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LUNAR AND PLANETARY SCIENCE CONFERENCE XVII

17-21 March 1986

The **SEVENTEENTH LUNAR AND PLANETARY SCIENCE CONFERENCE** will begin Sunday March 16 at 6:00 p.m. with registration and an open house at the Lunar and Planetary Institute. The registration fee for the conference is $35.00. A shuttle bus will run between NASA area hotels and the LPI from 5:45 to 10:00 p.m. Registration will continue throughout the conference on the 2nd floor of the Gilruth Center at the Johnson Space Center. All conference activities, technical sessions, exhibits, poster sessions, etc., unless otherwise listed, will be at the Gilruth Center.

From a total of 499 abstracts accepted for publication in *Lunar and Planetary Science XVII*, the Program Committee has constructed 29 technical sessions. The general structure of the program is as follows:

MONDAY AM
- Mars and Other Remote Sensing
- Chondrules, Carbonaceous Chondrites
- Impact Phenomena: Observational Data

MONDAY PM
- Martian Geomorphology and its Relation to Subsurface Volatiles
- Chondrites and Parent Body Processes
- Impact Phenomena: Experiment and Theory

MONDAY EVENING
- Mars Panel Discussion
- Space Utilization

TUESDAY AM
- Lunar Highlands, Samples and Meteorites
- Mars Remote Sensing
- Comets and Asteroids

TUESDAY PM
- Lunar Evolution, Mare Basalts and Experimental Petrology
- Planetary Volatiles and Aggregation
- Martian Tectonics/Planetary Stress and Strain

WEDNESDAY AM
- Venera/Vega/Venus
- Light Isotopes and Nebular Chemistry
- Interplanetary Dust

WEDNESDAY PM
- Venus
- Differentiated Meteorites I
- Cosmic Rays and Carbon

THURSDAY AM
- Dynamic Earth: Early Atmosphere, Crust, Mantle and Core
- Isotopic Anomalies
- Lunar Regolith

THURSDAY PM
- Lunar Origin(s)
- Primitive Chondritic Components
- Volcanic Plains/Mars Sediments

FRIDAY AM
- Differentiated Meteorites II. SNCs
- Planetary Physics
- Io, Europa, Ganymede, and Callisto

The preliminary program included in this issue reflects plans for the conference as they exist early in February. Minor changes may yet occur before the Conference itself. (See Appendix to this Bulletin)

CONFERENCE HIGHLIGHTS

POSTERS entered in the Technical Poster Session will be on display each day of the Conference in the Gilruth Center. A preliminary list of the poster exhibits now scheduled is included in the program. If anyone has exhibit material which is not part of the official poster session, but which they would like to display, please contact Pam Jones, at the LPI (713-486-2150) for a space allocation.

METEORITE FIELD TRIP Tours of the Antarctic Meteorite Laboratory at the Johnson Space Center will be offered during the week of March 17-21, 1986 as part of activities related to the Seventeenth Lunar and Planetary Science Conference. Each tour will include opportunities to view freshly cut surfaces of selected chondrites and achondrites, including new slabs of the shergottite, Elephant Moraine A79001. In addition,

scientists who are planning specific studies can request time for more detailed examinations of other specimens.

One tour will be offered at 12:00-1:30 p.m. each day of the conference. Detailed, research-level examinations of meteorite specimens can be arranged on an individual basis, given sufficiently advanced notice.

Due to space and time limitations, advanced reservations will be required for all tour and study activities and such reservations will be issued on a first-come-first-serve basis. In order to facilitate the reservation process, the Planetary Materials Branch at JSC is sending a letter of invitation to each person on its "meteorite" mailing list. If you do not receive such a letter by March 3, 1986 but would like to visit the meteorite processing laboratory, please contact Dr. James L. Gooding at the following address:

SN2/Planetary Materials Branch
NASA/Johnson Space Center
Houston, TX 77058
Telephone: (713) 483-6241

By special arrangement, and for these tours only, visitors with NASA escorts will be permitted to enter JSC building 31 using their LPSC-17 conference badges. For other purposes, access to building 31 will follow the usual restrictions as explained in the LPSC-17 information packet.

The *LPI Image Processing Facility* will conduct an open house throughout the conference in McGetchin Hall at the LPI. Check the registration desk for times. For additional information contact Mr. Kin Leung at 713-486-2165 or Ms. Rebecca McAllister at 713-486-2181.

The on-line and remote access capabilities of the *LPI Geophysical Data Facility* will be demonstrated at the LPI Exhibit in the Coffee area, Gilruth Center, during the regular conference hours.

The *Combined Publishers Exhibit* will be on display in the coffee area of the Gilruth Center from Monday through Friday noon. Several publishers have already indicated an intent to participate. Among them American Geological Institute, Cambridge, University of Arizona Press, Allen & Unwin, Scribner, and the Government Printing Office.

Sunday - March 16

There will be a meeting of the Ganymede Mappers from 8:30 am to 5:00 pm in the Hess Room at the LPI.

Monday - March 17

An informal meeting will be held at 8:00 pm at the LPI on a book and conference being planned by the University of Arizona. Dr. John Kerridge is coordinating this project.

The two concurrent sessions on Monday evening include the MARS Panel discussion and Space Utilization. An outline and agenda for the Mars Panel may be found elsewhere in this BULLETIN.

Tuesday - March 18

Tuesday evening is *Chili Cook-Off/Bar-B-Q* time. This much heralded event potentially returning for the sixth time will be held on the grounds of the LPI. Paid registrants of the Conference are welcomed at the Chili Cook-Off festivities. Tickets for guests and other non-conference registrants will be available at the Registration Desk during the Conference. Team applications are still being accepted. The Chili Cook-Off will be held only if enough teams sign up for the competition. Prizes will be awarded based on the best tasting chili not according to absolute "Texas Standards." Rain date will be Thursday, March 20.

Wednesday - March 19

The JSC Astronomer's Brownbag Lunch Club will present Jim Oberg in the Conference Room, Room 193, Building 31 at Noon. The topic for discussion will be *Terraforming-II: prospect for a symposium at LPSC XVIII.*

A meeting of the International Union for Geological Science (IUGS) Commission on Comparative Planetology will be convened by Richard Grieve at the LPI from 5 to 7 pm.

A *NASA/Recent Encounters Night* will be held in the Gilruth Center Auditorium. Preliminary plans for this session include remarks by Dr. Geoffrey A. Briggs, Director of the Solar System Exploration Division at NASA Headquarters; a member of the Voyager Project Team reporting recent results of the Uranus encounter; and a report on the comet sample return mission.

Thursday - March 20

The Lunar and Planetary Science Conference Forum convened by the Planetary Meetings Steering Committee (PMSC) will be held from 8:00 to 10:00 p.m. in the Gilruth Center auditorium. If it rains on Tuesday, this meeting will be held on Tuesday evening and the Chili Cook-Off/Bar-B-Q will be held on Thursday.

ABSTRACTS - Lunar and Planetary Science XVII

A staple-bound copy of abstracts will be sent before the conference to the corresponding author of an abstract. A copy is being sent to the foreign corresponding authors also. However, in the case of the foreign authors, if this mailing would result in multiple copies to one institution, only one will be sent. It is suggested that this copy be shared among the author's colleagues.

Abstract volumes will be distributed to conference attendees who have paid the $35.00 registration fee. For those who cannot attend the conference but wish to have the abstracts, a supply will be available after the conference at the cost of postage and handling.

Please use the order form included in this Bulletin and mail with payment to the Library Information Center at the LPI.

Summaries of the main topics discussed at the Conference will be published in the June issue of *Geotimes*.

MECA Special Session at LPSC XVII: "Martian Geomorphology and its Relation to Subsurface Volatiles"

by Stephen Clifford and Lisa Rossbacher

The three year LPI Study Project entitled "Mars: Evolution of its Climate and Atmosphere" (MECA) will conclude in October of 1986. During the course of the Study Project much attention has been devoted to theoretical discussions of the martian volatile inventory, the planet's climatic and atmospheric evolution, and the interpretation of various remote sensing data sets (specifically, those compiled by the Viking IRTM and MAWD instruments). As yet unaddressed, however, is what might be learned regarding the quantity and distribution of subsurface volatiles from a detailed examination of martian surface geology. This issue will be the central focus of the upcoming MECA-sponsored LPSC special session entitled: "Martian Geomorphology and its Relation to Subsurface Volatiles."

In recent years, a long list of martian landforms has been compiled whose origins have been attributed to the presence of ground ice. Typically this association is based on a perceived resemblance to cold climate features found on Earth. Unfortunately, among other problems, it is not uncommon for the scale of these martian features to differ by several orders of magnitude from their terrestrial counterparts. The picture is further complicated by the numerous conjectures that have been made linking the dimensions and appearance of these landforms with such variables as regolith volatile content, its physical state, and distribution with depth. All too often, these conclusions appear to be based on little more than an investigator's "gut feeling;" although, on occasion, a significant effort has been made to support a claim through detailed theoretical analyses and laboratory experiments.

