USRA

lunar & planetary information bulletin

NUMBER 32-33 SEPT.-DEC. 1982

Get Ready for the XIVth

The FOURTEENTH LUNAR AND PLANETARY SCIENCE CONFERENCE will be held at the Johnson Space Center, Houston TX, March 14-18, 1983, under the joint sponsorship of the Center and the Lunar and Planetary Institute. Co-chairmen of the Conference are Dr. Michael Duke, JSC, and Dr. Roger Phillips, LPI. Scientists in all lunar and planetary programs are invited to submit abstracts and to participate in the conference.

The Lunar and Planetary Science Conference continues to be the key annual conference in planetary science, bringing together a broad group of specialists in petrology, geochemistry, geophysics, geology and astronomy.

PROGRAM: There will be no more than three concurrent sessions. Nine half-days will be devoted to presentations of research papers in topical symposia and in problem-oriented sessions. Two half-day sessions will be set aside for plenary sessions of broad interest. Some evenings will be set aside for special sessions. These sessions may be impromptu or may be devised and structured by members of the Lunar and Planetary Science community as desired. These sessions will not be considered part of the formal program.

Poster sessions will be available as an alternative to oral presentations. Requests for display space must be supported by informative abstracts. The program committee will employ the same criteria to govern allocation of space in poster sessions as for oral presentations.

ABSTRACTS: Abstracts of papers submitted to the conference will be published in *Lunar and Planetary Science XIV*.

SOMETHING NEW — NOTICE

CONFERENCE FEE: For the first time since the inception of this conference, a $35. fee will be assessed each participant to cover some of the cost of the conference. Forms for pre-registration will be included in the second announcement. Abstract volumes will be available only to those who are paid registrants. If any copies of the Abstracts are left they will be available after the conference for $10.00 plus the postage charges. Watch the February LPIB for order form and price list.

The first announcement of the Conference has been sent to a portion of the LPI mailing list. Abstract forms and additional information about the Conference will be sent only to those who complete and return the "indication of interest" form which was included in the mailing. If you do not receive the FIRST ANNOUNCEMENT and wish to receive subsequent mailings about the conference please fill out and return the "indication of interest" form which is included in this BULLETIN or contact the Projects Office at the LPI (713-486-2150).

The following schedule lists dates important to the submission of abstracts, to attendance at the conference, and to the submission of papers for the Proceedings.

November 15, 1982	Abstract forms mailed to respondents
January 10, 1983	Deadline for submission of abstracts

March 14-18, 1983	Fourteenth Lunar and Planetary Science Conference
April 18, 1983	Deadline for submission of papers to the XIVth Proceedings

HOTELS: Conference participants are reminded that it is their responsibility to make all hotel and travel reservations. It is strongly recommended that you make your reservations NOW. Information on rates, addresses, and telephone numbers of local hotels are included in the FIRST ANNOUNCEMENT.

The February issue of this BULLETIN will contain the preliminary program for the conference and additional information.

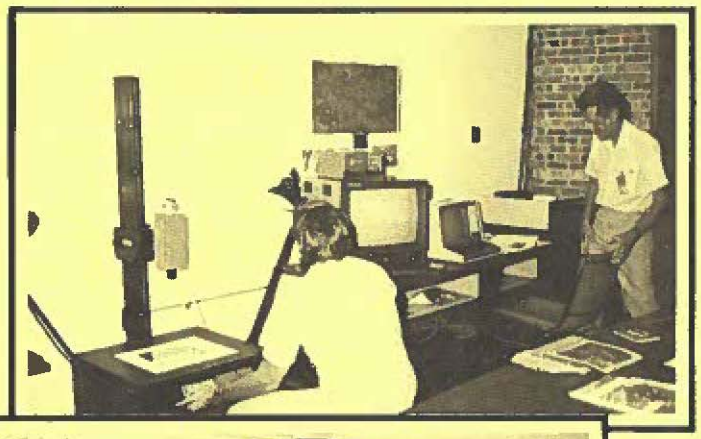
REMEMBER! YOU MUST RETURN THE FORM SENT TO YOU WITH THE FIRST ANNOUNCEMENT TO RECEIVE ANY SUBSEQUENT MAILINGS!

