC	Compilation of data and performance of calculations of the production of Li, Be, and B isotopes in nature by nuclear particle irradiations
Judy Hoyt Adelphi University	Dr. L. Srnka LPI	Work on computer modeling of magnetic anomalies
Kris Kirk U. of Arkansas	Dr. M. Duke NASA/JSC	Design of an experimental program to simulate cometary processes and cometary structure, employing the space environment chamber
Sara Langer Wellesley College	Dr. Fred Hörz NASA/JSC	Analysis of matrices of Ries cores
Marcus Mendenhall Washington University	Dr. L. Srnka Dr. P. Schultz LPI	Modeling thermal and mechanical histories of molten ballistic ejecta
Paula Norris U. of Connecticut	Dr. G. Lofgren Dr. M. Dungan NASA/JSC	Preparation of megascopic and microscopic descriptions of the Basaltic Volcanism Team 1 terrestrial suite
John Spencer Sidney Sussex College	Dr. P. Schultz LPI	Studying differential responses of surface units to impact
Michael Urbanic Purdue University	Dr. E. Gibson NASA/JSC	Studying thermal stability of potential Martian minerals, their alteration products and weathering processes using TGA
Michael Velbel Northwestern U.	Dr. D. McKay NASA/JSC	Studying soils and volcanic ash as analogs of Martian soil, using SEM and bibliographic techniques

Because of the success of the 1977 and 1978 programs, we anticipate that a similar Summer Intern Program will be held in 1979. Students in their sophomore-junior-senior years should contact the Lunar and Planetary Institute, Summer Intern Program, during early February 1979 for further information.

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is given. Contact author or your library for copy.

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GEOLOGICAL CONFERENCES AND THE PLANETS

During the last quarter, three geological conferences of note were held with important implications for planetary science, namely:

Plateau Uplifts (Flagstaff, Arizona August 16-18, co-sponsored by
LPI and ICG Working Group 7)

American Meteoritical Society (Sudbury, Canada, August 14-17)

International Rift Symposium on Rift Zones of the Earth (Santa Fe, New
Mexico, October 8-17)

The Uplift Conference focused on the Colorado Plateau but reviewed other plateau features of the earth. These regional features having vertical structural displacements of several kilometers are generally related to convergent plate boundaries (Tibet, Alto Plano) or divergent margins (Iceland), but some are not (Hawaii, Colorado Plateau). The last category are of particular interest. In the same context the Tharsis Uplift on Mars is important; it is believed to have approximately 10 km of structural relief. On the earth as well as the planets such uplifts certainly reflect expansion of the interior--the causes of which are debated but possibilities include heating (thermal expansion) partial melting (expansion due to volume of fusion or creation of low density residuum), hydration reaction, shear heating, expansions due to solid-state reactions, including phase transitions. An abstract volume of this conference is available from the Administration Office, LPI, prepaid \$1.00 U.S. mailing, \$6.00 Foreign mailing. Ask for "Plateau Up-Life" LPI Contribution No. 329.

The Rift features of global scale are known on Mars and Venus; regional compressional features (thrust faults) are known on Mercury--such features are thought to be important constraints on the thermal evolution of the planets, because a heating planet should place its lithosphere in tension; a cooling one, in compression. On the earth, rifts play an important role in understanding plate tectonics because they represent the initial stage of formation of the mid-ocean ridge systems. In this sense, the earth may be unique in that its lithosphere is both very thin and very mobile, still rift valley systems and the questions they spawn are of great interest to planetologists.

The possible relationship between the archean of the earth and the lunar highlands is a topic of growing interest. The origin of the earth's crust is not known--one possibility is that a process of feldspar-flotation from an early magma ocean may have occurred very early in earth history, segregating out a plagioclase-rich scum, as is believed to have occurred on the Moon. Other scientists believe that such a process occurs only on volatile-free planets and that the earth's crust was formed throughout geologic time by magmatic processes associated with plate tectonics--partial melting and melt migration in which water and other volatiles play an important role. Field trips associated with the Meteoritical Society Conference in Sudbury were focused on the impact origin of Sudbury and the archean rocks of the Canadian shield. The archean of the earth is likely to be deeply involved in debates in the future as new data from Venus and Mars-sample-return-mission options are developed. The origin and evolution of the crusts of all the terrestrial planets will be one of the important scientific battlegrounds, with the Moon and earth forming the principal calibration points.