Clearly, if our goal is to constrain the quantity and distribution of volatiles in the martian crust through the analysis of orbital imagery, then a necessary first step must include an objective reassessment of our present understanding of martian geomorphology. Specifically: Just how confident are we of the identification of various martian landforms as indicators of subsurface volatiles? Are volatiles truly the best possible explanation for the origin of these features, or is it a bias that is now so deeply ingrained that the presumption is automatically made whenever any new and unusual feature is discovered?

To help address these questions, a panel discussion/debate will highlight the LPSC Special Session. Participants in the discussion will include: Ray Arvidson, Mike Carr, Fraser Fanale, Baerbel Lucchitta, Pete Mouginis-Mark, Peter Schultz, Steve Squyres, and Jim Zimbelman. The moderators will be Steve Clifford and Lisa Rossbacher.

The panel will consider each of the major landforms that have been cited as potential indicators of subsurface volatiles, including brief discussions of outflow channels, valley networks, patterned ground, "thermokarst," table mountains, and lobate debris flows. However, the main focus of discussion will center on just two of the proposed morphologic indicators: rampart craters and terrain softening. The fluidized ejecta pattern that characterizes most rampart craters is thought to originate from an impact into a water or ice-rich crust. Terrain softening, on the other hand, does not reflect a unique morphology, but a general style of landform degradation. Specifically, it is a term that has been applied to describe the rounded or subdued appearance of martian topography poleward of 30° latitude. The "relaxed" appearance of such terrain has led investigators to suggest that terrain softening may result from ice-enhanced creep. It is because of the popular attention that rampart craters and terrain softening have received, and because their areal distributions are by far the most extensive of all the proposed volatile indicators, that they will be the subject of this more in-depth discussion.

In an effort to make the panel discussion as interesting and thought provoking as possible, as well as insure that all sides of an issue are heard, a number of changes to the traditional panel discussion format have been made. They include: 1) a highly structured program based on a pre-arranged series of questions, 2) the opportunity for the panelists to display visual material in support of their remarks, 3) the opportunity for panelists to "cross-examine" one another, 4) two moderators who will frequently participate in the discussion as devil's advocates, and 5) three built-in breaks during the discussion to permit questions and comments from the audience.

To provide the maximum opportunity for the interchange of ideas and opinions, each panelist will be limited to one minute in their response to any question. A similar time limit will be imposed on any follow-up remarks for the purposes of clarification or rebuttal. Members of the audience will also be expected to comply with the one minute rule when addressing their questions and comments to the panel. Should these guidelines at anytime begin to interfere with the quality of the debate, the moderators may suspend the one minute rule and allot more time at their discretion.

A dedicated volume containing a summary of the panel discussion, as well as reprints of all of the abstracts presented at the Special Session, will be published by LPI following the Science Conference.

Special Session, Monday, March 17th 1:30-5:00 PM Gilruth 104

Introductory remarks by session chairmen: S. Clifford and L. Rossbacher

Invited talk: The Volatile Inventory of Mars, *R. Pepin*

Contributed talks:

Small Valley Networks and the Past and Present Distribution of Subsurface Volatiles, Aeolis Quadrangle, Mars. *G. R. Brackenridge*

Northern Sinks on Mars? *B. K. Lucchitta, H. M. Ferguson, and C. Summers*

Geomorphic Evidence for Subsurface Volatile Reservoirs in the Elysium Region of Mars. *E. H. Christiansen and J. A. Hopler*

Early Changes in Gradation Styles and Rates on Mars. *P. Schultz*

Ground Patterns on Earth and Mars. *L. A. Rossbacher*

Spatial Resolution and the Geologic Interpretation of Martian Morphology. *J. R. Zimbelman*

Implications for Substrate Volatile Distributions on Mars from Complex Crater Morphology and Morphometry. *W. S. Hale-Erlich*

Morphologic Variations of Martian Rampart Crater Ejecta and Their Dependencies and Implications. *J. S. Kargel*

Effects of Elevation and Plains Thicknesses on Martian Crater Ejecta Morphologies for the Ridged Plains. *V. M. Horner and R. Greeley*

Pseudocraters as Indicators of Ground Ice on Mars. *H. Frey*

The Role of Fluidization in the Emplacement and Alteration of the Suevite Impact Melt Deposits at the Ries Crater, West Germany. *H. E. Newsom, G. Graup, T. Stewards, and K. Keil*

Water-Ice in the Martian Regolith: Experimental Investigation of Lithologic Effects. *J. L. Gooding*

Poster Sessions:

Morphology of Large Valleys on Hawaii: Implications for Groundwater Sapping and Comparisons to Martian Valleys. *R. C. Kochel and J. O. Piper*

Arcuate Ground Undulations, Gelifluxion-Like Features and "Front Tori" in the Northern Lowlands on Mars—What do They Indicate? *H.-P. Jons*

Lava-Ice Interactions on Mars. *D. E. Wilhelms*

The Youngest Channel System on Mars. *K. L. Tanaka and D. H. Scott*

Panel Discussion, Monday evening, March 17th 7:30-10:00 PM Gilruth 104

Questions selected from those listed below will serve as the basis of the panel discussion program. They will be supplemented by questions that arise during the course of the discussion from the panelists, moderators, and members of the audience.

Panel members: R. Arvidson, M. Carr, F. Fanale, B. Lucchitta, P. Mouginis-Mark, P. Schultz, S. Squyres, and J. Zimbelman. S. Clifford and L. Rossbacker (moderators).

Introduction: The moderators will introduce the panel and make some brief remarks concerning the organization of the session and the ground rules governing initial responses and follow-up remarks. (5 minutes)

Theoretical considerations: To set the stage for the rest of the discussion, there will be a quick overview of the theoretical basis for estimates of the martian H_2O inventory and how that H_2O might be distributed within the regolith (5 minutes). The overview will address each of the following questions:

1) Ignoring the geologic evidence for the time being, what is the best theoretical estimate of the total inventory of water on Mars?

2) On what assumptions is this estimate based? How well constrained is it? (That is, could it be an order of magnitude larger? Or an order of magnitude less?)

3) If Mars had only a small inventory of H_2O (e.g., equivalent to a 10 m layer), what would its likely state and distribution be within the regolith? What about a very large inventory (say 1000 m)?

Morphologic indicators: Following a general discussion about the kinds of information that can be learned from the analysis of morphological data, various members of the panel will provide brief (1-2 minute) summaries on each of the major martian landforms that have been attributed to the presence of subsurface volatiles. As each feature is discussed, their global distribution and one or two photographic examples will be displayed (15 minutes).

Outflow channels	Valley networks
Patterned ground	"Thermokarst"
Table mountains	Lobate debris flows

For each presentation, the following four questions will be addressed:

1) What is the basis for the identification of this landform as an indicator of subsurface volatiles?

2) Is there anything of particular importance that this landform might tell us about the state, quantity, distribution, or history, of subsurface volatiles either locally or on a planet-wide basis?

3) Are there any major uncertainties regarding the nature of this landform that might be addressable through further observational, theoretical, or experimental analysis?

4) Are there any alternative explanations (besides volatiles) that may account for the morphology of this feature?

After this "mini-introduction" to each landform, questions or comments from other members of the panel will be considered.

Questions and Comments from the Audience (15 minutes)

Rampart craters: As with the above landforms, there will be a few short introductory remarks about rampart craters that will include a global distribution map and some photographic examples (35 minutes).

1) What is the basis for the association of rampart craters with subsurface volatiles?

2) Is there any experimental evidence that supports the idea the rampart crater ejecta morphology originates from an impact into a volatile-rich regolith? If so, how close were the experimental conditions (e.g., impact velocity, target and projectile strength, temperature, etc.) to those expected in an actual impact on Mars?

3) Assuming a volatile origin, is there anything about the morphology of a rampart crater that is diagnostic of the specific volatile (i.e., CO_2, or H_2O), its original state in the regolith (chemically bound, physically adsorbed, ice, or a liquid), or the quantity that was entrained to produce the ejecta's characteristic fluidized appearance?

4) What is the experimental or theoretical basis for calculating the depth to, or thickness of, a volatile rich layer based on rampart crater onset or termination diameters?

5) What other target or projectile properties are likely to influence crater morphology, and in what way?

6) Rampart craters are alleged to form by an impact into a volatile-rich crust, yet, with the exception of a few isolated occurrences on Ganymede, no rampart craters are found on any of the icy satellites. How can this fact be reconciled with the popular model of rampart crater formation?

7) In studies of the distribution of rampart craters, various subcategories of crater morphology have been defined and mapped. Unfortunately, few investigators have utilized the same classification system. Can such studies be correlated? For example, are there any clearly identifiable trends in crater morphology with latitude or terrain type that are common to all such studies?

8) What obstacles prevent the adoption of a common system for the classification of martian crater morphology? Are there any reasons for not adopting such a common system of classification?