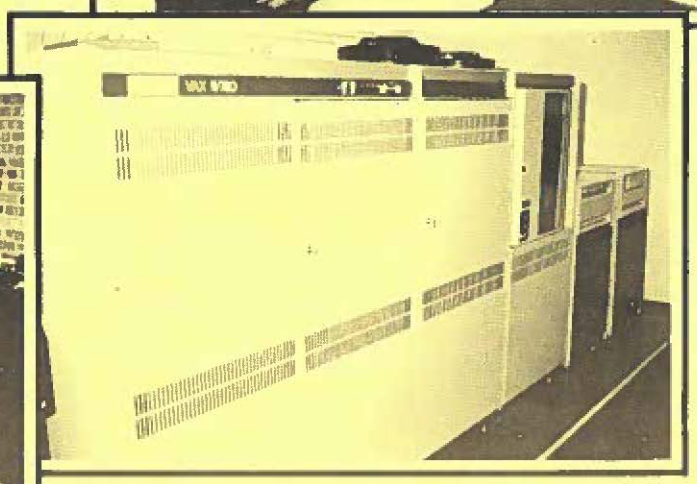
New Facility Opens at the LPI

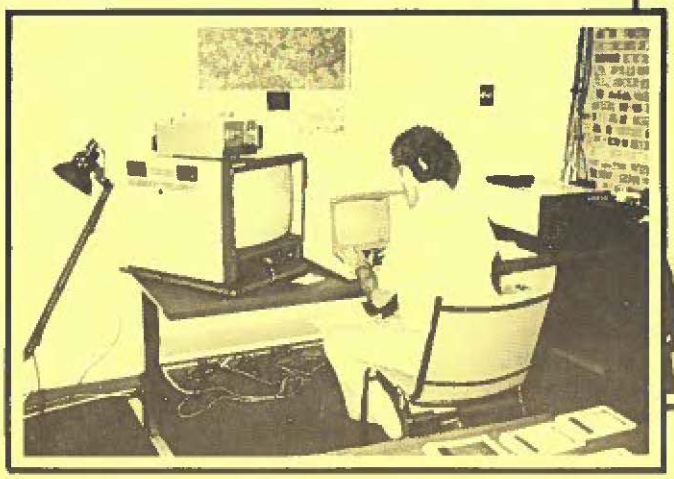
An Image Processing Facility (IPF) is now in operation in the Computer Center at the LPI. The ability to "process" images has become a very useful tool in geology, agriculture, medicine, resource management, land use management, and environmental research.

The process is based on the ability of the scanning equipment to transform an analog object or image to digital form. For example, an Earth or other planetary images acquired by such missions as Landsat, Viking or Voyager, can be digitized by being broken down into the picture elements or "pixels". An image is a representation of any real scene, formed from a regular (two dimensional in X-Y space) arrangement or array of picture elements. Each picture element corresponds to an equivalent finite area in the scene. In turn the ground area represented by the pixel is related to the effective resolution of the sensor system. (Short, 1982).

It is these pixels which are the digitized images that are processed by the equipment comprising the image processing system. The equipment at the Institute consists of a modularized system with a realtime, interactive Gould/De Anza IP8500 image processing system with an array processor, and four 512X512X8 bit image planes, a high resolution Matrix Instrument model 3000 hard copy output device, and a Cohu video input scanner for analog input. The system is supported by the in-house DEC VAX 11/780.







This equipment uses a number range of 0 to 255 to project the intensity of the pixel; and can display a matrix of 512x512 8-bit pixels using one or several of the four channels or image planes which are available. If three of the channels are used together color can be introduced into the image. By using this capability of the image processing equipment the "false color" pictures which usually accompany most articles concerned with remote sensing or photointerpretation.

THE LPI IPF has a growing library of software available for use with the image processing equipment. Two packages currently available are LIPS (Library of Imaging Processing Software) obtained from Gould/De Anza and VICAR (Video Image Communications and Retrieval) which was developed by the Jet Propulsion Laboratory. Through the use of the software packages images can be copied, intensified, magnified, restored, overlayed, mosaicked, translated into histograms, contrast-stretched, enhanced, and manipulated in a number of different ways. The information on these transformed images can be used to map geological formations, help in the interpretation of features on planetary surfaces, interpret gravimetric and magnetic data. The Facility at the Institute is an open facility. Proposals for its use will be accepted. To discuss the various features of the facility and to inquire about using it contact:

Image Processing Facility
Computer center, LPI
Telephone: 713-486-2165

References:

Moik, J G (1980) Digital processing of remotely sensed images. NASA SP-431. 330 pp. Washington DC, Govt Printing Office, $7.50

Short, N M (1982) Landsat tutorial workbook. NASA RP-1078. 552 pp. Washington DC, Govt Printing Office, $55.00

Watch for Halley with IHW

An international network of scientists and amateur astronomers is being organized to observe Comet Halley as part of a coordinated program when the comet passes Earth in 1986. The formation of this network was announced in August at the International Astronomical Union meeting in Patras, Greece.