WORKSHOP WRAP-UP's: Thermodynamics of Dust Sept 6-8
Experimental approaches to Comets Sept 11-13

The Workshop on Thermodynamics and Kinetics of Dust Formation in the Space Medium held at the LPI, chaired by Dr. Bibhas De, was designed to discuss the special properties of the condensation process in the space medium, vis-a-vis, the realistic physical basis of cosmochemistry. Physicists, chemists, astrophysicists, and cosmochemists from around the world (U.S., Canada, West Germany, the Netherlands, Australia, and Japan) participated in this intensive workshop consisting of three morning and afternoon sessions and two evening sessions. The opening address was given by Prof. Ilya Priogogine of the University of Texas at Austin and the Free University of Belgium. Emphasis was placed on actual observations of the space medium pertaining to the condensation process and on experiments and simulation studies attempting to clarify the process of condensation in space. Judging from the reaction of the participants, this workshop was novel, useful, and never dull. A limited number of copies of the abstracts of this conference are still available. Prepaid orders (\$1.00 U.S., \$6.00 foreign mailing) should be directed to the LPI Administration Office requesting "Dust Workshop Abstracts" LPI Contribution No. 330

The Workshop on Experimental Approaches to Comets held at LPI, convened by Dr. John Oró, University of Houston Central Campus, Depts. of Biophysical Sciences and Chemistry, was attended by approximately 50 scientists working in a variety of scientific fields to observe, simulate and model cometary phenomena. The first day was devoted to a discussion of the structure and composition of comets, cosmic relationships, and observational techniques. Laboratory and theoretical studies were discussed on the second day, and the third day consisted of relatively informal discussions of the comet rendezvous mission and guidelines for preparing a comprehensive bibliography on comets. Twenty-four abstracts were distributed during the meeting and a volume of extended abstracts and a workshop summary is now being prepared. When ready, the abstracts and summary will be available from the LPI Administration Office, prepaid \$1.00 U.S., \$6.00 foreign mailing. Request "Comets Workshop".

BE SURE TO SAVE PAGE 24 THIS BULLETIN. NEW "DIMENSIONS"
TELEPHONE NUMBERS FOR ALL DEPARTMENTS AND PERSONNEL AT THE LUNAR
AND PLANETARY INSTITUTE.

C A L E N D E R

Nov. 30 TENTH LUNAR & PLANETARY SCIENCE CONFERENCE
Abstract forms mailed to PI's

Dec. 4-8 AMERICAN GEOPHYSICAL UNION, Fall Meeting
San Francisco, Ca
CONTACT: AGU, 1909 K St. NW, Washington, DC 20006

1979

Jan. 3-8 AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE
(AAAS) Annual Meeting, Houston, TX
CONTACT: AAAS, 1776 Massachusetts Ave NW,
Washington, DC 20036
(See Science Sept. 29 and Oct. 13 issues for details)

Jan. 15 TENTH LUNAR & PLANETARY SCIENCE CONFERENCE
ABSTRACT DEADLINE.
(See Page 1 this BULLETIN for details)

Mar. 3 U.S. GEOLOGICAL SURVEY'S CENTENNIAL DAY
Ceremonies and tours at Reston and regional centers
in Rolla, Denver and Menlo Park. The Survey plans
commemorative programs, symposiums, special publi-
cations and exhibits to illustrate earth science as
a public service. Events may be held March 2 or 3
or both.
CONTACT: Clifford Nelson, U.S.G.S., Mail Stop 950,
Reston, VA 22092

MAR. 19-23 TENTH LUNAR AND PLANETARY SCIENCE CONFERENCE
Johnson Space Center and Lunar & Planetary Institute,
Houston.
(See Page 1 this BULLETIN for details)

April 23 TENTH LUNAR AND PLANETARY SCIENCE CONFERENCE
PROCEEDINGS MANUSCRIPTS DEADLINE

April 23-27 SOLAR-TERRESTRIAL PREDICTIONS, Boulder, Colo.
Sponsored by NOAA and AGU.
CONTACT: R. F. Donnelly, STP/PW Program, Space
Environment Laboratory, NOAA/ERL,
Boulder, CO 80302

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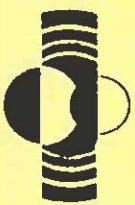
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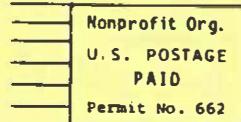
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