9) Are there any alternative explanations for the origin of rampart craters that do not require the presence of volatiles? If so, on what evidence are they based? Are there any arguments against these alternatives?

Questions and Comments from the Audience (15 minutes)

Terrain softening: Again, a brief introduction that includes a distribution map and photographic examples (25 minutes).

1) What is the basis for identifying H_2O ice as the agent responsible for this style of landform degradation?

2) Is there any experimental evidence that supports this conclusion? What about terrestrial or other analogs?

3) If terrain softening does indeed originate from ice-enhanced creep, are the mechanical properties of the martian crust implied by the dimensions and morphology of the affected terrain consistent with those expected of ice-mineral mixtures at ambient martian temperatures?

4) Could the observations of subdued topographic relief at mid to high latitudes result from processes other than ice-enhanced creep (e.g., dust mantling, or atmospheric obscuration)?

5) Would the analysis of crater diameter-frequency plots for the affected regions provide useful information to refute or support the ground ice hypothesis? Have any such studies been done?

6) Because terrain softening is restricted almost exclusively to the latitudes poleward of 30°, it has been argued that ground ice must be absent from the regolith at equatorial latitudes. However, rampart craters are found throughout the supposedly dry equatorial band—even in the very youngest of terrains. How can this apparent contradiction be reconciled?

Future research: (10 minutes)

1) Is there any type of analysis of existing Viking or Mariner data that could shed additional light on the rampart crater or terrain softening questions? What about laboratory studies?

2) Are there any diagnostic tests or observations that could be carried out by the instrument packages that have been proposed for the upcoming Mars Observer Mission?

3) What types of instruments or experiments might be included in some future Mars mission to help determine the state, distribution, and total inventory of subsurface volatiles?

Questions and Comments from the Audience (15 minutes)

Summary: Each panelist will be asked to give a two minute summary of what he feels were the most important points raised during the Special Session and panel discussion (20 minutes).

VIKING ANNIVERSARY ACTIVITIES

A number of activities are being planned to commemorate the 10th anniversary of the successful Viking mission to Mars.

THE MARS CONFERENCE

NASA will sponsor a major conference on the subject of Mars, to coincide with the tenth anniversary of the Viking missions. The conference will be held on July 21-23, 1986, at the National Academy of Sciences in Washington DC. The conference will take a comprehensive look at:

Our current knowledge and understanding of Mars.
The current and future unmanned exploration of Mars.
The issues and options for manned exploration.

Several areas of Mars science will be addressed including: History of the planet; geology, volcanism, channels, moons, meteorology, polar regions, and biology. In addition, prospective Mars programs will be discussed. These include: the Observer, Aeronomy, Seismic network, Sample Return Missions, and Manned Missions.

Anyone interested in the history, science and exploration of Mars is invited to attend. Attendance will be on a first-come, first-serve basis and will be limited to six hundred. Registration fee: $50.

For further information contact:

The Mars Conference
Mrs. Lu Agee
Administrative Chairman
P.O. Box 416
Hampton VA 23669
Phone: 804-865-8400

MECA Conference "Mars: The Evolution of its Climate and Atmosphere"

The final activity planned for the NASA-sponsored Lunar and Planetary Institute Study Project entitled "Mars: The Evolution of its Climate and Atmosphere" (MECA) will be a conference with the same title to be held July 18-19, 1986, in Washington D.C. The conference is scheduled to coincide

with the 10th Anniversary of the Viking Landing on Mars. Cosponsoring the conference are the Lunar and Planetary Institute and the National Air and Space Museum. The location for the conference is the Hirshhorn Museum. Dr. Ted Maxwell, National Air and Space Museum, and Dr. Ronald Greeley, MECA Steering Committee Chairman from Arizona State University, will serve as conference conveners.

The meeting will be organized to address questions dealing with the three principal topics of the MECA Project which are: 1) seasonal cycles; 2) surface processes and climate history; and 3) bulk chemical composition and outgassing history. In addition, a session will be organized on the volcanic and tectonic history of Mars. This topic will constitute the major theme of the Mars program as a "follow-on" to MECA.

To indicate interest in attending this meeting or to obtain additional information contact:

Pamela Jones
Conference Administrator
Lunar and Planetary Institute
3303 NASA Road One
Houston TX 77058
Phone: 713-486-2150

ECG PROJECT WORKSHOP BEING PLANNED FOR AUGUST

A field workshop on "Archean Deep Crustal Processes" will be held in the Thompson-Pikwitonei area of Northern Manitoba August 4-11, 1986. This workshop is one of a series initiated by the Early Crustal Genesis Project and sponsored by NASA, the Lunar and Planetary Institute and the Manitoba Geological Survey. The meeting will consist of six days of field excursions, a day and a half of workshop sessions with presentation of papers, and an optional half-day visit to a new INCO open pit nickel mine in Thompson. The objective is to bring together scientists in terrestrial and planetary geochemistry, geology and geophysics to examine first-hand the evidence for deep crustal processes that have transformed low-grade greenstone-granitoid crust to high-grade granulite crust across a gradational transition zone. More specifically, the field excursions will attempt to demonstrate that the Pikwitonei granulite domain at the northwestern Superior Province margin represents typical Archean greenstone-granitoid crust which subsequently has been subjected to granulite facies conditions during late Archean crustal thickening. Conveners for the field workshop are Dr. Werner Weber, Manitoba Geological Survey, Dr. Lewis D. Ashwal, Lunar and Planetary Institute, and Dr. William Phinney, NASA Johnson Space Center. Field guides and an abstract volume of submitted papers will be distributed to participants and then later combined with a summary to be published as part of the LPI Technical Report Series.

TERRAFORMING-II; COLLOQUIUM ANNOUNCEMENT

Preliminary planning has begun for a second colloquium on planetary engineering, to be called "Terraforming-II" (T-II). The first formal gathering on this far-future topic was in March 1979, under the aegis of the Tenth Lunar and Planetary Science Conference in Houston.

A short planning and organization session led by Jim Oberg will be held at the JSC Astronomy Club Brown Bag Lunch on March 19 during the XVIIth Lunar and Planetary Science Conference. Mr. Oberg's concept for the colloquium would include an evening meeting at the Lunar and Planetary Institute during the XVIIIth Lunar and Planetary Science Conference in 1987. The session would include a key-note talk, formal papers, and a panel discussion. Mr. Oberg comments, "Terraforming other planets such as Mars may capture the public imagination, but an important aspect of planetary engineering is that Earth itself is being 'terraformed' for good and for ill, accidentally. To maintain current climates against artificial and natural perturbations, deliberate planetary engineering may be needed within a few decades. Only after surviving such experiences and developing the appropriate technologies should we consider 'eco-synthesis' on other planets. . . . As with other far-future projects, estimates of necessary efforts should take into account the normal development of technology and ways in which tools and techniques from one area may be co-opted for planetary engineering."

To participate in doing some serious "imagin-eering' at T-II, contact:

James E. Oberg
Rt 2 Box350
Dickinson, TX 77539
Phone: 713-337-2838

MARS CONTEST

The Planetary Society's Mars Institute announces the third annual Mars student contest. The topic for this year's contest is: *Design a System of Transportation for the Scientific Exploration of Mars from a Mars Research Base.* Students in any high school or college are eligible. Groups of students may work together, however this will be considered in judging. The prize is $1,000 plus an all expense paid trip to a scientific conference on Mars exploration in Washington DC to receive the award. Other prizes for excellent papers will be considered.

Entries must be postmarked by April 15, 1986.
The winner will be announced by June 15, 1986.
More information can be obtained by contacting:
Mars Institute
Planetary Society
65 N. Catalina Avenue
Pasadena CA 91106

Comet Halley Airplane Flights and Field Trip at LPSC XVII

For those northerners whose furthest venture south this spring will be to attend the Lunar and Planetary Science Conference (March 17-21) in Houston, LPI is in the process of organizing several unique opportunities to view Halley's Comet. During the week of the Conference, the comet will be visible early in the morning (4:00-5:00 AM) at a height of about 15° above the southeastern horizon. For those intrepid souls who are willing to venture out at this rather uncivilized time of day, the Institute will offer two ways in which to get a better view of the action. The first will be from the seat of a small low-wing private airplane, while the second will be from firmer footing out in the countryside.

For the comet flight, the Institute is chartering several planes, each with the capability of carrying 3-5 passengers. The planes will leave from a local airfield and remain in the air for approximately one hour at the time of best viewing. While the plane's movement will prohibit any chance for worthwhile photography, passengers should get a fairly decent eyeball-view away from city lights and above any low-level clouds or fog. The cost will be $35 per person.

The ground-based option will consist of a field trip to the countryside. There, away from city lights, those with cameras and small telescopes should obtain reasonable photographic results. To cover transportation expenses, the cost of the field trip will be $7 per person.

In order to make final arrangements for both activities, it is necessary that all checks be received at the Institute by March 3rd. The checks should be made out to LPI and should be sent to the attention of Stephen Clifford. For those who wish to take the airplane flight, we will also need to know your weight (be honest!). The precise day for the plane flights and countryside field trip will be subject to the weather, but is tentatively scheduled for Tuesday, March 18th. For more information contact Stephen Clifford (713-486-2146).