The organization, called the International Halley Watch (IHW), will be led by Ray Newburn, cometary science team leader at Caltech's Jet Propulsion Laboratory, Pasadena, California, and Jurgen Rahe, director of Remeis Observatory (Bamberg) of the University of Erlangen-Nurnberg, Erlangen, Federal Republic of Germany.

The IHW invites all Comet Halley observers, professional or amateur, to share their data with the IHW networks now being created. Ground-based observations along with those of balloon, airborne and Earth-orbital instruments will be collected by the IHW. Data compiled by the IHW will form the Halley Archive, the largest collection of information ever produced on a single comet.

Japan, the Soviet Union, and the European Space Agency are each sending spacecraft to encounter the comet in 1986, and plan to supply their scientific results to the Halley Archive.

Experiment teams supported by the IHW will study the comet using seven general techniques:

1. Large-scale phenomena studies will use wide angle photography to study the comet's tails.
2. Near-nucleus studies, using high-resolution photographic and electronic imaging of the coma, will yield data on the nucleus, its rotation rate, surface structure, and the comet's general activity.
3. Spectroscopy and spectrophotometry will provide data on the physical composition of the nucleus, coma and tail.
4. Photometry and polarimetry will determine the abundances and distribution of volatile and non-volatile components of the coma and tail.
5. Radio science experiments study the chemical composition and kinematics, or motion, of the coma, nucleus and tail, searching for chemical species not discernable in optical wavelengths. Radio experiments will also detect thermal emissions from solids and perform studies of plasmas.
6. Infrared spectroscopy and radiometry will determine the temperature, size and composition of dust particles released by the comet. Gaseous components may also be identified.
7. Astrometric observations—studies of Halley's position in relation to stars—will provide information on the comet's orbit and ephemeris. The observations will also help determine what effect outgassing of ice from the nucleus has on the comet's velocity.

The efforts of amateur astronomers will be coordinated by the IHW to complement those of professionals.

1. Amateur visual and photographic observations will be compared with those of the 1910 apparition of Halley.

2. Spectroscopy and photoelectric photometry of the comet obtained by amateurs can provide supplementary coverage of Halley in cases of weather interference at major observatories.
3. Amateur studies of meteors during the Halley apparition will be especially helpful, since few professional astronomers devote time to meteor observations. The Eta Aquarid meteor shower in May 1986 and the Orionid Meteor shower in October in the same year are believed to originate from Halley.

A meeting of the discipline specialists and the steering group of IHW will be held at the NASA Goddard Space Flight Center on March 28-30, 1983. For more information contact either Ray Newburn at JPL or Jurgen Rahe at Remeis.

A Close Encounter of Veteran Spacecraft

Two of NASA's most venerable spacecraft, Pioneers 8 and 9, will have a close encounter by space standards when they pass within 1.5 million miles of each other on Thursday, October 7. The still-operating solar satellites have been circling the Sun like miniature planets since 1967 and 1968.

Two similar spacecraft that predate these sister ships are Pioneers 6 and 7, launched in 1965 and 1966. Also in solar orbit, they are still transmitting information on the space around the Sun.

Designed to last at least six months, these four Pioneer craft have far exceeded expectations. They have been orbiting the Sun a total of 62 years, and have collectively traveled over 36 billion miles through space. Pioneer 6 is man's longest-lasting craft in interplanetary space.

Together the four spacecraft make up a network of solar weather stations which circle the Sun. Despite occasional equipment malfunctions, the rugged satellites transmit magnetic and electric fields of the Sun and planets, and the high energy cosmic ray particles in space.

Data from Pioneers are transmitted to radio engineers, to space scientists, and to the "solar weather forecasters" of the National Oceanographic and Atmospheric Administration's Solar Disturbance Forecast Center at Boulder, Colorado. These data are made available to a range of users.