LUNAR SAMPLE DISPLAY AREA UPDATE

The public display area in Building 31 which is included on the visitor's walking tour recently has been renovated and now includes meteorites and cosmic dust as exhibit topics. The interior of the Pristine Lunar Sample Processing Laboratory can be viewed from this area. Plan to see the new exhibits in this display area while attending the Lunar and Planetary Science Conference or any other time you are visiting the Johnson Space Center.

LUNAR INITIATIVE UPDATES

by Wendell Mendell

Establishing and sustaining a permanent manned lunar base will have a major impact on the Space Transportation System of the United States. Scenarios for the buildup of a lunar facility provide detailed descriptions for the movement of mass in the transportation system, and consequently their construction is an important planning tool. The elaboration of any such scenario is a complex exercise requiring a wide range of expertise and a great deal of judgment. First, the nature and the scope of the activities at a base must be assumed. Elements such as habitats, laboratories, power plants, or industrial facilities must be sized and described. Cargo capabilities of the space freighters must be estimated. Three such system studies by Eagle Engineering ("Lunar Oxygen Impact upon STS Effectiveness"), by the JSC Advanced Projects Office (unpublished study "Lunar Surface Return"), and by the Technische Universitat Berlin ("Comparison of Alternative Strategies of 'Return-to-the-Moon'") illustrate the complexity of the final product and the difficulty of studying alternative assumptions without starting from scratch.

Lunar Base Computer Model

The Large Scale Projects Institute at the University of Texas, Austin, has recently issued the *Report of the LSPI/NASA Workshop on Lunar Base Methodology Development* (NASA Grant NASG-116) from a weeklong meeting held in August, 1985, in La Jolla, CA. Invitees to the workshop brought expertise in various disciplines relevant to potential lunar base functions as well as working experience in modeling of systems. The working group was charged to develop a computer-based methodology for generation and analysis of lunar base models. The final product of this ongoing effort (subject to available funding) will reside on a NASA computer, but an important goal of the project is to provide a somewhat simplified public version which could be run on a personal computer. The "official" model will be updated continuously, with inputs and improvements actively encouraged from interested parties in academia, industry, and government.

At the present, the methodology exists only in concept. Ideally, a user will specify an activity or a set of functions to be accomplished by a proposed lunar base. The model will suggest a configuration of elements (habitats, power plant, laboratories, etc.) to satisfy the requirements. Characteristics of base elements will reside in modules in the model. Obviously, users who wish to explore the impact of "nonstandard" activities

(e.g., neutrino astronomy, cement production) must define modules which describe the required lunar base elements. Complete and tested user modules eventually will be incorporated into the standard library, thereby increasing the scope and flexibility of the formulation.

Once an acceptable lunar base configuration has been defined, the program will be able to develop a schedule for deployment, assuming a standard model of the Space Transportation System. Again, the user will be able to redefine the capabilities of transportation elements for optimization of a particular buildup or operational scenario. At the highest level, the NASA model will produce cost estimates and economic analyses of particular scenarios.

A Lunar Base Systems Model will be a communication tool as well as a powerful planning tool. Since the "Lunar Initiative" in its present incarnation is a collection of interested parties and not a NASA program, exchange of ideas among a diversity of disciplines is always a problem. A widely accessible model can serve as a channel for professional interaction with the planning process and in particular can provide a structured design environment for university classes, both graduate and undergraduate.

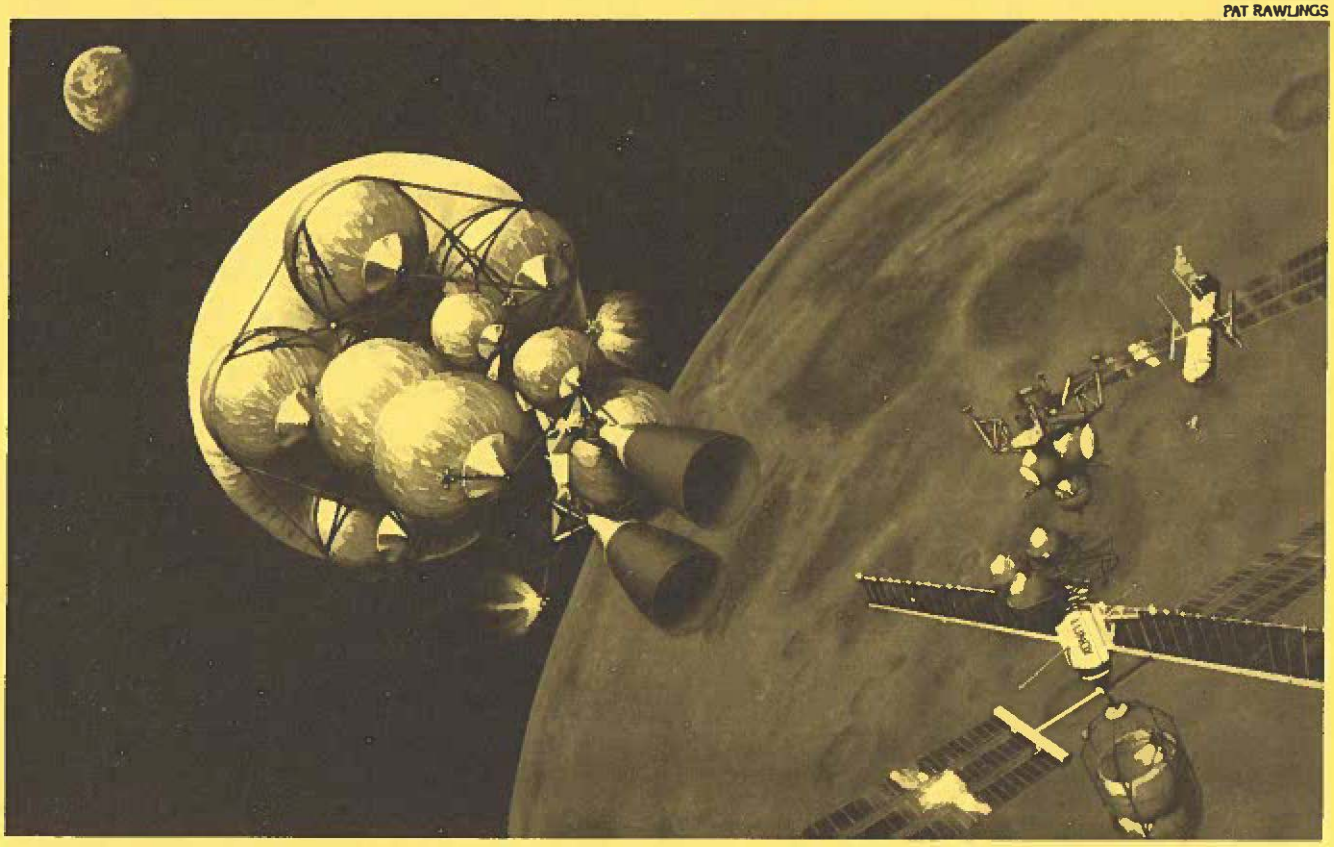
Lunar Base Architecture

Professors Larry Bell and Gui Trotti of the Environmental Center, College of Architecture, University of Houston, have been interested in lunar architecture for many years and have done work on space platforms both for NASA and for private companies. They also have taught a graduate architecture course in lunar base design. In past years students have produced interesting concepts that tended to be stand-alone pieces, not directly related to other lunar base planning. This year graduate students Jeff Brown, Sam Ximenes, and Francis Winisdorfer have set out to establish a conceptual framework within which they, and future students, can make relevant contributions to planning activities in the space program. To that end they have collected ideas from engineering, scientific, and space medicine groups at NASA/JSC. In a working draft of their first semester's work they describe a hypothetical buildup of a lunar facility over 5 years to a staff level of 28 people. Over the semester break the draft has been critiqued at JSC, Los Alamos National Laboratory, and elsewhere. For the second semester they intend to focus on design of selected elements from the revised scenario. The overall plan will be continued and developed by future students in the department. For further information contact Jeff Brown at UH College of Architecture, Houston, TX 77004.

Lunar Base Workshop

The one-day workshop on Astronomy from a Lunar Base was held in Houston, Texas, on January 10, following the annual meeting of the American Astronomical Society. Approximately 100 attendees heard 3 papers on the programmatic status, budgetary feasibility, and geological environment of a lunar base followed by 15 papers on the advantages (and disadvantages) of lunar surface observations relative to

PAT RAWLINGS



observatories in space or on the Earth. Papers covered astronomy at gamma ray, x-ray, optical, infrared, and radio wavelengths. Interferometry, both radio and optical, was discussed, along with ideas about the construction of telescopes on the Moon. Neutrino and cosmic ray observations were reviewed. By the end of the symposium it was clear that the extreme stability of the lunar surface, the cleanliness of the environment, and other special properties will enable measurements of unmatched spatial resolution and extraordinary sensitivity in certain observational regimes. Speakers were asked by Jack Burns of the University of New Mexico to prepare short papers for a "proceedings" to be available, hopefully, by April. A summary of the conference is being planned for a future issue of this bulletin.

Lunar Development Symposium

The American Mag-Lev Corporation continues preparations for the First Lunar Development Symposium to be held in Atlantic City September 1986. Since it will be held jointly with the Fourth International High Speed Ground Transportation Conference, a major theme will be application of electromagnetic levitation technology to lunar transportation problems. However, the conference will consider the broader issues of known and unknown effects of the lunar environment on industrialization, the role of private sector financing in development of lunar technologies, and the benefits to terrestrial technologies accruing from research on advanced space applications. Significant participation by an international community interested in advanced transportation technology is anticipated. The Philadelphia Engineers Club is cosponsoring the event; supporting organizations include NASA/JSC, DOT/Urban Mass Transit Authority, and high speed rail commissions from the states of New Jersey, Pennsylvania, and Florida.

IAA Return-to-the-Moon Committee

Prof. Dr. H. H. Koelle (Aerospace Institute, Technical University Berlin, FRG) has been named Chairman of an Ad Hoc Committee for Return-to-the-Moon within the International Academy of Astronautics. The committee will have the responsibility of collecting, organizing, and disseminating information on available options for a manned lunar project near the turn of the Century. At the present time, Prof. Dr. Koelle is organizing a session of invited and contributed papers for the XXXVII Congress of the International Astronautics Federation to be held at Innsbruck, Austria, October 6-11, 1986. Papers will address the state of lunar exploration and knowledge, lunar logistics and infrastructure, research opportunities in the lunar environment, and a look at lunar settlements from the social science aspect.

Lunar Base Symposium Book

Lunar Bases and Space Activities of the 21st Century is in press, and prepublication orders should be shipped in late February. The collection of 85 manuscripts draws heavily from papers presented at the symposium of the same title, held in Washington, DC, October, 1984. The peer-reviewed contributions address issues of planetary settlement in the areas of science, technology, space policy, industry, architecture, literature, history, law, finance, politics, and human aspiration. The book is positioned to play a seminal role in the anticipated renaissance of vision in space development. In galley form, it is being utilized by the National Commission on Space during preparation of their final report to the President. Copies may be ordered from the Publications Office of the Lunar and Planetary Institute for $20.00 prepaid ($15.00 additional for air mail service to foreign countries).

NASA RENAMES PLANETARY MISSIONS TO VENUS AND MARS

NASA has selected official names for two planetary missions scheduled for flight in 1988 and 1990. A mission to map the planet Venus, previously known as Venus Radar Mapper, is now called *Magellan*. The Mars Geoscience/Climatology Orbiter is now named *Mars Observer*.

The Magellan mission will map the entire surface of planet Venus for the first time, using a synthetic-aperture radar instrument. The radar—which can image the surface despite the cloud cover that enshrouds Venus—will map the surface with subkilometer resolution adequate enough to identify geological processes and provide information that will lead to an improved understanding of the planet's evolution. The spacecraft will orbit the planet about once every 3 hours, coming as close as 250 kilometers from the surface.

The Magellan spacecraft, attached to a Centaur-G upper stage, is scheduled for launch from the Space Shuttle in April 1988 and arrival at Venus in July 1989.

The name selection resulted from a search conducted by the NASA Headquarters Office of Space Science and Applications, aided by The Planetary Society.

The Mars Observer mission will map the planet Mars to determine the global elemental and mineralogical character of its surface and to investigate the Martian climate, both present and past.

The Observer spacecraft will be adapted from an existing, production-line type of Earth-orbital spacecraft to reduce costs. This mission will be the first in a series of low-cost planetary observer missions using this approach.

Mars Observer is scheduled for launch in August 1990 from the Space Shuttle. It is scheduled to arrive at Mars in August 1991.

The Magellan and Mars Observer projects are managed by the Jet Propulsion Laboratory, Pasadena, Calif., for NASA's Office of Space Science and Applications.

NASA Press Release 86-1

LPI'S GEOPHYSICAL DATA FACILITY EXHIBITS AT AGU

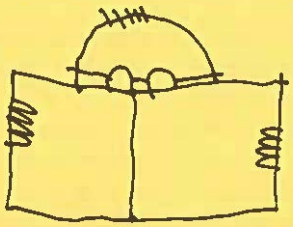
Once again, the remote access capabilities of the LPI's Computer Center for Planetary Data Analysis (C^2PDA) were demonstrated by an exhibit of the Geophysical Data Facility (GDF) during the Fall American Geophysical Union meeting in San Francisco, December 10-12. This year the demonstration was in the exhibit area in the San Francisco Auditorium. Conference attendees were able to dial up the LPI VAX computer to display and run modeling programs on the on-line databases. Current collections include earth topography, SEASAT, MAGSAT, GEOS-3 LOS(line of sight) gravity, Venus topography and LOS gravity, Mars topography and LOS gravity, the Mars Consortium datasets and the Lunar Consortium datasets.

C^2PDA is dedicated to access and utilization by the earth and planetary science community. We encourage both on-site visits as well as remote access through dial-in modems. Access to the GDF databases and modeling programs is free. The modem telephone number is 713-486-8214 (300/1200 bauds), or you can contact Kinpong Leung at 713-486-2165.

Introducing. . . New Managing Editor at LPI

The Publications Department at the Lunar and Planetary Institute has a new Managing Editor. Stephanie Tindell was Managing Editor at the University of Tennessee, Center for Business and Economic Research for three years. The Center publications included monographs, a bimonthly magazine, and numerous reports. Stephanie's telephone number at the Institute is 713-486-2143.

Karen Hrametz, the previous managing editor, is now a "lady of leisure" at home.



NEW PUBLICATIONS

Some of 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.

Some of the NASA documents cited here are only available from the National Technical Information Service, Springfield VA 22161. This agency also requires prepayment. It should also be noted that the paper copy supplied by this agency is often a photocopy produced from a microfilm. Consequently quality is not always consistent.

PLEASE do not send orders for these publications to the LPI. We are not a distribution center for SOD or NTIS documents and this will only delay your order. If you are interested in obtaining any of the items in the ***New Publications List*** do contact the publisher or supplier as given with each item.

In Memoriam

The Space Shuttle Challenger crew:

Francis R. Scobee, Commander
Michael J. Smith, Pilot
Judith A. Resnik, Mission Specialist
Ronald E. McNair, Mission Specialist
Ellison S. Onizuka, Mission Specialist
Christa McAuliffe, Payload Specialist
Gregory B. Jarvis, Payload Specialist

NASA PUBLICATIONS

Galileo: Exploration of Jupiter's System

This NASA special publication is an excellent overview of the Galileo mission compiled by C.M. Yeates, Science Manager, T.V. Johnson, Project Scientist, L. Colin, Probe Scientist, F.P. Fanale, Satellite Working Group Chairman, L. Frank, Mangetospheric Working Group Chairman, and D.M. Hunter, Atmospheric Working Group Chairman. It begins with a history of the project and description of the spacecraft and instruments. Several chapters describe the Jupiter system; its atmosphere, magnetosphere, and the satellites, rings, and dust. The book contains several excellent colored pictures and diagrams of both Jupiter and its satellites and the Galileo mission. It is a way to review the background of this exciting space mission and the science of the Jupiter system in one book and is certainly recommended to anyone interested in planetary science. The appendices contain the listings of the mission teams, a list of acronyms, and a chart of the characteristics of the system.

NASA SP-479 is available from the Government Printing Office. $12.00 U.S. and $15.00 foreign. 175 pp. 1985.

Bibliography of Terrestrial Impact Structures

This bibliography lists 105 terrestrial impact structures, of which 12 are proven structures, that is structures associated with meteorites, and 93 are probable. Of the 93 probable structures, 18 are known to contain rocks with meteoritic components or to be enriched in meteoritic signature-elements, both of which enhance their probability of having originated by impact.

An attempt has been made to cite for each impact structure all literature published prior to mid-1983. The structures are presented in alphabetical order by continent, and their geographic distribution is indicated on a sketch map of each continent in which they occur. They are also listed in tables in (1) alphabetical order, (2) order of increasing latitude, (3)order of decreasing diameter, and (4) order of increasing geologic age.

This bibliography has been compiled by Maurice J. Grolier, U.S. Geological Survey, Flagstaff, Arizona. It has been published as NASA Technical Memorandum TM-87567. Unfortunately, its only availability is through the National Technical Information Service, which, because of its length (548 pages) makes a hard copy rather expensive $40.95. Microfiche is available for $5.95.