When Pioneer 10 passed near Pioneer 9 on its way to Jupiter in 1972, Pioneer 9 was tracked by NASA's space antennas during increased solar flare activity. Changes in the solar material were documented as it traveled the 279 million miles between Pioneers 9 and 10.

Two of NASA's antennas, located in Australia and Goldstone, California, will be listening on October 10, when Pioneers 8 and 9 are still close together. Their simultaneous signals will help scientists compare the interplanetary medium in relatively close locations, as well as assess the precision of the information the two solar satellites transmit.

During this encounter, specific tests will be done to check the recalibration of Pioneer 8's solar wind instrument, which had been damaged shortly after launch. Transmitted measurements of the one-million-miles-per-hour solar winds will be compared to those from an identical instrument on Pioneer 9, about an hour and a half (1.5 million miles) "upwind."

The October encounter is the result of the positions of the crafts in their solar orbits, which average about 180 million miles across. Pioneer 8 will be at its point closest to the Sun (the perihelion of its orbit) at the same time Pioneer 9 is swinging out to its farthest position from the Sun (the aphelion of its orbit).

Pioneer 8, launched December 13, 1967, orbits the Sun every 388 days, mostly outside the Earth's own solar orbit. Its orbit varies from 0.99 to 1.09 Astronomical Units from the Sun. An Astronomical Unit (AU) is the average Sun-to-Earth distance, or 93 million miles.

Pioneer 9 has been circling the Sun every 298 days since its launch November 8, 1968. Its orbit, which is primarily within the Earth's solar orbit, swings from 0.75 to 0.99 AU from the Sun.

There have been 15 prior occasions when Pioneers 6-9 have traveled near one another in space, but they have been no closer than 8 million miles apart. In comparison, the 1.5 million miles that will separate Pioneers 8 and 9 is a short hop through space, though it is approximately seven times the average distance between the Earth and the Moon. (NASA/Ames Press Release 82-37)

Archivists Seek Materials

Two archivists in different parts of our world are seeking information for their space archives.

Horst Schienke, an amatuer astronomer, is urgently looking for newspaper and illustrated magazine articles about astronomy and space flight in all languages to enlarge his collection. The archive comprises approximately 50,000 press reports since 1822, mainly from German newspapers. However, almost every event in space research, which has been reported in the press, is documented. Mr. Schienke would like to hear from you whether you have a large or small contribution to make to his collection. His address is: Horst Schienke, Klopstockstr. 25, 1000 Berlin 37, FRG.

From Vancouver, British Columbia, Canada, comes a request from the James Cook Archive of Space Exploration. This archive is a small privately funded research, educational and consultative facility operated on a non-profit basis in Victoria, the capital of British Columbia, Canada. The Archive was founded in 1978 with the intention of recording the development of planetary science.

Because the Archive was founded 20 years after the start of the 'space age' and operates on a very small budget, it has had some difficulty in keeping up with the present burst of publication of planetary research while simultaneously collecting older background materials. The Archive now asks for donations of old reprints of papers relating to lunar geology, its most deficient area, and for copies of older lunar charts. Many older charts especially of Lunar Orbiter scientific sites, are no longer available.

Many of these older materials are now superceded by more recent research. Nevertheless they have importance as historical records of the development of our knowledge of the solar system. The James Cook Archive would appreciate any assistance in the collection of old reprints or any materials related to lunar and planetary geology and exploration. Space technology is NOT part of the range of interest of the Archive.

Materials for this Archive may be sent to: The James Cook Archive of Space Exploration, Box 1767, Station E, Victoria, British Columbia Canada V8W 2Y1.

NEW PUBLICATIONS

The following publications are available from the Superintendent of Documents, Government Printing Office, Washington DC 20402. Although this agency requires prepayment on all orders, they will accept Mastercard or VISA credit cards. Just include the account number and expiration date on your order to them. Some of the publications may be available from the GPO bookstores which are found in major cities around the U.S. Check your city directory for a local listing.

Several of the GPO publications are being offered by other distributors at widely varying prices. It pays to shop and compare.

PLEASE do not send orders for these publications to the LPI. We are not a distribution center for SOD documents and this will only delay your order.

Nasa Publications

Meeting with the Universe
For the past 20 years, America has been involved in space exploration. With each new voyage, we became bolder. The discoveries that have been unearthed during the Space Age are almost too numerous to count and the mysteries of the universe that we are slowly unraveling challenge us to continue our quest for knowledge about our universe.