OTHER PUBLICATIONS AND MATERIALS OF NOTE

The Continental Crust: Its Composition and Evolution. An Examination of the Geological Record Preserved in Sedimentary Rocks

Graduates in geology, geochemistry and geophysics will find this volume in the Geoscience Texts series from Blackwell Publishing Co, a valuable reference text. The book begins by describing the known composition of the present upper crust, then deals with possible compositions for the total crusts and the inferred composition of the lower crust. The question of the uniformity of crustal composition throughout geological time is discussed. The rate of growth of the crust through time is assessed, and the effects of the extraction of the crust on mantle compositions are considered. Finally the question of early pre-geological crusts on the Earth is debated, and comparisons are given with crusts on the Moon, Mercury, Mars, Venus and the Galilean satellites.

The authors, S.R. Taylor and S.M. McLennan are both at the Research School of Earth Sciences, Australian National University, Canberra. The book contains 328 pages, 118 illustrations and sells for $25.00 US.

International Aerospace Directory 1985-1986

Considering the current thrust encouraged by the Office of Technology Assessment, that more and more of the commercialization of space should be in the hands of the private sector, Eclipse Publishing Company has compiled a directory which lists names, addresses, phone numbers, and chief executives of companies world-wide who are involved in space technology projects. In addition to the alphabetical list, an index groups the companies by subject services or products. A listing of government agencies with addresses, phone numbers, and brief descriptions of responsibilities and a glossary complete the volume. Although the price of $50.00 may seem high for this 205-page, paperback, the compilation of this information into one volume would make it very useful to anyone working in the aerospace commercialization efforts.

The book may be obtained from Eclipse Publishing Company, P.O. Box 1796, Centreville, Virginia 22020.

Out of the Cradle

This book documents the history of space exploration in text and visionary pictures. The worlds in our solar system come alive in full-color paintings that depict people living and working in outer space. Astronomer William K. Hartmann and artists Ron Miller and Pamela Lee studied NASA photos and maps, and reviewed scientific data about colors and textures of other worlds. The paintings reproduced in full color show such images as the midnight side of the Earth, an asteroid gusher, dust storms on Mars, and free-floating astronauts linking modular sections of a space city.

In the accompanying text, Hartmann describes the extraordinary adventure humans have embarked on and suggests that the cosmos may well provide answers to the problems of a planet undergoing shortages or energy and raw materials.

In view of the potential in space travel, the most important step, according to Hartmann, is not a particular mission, but rather the adoption of a critical golden rule: "Space exploration must be carried out in a way so as to reduce, not aggravate, tensions in human society." By skillful application of this rule, we may find that in taking the first steps out of the cradle, twentieth century society will take steps toward solving some of the problems on Earth.

Out of the Cradle by William K. Hartmann, Ron Miller, and Pamela Lee is now available in cloth: $19.95 and paper: $11.95. It contains 192-pages with full-color illustrations and paintings throughout. It is published by Workman Publishing, 1 West 39 Street, New York, NY 10018.

New Releases from Astronomical Society of the Pacific

In keeping with its continuing program of educational materials in the field of astronomy, the ASP has released the following publications:

Packet on Interdisciplinary Approaches to Astronomy

This is a 32-page collection of articles and resource lists for connecting astronomy with the humanities. It includes articles describing the interaction of astronomy with music, poetry, and science fiction, together with a four-page, annotated reading list exploring the relationship between astronomy and a variety of other fields. To obtain a copy send a donation of $3.00 with your name and address and request "Interdisciplinary Packet."

1986 Selectory of Astronomy Materials

A new 16-page illustrated catalog of interesting materials about astronomy is now available. Each item listed was selected by the Society's professional staff for its scientific and educational value and for its visual appeal. Included in the catalog are slides, posters, charts, computer software, tapes, observing aids, and information packets about a variety of astronomical topics. For example, the catalog includes some of the best books, posters, software, and other finding aids for Halley's Comet, and a new slide set about upcoming space astronomy missions. To obtain a copy send a legal-sized self-addressed envelope with two first class stamps on it and request the "Selectory".

The address of the society is:
Astronomical Society of the Pacific
1290 24th Avenue
San Francisco CA 94122

The *LUNAR AND PLANETARY INFORMATION BULLETIN* is published by the Lunar and Planetary Institute. There are usually three 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 MAY. Copy deadline is MAY 2, 1986. 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 77058-4399
Phone: 713/486-2135

Number 43
February 1986

NOTE TO OUR READERS:

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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 77058-4399. 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

March 2-6	**TMS-AIME Annual Meeting "Experimental Methods for Microgravity Materials Science Research"**, New Orleans, Louisiana.	Barbara Kamperman Technical Program Coordinator-TMS 420 Commonwealth Drive Warrendale PA 15086 Phone: 412-776-9050.
MARCH 17-21	**17TH LUNAR AND PLANETARY SCIENCE CONFERENCE,** Houston, Texas	Pam Jones Lunar and Planetary Institute 3303 NASA Road One Houston TX 77058-4399 Phone: 713-486-2150.
March 25-27	**Eleventh Symposium on Antarctic Meteorites**, Tokyo, Japan.	Tatsuro Matsuda National Institute of Polar Research 9-10, Kaga 1-Chome, Itabashi-ku Tokyo 173, Japan
May 19-23	**American Geophysical Union, Spring Meeting**, Baltimore, Maryland.	American Geophysical Union 2000 Florida Avenue NW Washington DC 20009 Phone: 202-462-6903.
May 23-26	**5th L5 Society Space Development Conference,**	L5 Society 1060 East Elm Tucson AZ 85719-9990 Phone: 602-622-6351
June 1-6	**Third International Conference on Geoscience Information**, Adelaide, South Australia.	The Secretary, Third ICGI Australian Mineral Foundation Private Bag 97 Glenside South Australia 5065, Australia.
June 22-26	**168th Meeting of the American Astronomical Society**, Ames, Iowa.	George Bowen Dept. of Physics Iowa State University Ames IA 50011 Phone: 515-294-7659
June 30-July 4	**Sixth International Conference on Geochronology, Cosmochronology and Isotope Geology**, Cambridge, England.	Organizing Committe 6th International Conference Dept.of Earth Sciences University of Cambridge Downing Street Cambridge CB2 3EQ, England.

July 12-17	**98th Annual Meeting of the Astronomical Society of the Pacific**, University of Colorado, Boulder.	A.S.P. Boulder Meeting 1290 24th Avenue San Francisco CA 94122 Phone: 415-661-8660
July 14-17	**Conference on Primitive Body Cornerstone**, University of Kent at Canterbury.	Prof. J.A.M. McDonnell Physics Laboratory University of Kent Canterbury, Kent CT2 7NR England
July 16-24	**Spaceweek '86: Space Beckons: Join the Adventure**.	Spaceweek National Headquarters P.O. Box 58172 Houston TX 77528
July 18-19	**Mars: the Evolution of Its Climate and Atmosphere**, Hirshhorn Museum, Washington DC. Sponsors: National Air and Space Museum and Lunar and Planetary Institute.	Pam Jones Lunar and Planetary Institute 3303 NASA Road One Houston TX 77058-4399 Phone: 713-486-2150.
July 21-23	**The Mars Conference**, National Academy of Sciences Auditorium, Washington DC.	Mrs. Lu Agee Administrative Chairman P.O. Box 416 Hampton VA 23669 Phone: 804-865-8400
August 4-11	**Field Workshop on Archean Deep Crustal Processes**, Northern Manitoba.	Pam Jones Lunar and Planetary Institute 3303 NASA Road One Houston TX 77058-4399 Phone: 713-486-2150.
August 6-9	**The Planet Mercury Conference**, Tucson, Arizona	Mildred S. Matthews Lunar and Planetary Laboratory University of Arizona Tucson AZ 85721 Phone: 602-621-2902
September 22-25	**Meteoritical Society, 49th Annual Meeting**, New York, New York.	Martin Prinz Dept. of Mineral Sciences American Museum of Natural History New York NY 10024 Phone: 212-873-1300
October 6-11	**XXVII Congress of the International Astronautical Federation**, Innsbruck, Austria	
October 14-18	**International Symposium: Origin and Evolution of Planetary and Satellite Systems**, Potsdam, DDR.	Prof. Dr. H. Stiller Zentralinstitut für Astrophysik Potsdam, DDR

October 27-31	**20th ESLAB Symposium on the Exploration of Halley's Comet**, Heidelberg, West Germany.	Dr. R. Reinhard Space Science Dept. ESA, ESTEC Postbus 299 2200 AG Noordwijk, The Netherlands.
November 10-13	**Geological Society of America Annual Meeting**, San Antonio, Texas.	Jean Kinney Geological Society of America P.O. Box 9140 Boulder CO 80301 Phone: 303-447-2020
December 8-12	**American Geophysical Union** Fall meeting, San Francisco, California.	American Geophysical Union 2000 Florida Avenue NW Washington Dc 20009 Phone: 202-462-6903
December 15-19	**Space Exploitation and Utilization,** Sheraton Waikiki Hotel, Honolulu, Hawaii.	American Astronautical Society 6212-B Old Keene Mill Court Springfield VA 22152 Phone: 703-866-0020

1987

January 4-8	**169th Meeting of the American Astronomical Society**, Vancouver, British Columbia.	Alan Dressler Mt. Wilson & Las Campanas Observatories 813 Santa Barbara Street Pasadena CA 91101 Phone: 213-577-1122
January 5-9	**Meteorites and the Early Solar System Conference**, Tucson, Arizona.	Dr. John Kerridge Institute of Geophysics University of California Los Angeles CA 90024 Phone: 213-825-3331
March 10-14	**Origin and Evolution of Planetary and Satellite Atmospheres Conference**, Tucson, Arizona.	Sushil K. Atreya University of Michigan Space Research Building Ann Arbor MI 48109-2143
March 16-20	**XVIIIth Lunar and Planetary Science Conference** Houston, Texas.	
June 14-18	**170th Meeting of the American Astronomical Society,** Vancouver, British Columbia.	Harvey Richer Dept. of Geophysics and Astronomy University of British Columbia Vancouver BC V6T 1W5 Canada Phone: 604-228-4134

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METEORITICS VOL. 20, 523-540 (1985)

MIYAMOTO,M. + TAKEDA,H. + TOYODA,H. (COLLEGE OF ARTS AND SCIENCES, UNIV. OF TOKYO, TOKYO, JAPAN): COOLING HISTORY OF SOME ANTARCTIC UREILITES
PROCEEDINGS OF THE SIXTEENTH LUNAR AND PLANETARY SCIENCE CONFERENCE, PART 1, JOURNAL OF GEOPHYSICAL RESEARCH, VOL. 90, SUPPLEMENT, PAGES D116-D122, NOVEMBER (1985)

NIEMEYER,S. (LAWRENCE LIVERMORE NATIONAL LAB., LIVERMORE, CA 94550): SYSTEMATICS OF TI ISOTOPES IN CARBONACEOUS CHONDRITE WHOLE-ROCK SAMPLES
GEOPHYSICAL RESEARCH LETTERS VOL. 12, 733-736 (1985)

NUTH,J.A. (SOLAR SYSTEM EXPLORATION DIV., OFFICE OF SPACE SCIENCE AND APPLICATIONS, NASA HEADQUARTERS, WASHINGTON, DC 20546): METEORITIC EVIDENCE THAT GRAPHITE IS RARE IN THE INTERSTELLAR MEDIUM
NATURE VOL. 318, 166-168 (1985)

OTT,U. + BEGEMANN,F. (MAX-PLANCK-INSTITUT FUR CHEMIE, OTTO-HAHN-INSTITUT, 6500 MAINZ, FRG): ARE ALL THE 'MARTIAN' METEORITES FROM MARS?
NATURE VOL. 317, 509-512 (1985)

PEPIN,R.O. (DEPT. OF PHYSICS AND ASTRONOMY, UNIV. OF MINNESOTA, MINNEAPOLIS, MN 55455): EVIDENCE OF MARTIAN ORIGINS
NATURE VOL. 317, 473-475 (1985)

POVENMIRE,H. (FLORIDA FIREBALL PATROL, 215 OSAGE DR., INDIAN HARBOUR BEACH, FL 32937): THE CLAXTON, GEORGIA, METEORITE
METEORITICS VOL. 20, 541-544 (1985)

PROMBO,C.A. + CLAYTON,R.N. (DEPT. OF THE GEOPHYSICAL SCIENCES, UNIV. OF CHICAGO, CHICAGO, IL 60637): A STRIKING NITROGEN ISOTOPE ANOMALY IN THE BENCUBBIN AND WEATHERFORD METEORITES
SCIENCE VOL. 230, 935-937 (1985)

RUBIN,A.E. (INST. OF GEOPHYSICS AND PLANETARY PHYSICS, UNIV. OF CALIFORNIA, LOS ANGELES, CA 90024): IMPACT MELT PRODUCTS OF CHONDRITIC MATERIAL
REVIEWS OF GEOPHYSICS VOL. 23, 277-300 (1985)

RUBIN,A.E. + GROSSMAN,J.N. (INST. OF GEOPHYSICS AND PLANETARY PHYSICS, UNIV. OF CALIFORNIA, LOS ANGELES, CA 90024): PHOSPHATE-SULFIDE ASSEMBLAGES AND AL/CA RATIOS IN TYPE-3 CHONDRITES
METEORITICS VOL. 20, 479-489 (1985)

SCOTT,E.R.D. + LUSBY,D. + KEIL,K. (INST. OF METEORITICS, UNIV. OF NEW MEXICO, ALBUQUERQUE, NM 87131): UBIQUITOUS BRECCIATION AFTER METAMORPHISM IN EQUILIBRATED ORDINARY CHONDRITES
PROCEEDINGS OF THE SIXTEENTH LUNAR AND PLANETARY SCIENCE CONFERENCE, PART I, JOURNAL OF GEOPHYSICAL RESEARCH, VOL. 90, SUPPLEMENT, PAGES D137-D148, NOVEMBER (1985)

SEN GUPTA,P.R. + RAM,K. + DAS,A.K. + PAUL,S.R. + GUHA,B.K. + NAG,D.K. (GEOLOGICAL SURVEY OF INDIA, 27 JAWAHARLAL NEHRU RD., CALCUTTA 700016, INDIA): THE GUJARGAON METEORITE
METEORITICS VOL. 20, 583-589 (1985)

TOMEOKA,K. + BUSECK,P.R. (DEPT. OF GEOLOGY AND CHEMISTRY, ARIZONA STATE UNIV., TEMPE, AZ 85287): INDICATORS OF AQUEOUS ALTERATION IN CM CARBONACEOUS CHONDRITES: MICROTEXTURES OF A LAYERED MINERAL CONTAINING FE, S, O AND NI
GEOCHIMICA ET COSMOCHIMICA ACTA VOL. 49, 2149-2163 (1985)

WASSON,J.T. + RUBIN,A.E. (INST. OF GEOPHYSICS AND PLANETARY PHYSICS, UNIV. OF CALIFORNIA, LOS ANGELES, CA 90024): FORMATION OF MESOSIDERITES BY LOW-VELOCITY IMPACTS AS A NATURAL CONSEQUENCE OF PLANET FORMATION
NATURE VOL. 318, 168-170 (1985)

WOLBACH,W.S. + LEWIS,R.S. + ANDERS,E. (DEPT. OF CHEMISTRY, UNIV. OF CHICAGO, CHICAGO, IL 60637): CRETACEOUS EXTINCTIONS: EVIDENCE FOR WILDFIRES AND SEARCH FOR METEORITIC MATERIAL
SCIENCE VOL. 230, 167-170 (1985)

MISCELLANEOUS (Dust, Tektites, Events)

GLASS,B.P. + BURNS,C.A. + CROSBIE,J.R. + DUBOIS,D.L. (GEOLOGY DEPT., UNIV. OF DELAWARE, NEWARK, DE 19716): LATE EOCENE NORTH AMERICAN MICROTEKTITES AND CLINOPYROXENE-BEARING SPHERULES
PROCEEDINGS OF THE SIXTEENTH LUNAR AND PLANETARY SCIENCE CONFERENCE, PART 1, JOURNAL OF GEOPHYSICAL RESEARCH, VOL. 90, SUPPLEMENT, PAGES D175-D196, NOVEMBER (1985)

LAVIOLETTE,P.A. (2166 N.E. CLACKAMAS ST. NO. 2, PORTLAND, OR 97232): EVIDENCE OF HIGH COSMIC DUST CONCENTRATIONS IN LATE PLEISTOCENE POLAR ICE (20,000 - 14, 000 YEARS BP)
METEORITICS VOL. 20, 545-558 (1985)

OFFICER,C.B. + DRAKE,C.L. (DEPT. OF EARTH SCIENCES, DARTMOUTH COLLEGE, HANOVER, NH 03755): CRETACEOUS-TERTIARY EXTINCTIONS: ALTERNATIVE MODELS
SCIENCE VOL. 230, 1292-1295 (1985)

RIETMEIJER,F.J.M. + MACKINNON,I.D.R. (NASA JOHNSON SPACE CENTER, HOUSTON, TX 77058): LAYER SILICATES IN A CHONDRITIC POROUS INTERPLANETARY DUST PARTICLE
PROCEEDINGS OF THE SIXTEENTH LUNAR AND PLANETARY SCIENCE CONFERENCE, PART I, JOURNAL OF GEOPHYSICAL RESEARCH, VOL. 90, SUPPLEMENT, PAGES D149-D155, NOVEMBER (1985)

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N O T E S

PRELIMINARY CONFERENCE PROGRAM

17th Lunar and Planetary Science Conference
March 17-21, 1986

Monday, March 17, 1986
MARS AND OTHER REMOTE SENSING
8:30 a.m. Gilruth 104

Clark P. E. Jurgens R. F. Thompson T. W. Robinett L. Chan F.
Brokl S. Franck C. Stone E.
Mercury: New Results from Dual Polarization Measurements at X-band