A *Meeting with the Universe* is a new NASA publication which chronicles the wealth of information we have acquired from our travels into space. It is crammed with beautiful full-color illustrations which enhance the well-written nontechnical text.

In addition to an excellent history of our space program, the book also contains a "window on the future"—a more concerted effort to locate other life in space, the many additional worlds which remain to be explored, an intense examination of our Sun and the interactions that link our future to this star, and the

next generation of space missions planned for the mid-1980's and beyond.

The book done with flexible cover in a larger format size, edited by Bevan M. French and Stephan P. Maran, has contributions by several well-known lunar and planetary scientists. It is NASA Educational Publication (EP) 177 and is available from GPO for $14.00. THINK CHRISTMAS!

Voyage to Saturn
Everything you always wanted to know about the Voyager encounter with Saturn has been put together in this 225-page NASA SP-451 written by Dr. David Morrison. He has put together an outstanding compendium of the Saturn mission. He has used a chronological approach to the report following the spacecraft from October 1, 1980 through August 30, 1981. The glossy book is liberally illustrated with colored pictures of the planet, its satellites, and on a more personal note, pictures of the people involved in the project.

To all of us interested in the development of planetary science, ownership of this publication is a must. For sale by GPO for $9.50.

NOTE: A few notable government publications such as *Meeting with the Universe* are now available at B. Dalton Book Stores. Negotiations are under way to place government documents in other major chains across the country. Be sure to inquire for them at your favorite book store. Supply follows demand.

New and Notable - Mars in Focus

Surface of Mars by Michael H. Carr, Yale University Press, 256 pages, 185 illus., $45.00

The 1970's saw an explosive growth in our knowledge of Mars. The decade began with the Mariner 9 orbiter. Then, in 1976, two Viking spacecraft were put in orbit around Mars and another two made soft landings on its surface. These vehicles returned a continuous flow of data to Earth for the rest of the decade.

Michael Carr was the leader of the Viking Orbiter Imaging Team, responsible for development and use of cameras on the Viking spacecraft and for coordinating interpretation of the data acquired. In this book he summarizes our present perception of Mars—what the surface is like and how it evolved to its present form—the first such work to integrate all the Viking results.

Carr begins his study with several introductory chapters that compare Mars with other bodies in the solar system, outline the history of Mars observations, and discuss the general features of the planet. Carr then offers details and explanations for Mar's unique surface geology. His concluding chapters are an account of the search for life on Mars, a description of the two Mars moons, and a synthesis of the geologic history of the planet.

Appendices provide information on the taking of Viking orbiter pictures and how they may be obtained.

Lucidly written and lavishly illustrated, this will be the definitive work on the geology of Mars for years to come. Michael H. Carr is a geologist with the U.S. Geological Survey.

Mission to Mars by James E. Oberg, 224 pp., illus., Stackpole, $14.95

This book is the first step toward understanding and appreciating the technology and rationale for the first manned landing on the fourth planet. Mars has captured the minds and hearts of the forward-looking for over 100 years and now the time is approaching for speculation to end and human exploration to begin. Though unmanned space probes have brought back analyses of rocks and soils on other planetary bodies, science benefited a great deal more when astronauts, using their human discretion, brought back soil and rock samples from the lunar landscape. In order to get a robot probe capable of making such sophisticated choices, the costs would have been significantly greater.

With the premise of a manned flight not argued persuasively, a vast number of questions present themselves and are currently being addressed right now by space experts at NASA, corporations, universities, and space organizations around the country. It is with these issues that James Oberg concerns himself in MISSION TO MARS. Spaceship design, propulsion, navigation, life-support systems, scientific experiments and activities in flight and on the surface, martian exploration, cost factors, political and social issues, and future plans for colonization and terraforming are all discussed here at length, incorporating the latest findings and ideas of the scientific community.

From his knowledge of the Russian space program and their technology, Oberg (*Red Star in Orbit*) has included some observations and speculations as to what the Russians really have in mind as far as the race to Mars is concerned. Are they going and would they let us know if they intended to try? The last time they let their intentions be known, they were sorely disappointed as the U.S. geared up and left them behind in a trail of

rocket exhaust in the race to the moon. It does not seem likely that they would make that mistake a second time. MISSION TO MARS incorporates what we know about Mars to date, the technologies we will use for flight and surface activities and looks ahead to future benefits and repercussions of mankind's newest adventure.

Planets of Rock and Ice: From Mercury to the Moons of Saturn by Clark R. Chapman, 256 pp. illus., Scribners, $12.95

This engagingly written, popularized treatment of the emerging subject of planetary geology offers the reader a very readable discussion of the physical processes that have shaped and continue to shape the surfaces of the solid bodies of our solar system from terrestrial planets to planetary satellites to asteroids. Intermediate in level between Ron Miller and W.K. Hartmann's lavishly illustrated *Grand Tour* and Bruce Murray et al. *Earthlike Planets*, a more technical work, Chapman's up-to-date book is satisfyingly erudite and entertaining. For general readers, informed laypersons and young adults. (Review from Library Journal 5/1/82 by Thomas E. Margrave, Univ. of Montana.)

From the Astronomical Society of the Pacific

The ASP is attempting to fill the gap for educational materials in the fields of astronomy and planetary science (and doing a notable job of it). Many of their items are available for the cost of a couple of postage stamps; others have very nominal prices.

Subject Index to Astronomy in Mercury Magazine
Mercury is a bimonthly illustrated journal published by ASP for the general reader. Now a subject index to all the astronomy articles which have appeared in the first ten years of this publication is available to the public for the cost of two first-class stamps. Subjects covered include black holes, history of astronomy, lab activities, life on other worlds, and stars and stellar evolution.

ASP Catalog
Have you ever wondered where to get copies of those out-of-this-world photographs resulting from the recent space exploration missions? How about bumper stickers for your favorite astronomer, t-shirts embodying stellar topics, mugs, pamphlets, maps and charts. A stamped self-addressed envelope sent to ASP will get you a copy of their new catalog. Remember Christmas is coming.

How to Buy a Telescope
A new consumer guide to selecting your first telescope has just been published by ASP. Written in plain English for the non-scientist, the pamphlet provides all the necessary background for understanding how different types of telescopes work and which types are best for various purposes.
Clear diagrams and text explain how telescopes are rated, what sort of mountings are required, and what to do with a telescope once you get it home. The guide also includes a complete list of major telescope manufacturers, information about resource organizations in astronomy, a reading list for beginning and advanced observers, and a handy list of questions to ask before making any telescope purchase. This pamphlet will cost you $2.00 but is well worth it.
The address of the ASTRONOMICAL SOCIETY OF THE PACIFIC is 1290 24th Avenue, San Francisco, CA 94122

Something New - Space Videodiscs

SPACE DISC™ is a series of videodiscs being produced by the Center for Aerospace Education at Drew University, in cooperation with NASA Education Services. It will feature tens of thousands of still images and hours of movie clips from NASA, JPL, EROS, NOAA, major astronomical observatories, university observatories and amateur astrophotographers.

The SPACE DISC collection can be used as a lecture aid by teachers, as an independent study resource by students, as an invaluable reference in libraries, and for interactive displays in museums and planetaria.

Library Journal 10/1/82, reports that this videodisc series consists of 6 laser videodiscs, 60 minutes each with teacher's guide, 45 prepared lectures. $1,750 for the series. A preview is available as is a catalog. For more information contact: Video Vision Associates, 7 Waverly Place, Madison NJ 07940 (201-377-0302)

News from NASM

Air & Space an excellent informative magazine published by the National Air and Space Museum (NASM) has opened its circulation list for new subscribers. Interested educators should send requests on official school stationary to:

Air & Space
Room P-700, Education Service Division
National Air and Space Museum
Smithsonian Institution
Washington DC 20560

Also available from NASM is an exhibition booklet titled *Apollo to the Moon: a Dream of Centuries*. This publication traces the U.S. space program from the launch of the first U.S. satellite, Explorer 1 in 1958 through the Apollo program years in the 1960's, to the launch of Columbia, the first Space Shuttle in April 1981. The guide features spectacular color photographs of various space missions, photographs of Apollo artifacts currently on exhibit at NASM, as well as a detailed discussion of man's long time fascination with the universe. The book is currently on sale at NASM's Spacearium and Museum shops for $2.75.

Thirteenth Proceedings . . . Proceeding

The Proceedings of the Thirteenth Lunar and Planetary Science Conference which was held in Houston in March 1982, are being published by the American Geophysical Union as a special supplement to the *Journal of Geophysical Research*. The Proceedings are not included in the subscription price and must be ordered separately. Special rates are being given to members of the AGU, Meteoritical Society, Geochemical Society, and the Division for Planetary Science of the AAS. It is noted however that an individual may join AGU for $20 and receive the Proceedings for $25.00 (total of $45.00 instead of $70.00). Anyone interested in joining AGU should write to:

Membership Information
American Geophysical Union
2000 Florida Avenue NW
Washington DC 20009

An order form for the Proceedings is included with this Bulletin. Order your set now.

Book Review . . . "Planetary Science"

by S.R. TAYLOR

Ross Taylor offers his third synthesis of lunar geology at what might well be called "the best of times. . . the worst of times" for American planetary science. Following close on the heels of the awe-inspiring Voyager and Pioneer missions have come deep budget cuts that threaten both our capabilities to analyze these data and the prospect of future missions. The central theme of this volume is that we must heed the warnings provided by the history of the lunar studies as to the limitations inherent in remotely-sensed geological data. Our understanding of the other planets in our solar system at present is directly comparable to the 1968-69 state of lunar science, Taylor points out, and advances comparable to those made possible by the Apollo sample return missions would undoubtedly be achieved through advanced missions to these bodies.

The book deals primarily with the Moon, emphasizing the major issues which have been clarified by studies since 1974, the date of the author's previous synthesis. Several of these issues and related questions are treated in full chapters, among them the nature of regolith-forming processes, the composition of the highlands crust, mare basalt petrogenesis and the formation of multi-ringed basins. Taylor favors the double planet hypothesis for lunar origin and the proposal that the entire Moon melted early in its evolution. Primary differentiation occurred during cooling of the magma ocean. Generation of mare basalts by impact melting is dismissed on geochemical grounds in favor of an origin (along with KREEP) related to the magma ocean.

The author points out that the Moon is a relatively simple planetary body to study, because of its relative proximity to Earth, small size and comparatively simple geologic history. In assessing our current understanding of our neighbor, we should remember that significant gaps still exist in our data. The lunar poles have never been imaged; global geophysical and geochemical maps do not exist at even the coarsest scales or resolutions; the few sites sampled thus far are now known to not be representative of the major "typical" terrain types. In assessing our undersanding of the other bodies in the solar system, he cautions us to remember the corrections to early lunar models that emerged from sampling and the greater complexity of these planets.

The final chapters again strongly state the need for advanced missions to both the Moon and the other

major planets. The complex scientific and political issues surrounding such programs are touched upon in a brief but provocative discussion.

I found the book quite readable, generally well-illustrated and well-edited. The author's admitted geochemical bias does show through (the chapters on impact cratering and regolith formation were not as well-balanced or readable as were the geochemically-oriented chapters, for instance) but, on the whole, the treatment is quite good. The book is obviously intended for an audience that is already well-versed in the principles and methods of planetary geology, and so would be more suited for use in a graduate or advanced undergraduate course, rather than as a general text. It is a very scholarly synthesis of lunar science through 1981 and should be a useful addition to the bookshelves of amateur and professional planetary scientists.

Dr. Kathryn Sullivan, Astronaut Office,
NASA/Johnson Space Center

"Planetary Science: a Lunar Perspective"
by Stuart Ross Taylor is available for $39.95 plus $3.00 domestic and foreign surface mail; add $15.00 for foreign air mail. Foreign orders must be pre-paid in U.S. Dollars with checks drawn on U.S. banks or with International Postal Money Order. Send orders to the Lunar and Planetary Institute, Code B, 3303 NASA Road 1, Houston TX 77058 U.S.A.

The **LUNAR AND PLANETARY INFORMATION BULLETIN** is published by the Lunar and Planetary Institute. There are usually four issues per year. It is distributed free on request to lunar and planetary scientists, educators, students, and their institutions.

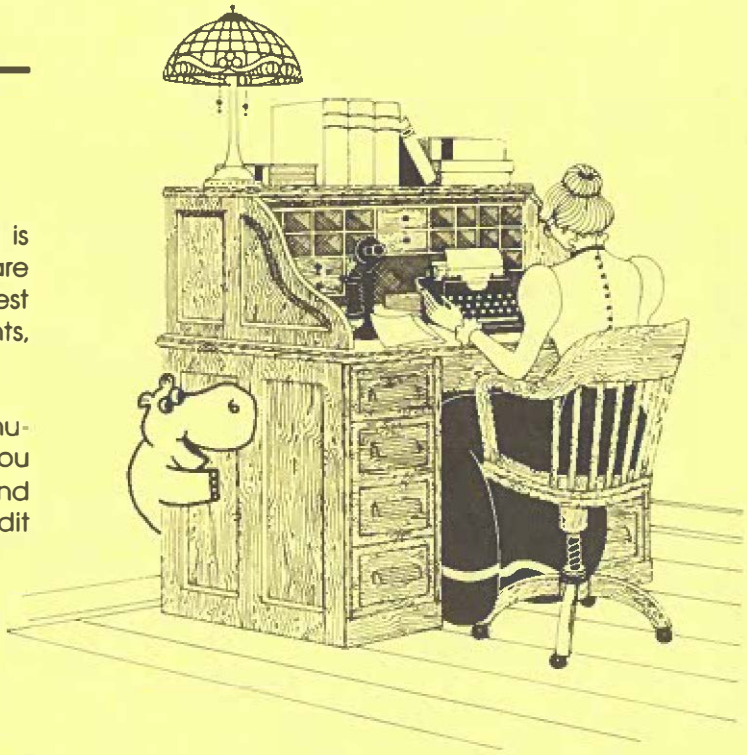
The next issue will be in February. Copy deadline is January 15, 1983. If you have any announcements which you would like to have printed in the *BULLETIN*, please send them to the Editor. We reserve the right to select and edit copy.

Editor: Frances B. Waranius,
Lunar and Planetary Institute
3303 NASA Road One, Houston, TX 77058

Phone: 713/486-2135

NOTE TO OUR READERS: PLEASE let us know when you move. Each change of address which we get through the postal service costs us $.25-$.80 in return postage costs. Because of the high costs of postage, we will make the address change on our list but we will no longer send the current issue out to you on a straight third or firstclass mailing. This means you will miss receiving whatever mailing from the LPI we get from the Post Office with your change of address.

If you want to be sure that you get all of your mailings from the Institute promptly, be sure to send a change of address to: Mailist, Lunar & Planetary Institute, 3303 NASA Road One, Houston, TX 77058. It often takes the postal service 60-90 days to return an item to us with the address correction. Do yourself and us a service. Remember the LPI Mailing List when you move. Thanks. (ye editor)



CALENDAR

November 15-18

Topical Conference on **Chondrules and Their Origins**, LPI, Houston Texas
Contact: Pam Jones
Lunar and Planetary Institute
3303 NASA Road One
Houston TX 77058
Telephone: 713/486-2150, or
Elbert King
Dept. of Geosciences
University of Houston
Houston TX 77004
Telephone: 713/749-3724

November 15-19

International Conference on **Cometary Exploration**, Budapest, Hungary
Contact: Dr. K. Szego
Central Research Inst. for Physics
P.O. Box 49
Budapest, Hungary H-1525

December 7-15

American Geophysical Union, fall meeting
San Francisco
Contact: AGU Headquarters
2000 Florida Avenue NW
Washington DC 20009
Phone: 202-462-6903

1983

January 10

DEADLINE for abstracts for the XIVth Lunar and Planetary Science Conference

January 17-21

Planetary geologists/principal investigators meeting, Reston VA
Contact: Charles A. Baskervilie
U.S. Geological Survey
Reston VA 22092

March 14-18

XIVth Lunar and Planetary Science Conference, Houston, Texas
Contact: Projects Office
Lunar and Planetary Institute
3303 NASA Road One
Houston TX 77058
Phone: 713-486-2150

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May 9-12	Sixth Princeton Conference on **Space Manufacturing**, Princeton University, Princeton NJ Contact: April Whitt Space Studies Institute Box 82 Princeton NJ 08540
June 14-16	94th Annual Scientific Meeting of the **Astronomical Society of the Pacific** Contact: Hawaii Meeting ASP 1290 24th Avenue San Francisco CA 94122
June 21-24	Physics of the Jovian and Saturnian Magnetospheres, Massachusetts Inst. of Technology Cambridge, Massachusetts Contact: Professor H. S. Bridge MIT: 37-241 Cambridge MA 02139 Phone: 617-253-7501

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