Potter A. E. Morgan T. H.
Further Observations of Sodium on Mercury

Moore H. J. Thompson T. W.
Landform Identification in Lunar Radar Images

Gradie J.
Sulfur Deposition on Silicates: Effects on Band Strengths

Nash D. B.
Solid Sulfur in Vacuum: Sublimation Effects on Surface Microtexture, Color, and Spectral Reflectance, and Applications to Planetary Surfaces

Pang K. D. Ajello J. M. Lunine J. I. Wagner J. Hapke B. Wells E.
A Pre-Phobos-mission Assessment of the Composition of the Martian Moons Based on Viking, Mariner 9 and Groundbased Data

Mustard J. F. Pieters C. M. Pratt S. F.
Deconvolution of Spectra for Intimate Mixtures

Johnson P. E. Smith M. O. Adams J. B.
Quantitative Spectral Mixture Modeling Applied to Viking Lander Images

Smith M. O. Adams J. B. Johnson P. E.
Separation of Effects of Composition, Illumination Geometry, and Calibration in Viking 1 and 2 Multispectral Images

Bruckenthal E. A. Singer R. B. Guinness E. A. Arvidson R. E.
Multispectral Interpretation of Geologic Materials Exposed at the Viking Lander Sites

Burns R. G.
Ferric Hydrolysates on Mars: Basic Fe(III) Sulfates

Morris R. V. Lauer H. V., Jr.
Evidence for Hematite on Mars: Spectral Properties of Ferric Iron Phases in Annealed, Al-rich Precipitates of Fe-Al Sulfate Salt Solutions

Huguenin R. Harris S. Carter R.
A Spectroscopic Analog to the Silicate Component of Martian Dust

POSTER PRESENTATIONS

Pieters C. M.
Compositional Information for the Moon: Some Characteristics of Current Near-IR Spectra (Telescopic and Laboratory)

Batson R. M.
Digital Image Models of Planetary Science

Thompson T. W.
High Resolution Radar Map of the Moon

PRESENTED BY TITLE ONLY

Miyamoto M.
Infrared Diffuse Reflectances (2.5-25 μm) of the Murchison and Allende Meteorites

El-Baz F.
Space Photographs of Drought in Africa

Pike R. J.
Mapping Geomorphic Provinces on Solid Planets: A Quantitative Example from Earth

Pike R. J.
Variance Spectra of Representative 1:62,500-scale Topographies: A Terrestrial Calibration for Planetary Roughness at 0.32 km to 7.0 km

Pike R. J.
Scale Dependence of Planetary Surface Slope is Curvilinear

Muller A. Hawke B. R. Lucey P. G. Pieters C. M.
Remote Sensing and Geologic Studies of the Lassell Region of the Moon

Fujii N. Azuma H. Ito K. Miyamoto M.
Effects of Grain Sizes on the Spectral Reflectance of Mineral Mixtures: Towards an Inversion Problem for Three Components Mixtures

Schaber G. G. Kozak R. C.
Venera 15/16 and Arecibo Radar Images of Venus: Complementary Data Sets

Monday, March 17, 1986
CHONDRULES, CARBONACEOUS CHONDRITES
8:30 a.m. Gilruth Gym

Wood J. A.
High Temperatures and Chondrule Formation in a Turbulent Shear Zone beneath the Nebula Surface

Radomsky P. M. Turrin R. P. Hewins R. H.
Dynamic Crystallization Experiments on a Pyroxene-olivine Chondrule Composition

Rubin A. E. Kallemeyn G. W. Wasson J. T.
The Continuous Nebular Fractionation Sequence Within H-group Chondrites

Swindle T. D. Caffee M. W. Hohenberg C. M.
I-Xe and 40Ar-39Ar Ages of Chainpur Chondrules

Grossman J. N. Rubin A. E.
The Origin of Chondrules and Clasts Bearing Calcic Plagioclase in Ordinary Chondrites

Weisberg M. K.
Barred Olivine Chondrules in Ordinary Chondrules: Petrologic Constraints and Implications

Palme H. Spettel B. Steele I. M.
Trace Elements in Forsterite-rich Inclusions in Allende

Steele I. M. Smith J. V.
Contrasting Forsterite Compositions for C2, C3, and UOC Meteorites: Evidence for Divergence from Common Parent

Bunch T. Chang S. Cassen P. Reynolds R.
Allende: Profile of Parent Body Growth

Agresti D. G. Qasem M. A. Wdowiak T. J.
Evidence for Superparamagnetism in the Orgueil and Tieschitz Meteorites

Tomeoka K. Buseck P. R.
Phyllosilicates in the Mokoia CV3 Carbonaceous Chondrite: Petrographic and Transmission Electron Microscope Observations

Keck B. D. Sears D. W. G.
Thermoluminescence and the Metamorphic History of the CO Chondrites

Housley R. M.
Laboratory Simulations Relevant to CV Parent Body Alteration

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Baryshnikova G. V. Stakheeva S. A. Ignatenko K. I. Lavrukhina A. K.
Mineral Compositions and Assemblages in Chondrules of Different Mineralogical-structural Types of the Allende CV Carbonaceous Chondrite

Housley R. M.
Possible CV Parent Body Alteration Processes

Nagahara H.
Reduction Kinetics of Olivine and Oxygen Fugacity Environment During Chondrule Formation

Taylor L. A. Cirlin E. H.
Olivine/Melt Fe/Mg KDs <0.32: Rapid Cooling of Olivine-rich Chondrules

Monday, March 17, 1986
IMPACT PHENOMENA: OBSERVATIONAL DATA
8:30 a.m. Gilruth 206

Elston W. E. Twist D.
Bushveld Complex, South Africa: Is Rooiberg Felsite an Impactite?

Ekelund A.
Geophysical Results from Ramso Island in Lake Mien, an Impact Site in Southern Sweden

Shoemaker E. M. Shoemaker C. S.
Connolly Basin: A Probable Eroded Impact Crater in Western Australia

Reimold W. U. Fletcher P. Snowden P. A. Wilson J. D.
Pseudotachylite--A General Witwatersrand Basic Phenomenon!

Hartung J. B. Izett G. A. Naeser C. W. Kunk M. J.
Sutter J. F.
The Manson, Iowa, Impact Structure and the Cretaceous Tertiary Boundary Event

Bohor B. F. Izett G. A.
Worldwide Size Distribution of Shocked Quartz at the K/T Boundary: Evidence for a North American Impact Site

Graup G. Huth J. Rast U. Spettel B.
Microtektites at the Cretaceous/Tertiary Boundary

Koeberl C. Badyukov D. D. Nazarov M. A.
Blue Glass from Zhamanshin Impact Crater (USSR)

Murali A. V. Zolensky M. E. Sommer M. A. Blanchard D. P.
Tektite-like Bodies from Lonar Crater, India

Delano J. W. Bouska V. Fernandez M. M.
Chemical Variations Among the Moldavite Tektites: Major-element Data

Nagasawa H. Fukuoka T. Glass B. P.
Trace Element Concentrations in Microtektites from Barbados and DSDP-Core from Pacific Ocean

O'Keefe J. A.
Eocene Microtektites and Clinopyroxene-bearing Spherules

Glass B. P.
No Evidence for a 0.8-0.9 M.Y. Old Micro-Australite Layer in Deep-sea Sediments

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Reimold W. U. Dressler B. O. Tao D.
First Results of a Petrographic Comparison of Pseudotachylite from Vredefort, Sudbury, and Endogenic-tectonic Settings

Gurov E. P.
Elgygytgyn Crater Glassy Bombs: From Impactites to Tektites

Garvin J. B. Grieve R. A. F.
A Remote Sensing of the Elgygytgyn Impact Crater

Read W. F.
Fragments of Rock from a Probable Impact Ejecta Deposit in Ordovician Sediments of Northern Illinois

Garvin J. B.
Possible Impact Structures in Central Africa

Durrheim R. J. Reimold W. U.
Can Cratering Periodicities be Produced ad lib?

Grieve R. A. F. Sharpton V. L.
The K/T Impact Event: Some Implications from the Evidence

Badjukov D. D. Nazarov M. A. Suponeva I. V.
Shocked Quartz Grains from K/T Boundary Sediments

Nazarov M. A. Barsukova L. D. Kolesov G. M. Nizhegorodova I. V.
Alekseev A. S. Amanniyazov K. N.
Cretaceous/Tertiary Event: Geochemistry of Turkmenia K/T Sections

Alekseev A. S. Barsukova L. D. Kolesov G. M. Nazarov M. A.
Amanniyazov K. N.
Cretaceous/Tertiary Event: Iridium Distribution in Turkmenia Sections

Miura Y.
Anomalous Total Dose of ESR Data in Danish Calcite at K-T Boundary

Glazovskaya L. I. Golubkov V. V.
Tectites and Impact Glasses: Specific Features of Microstructure

Koeberl C.
Muong Nong Type Tektites from the Moldavite and North American Strewn Fields?

Rodionova Zh. F. Shevchenko V. V. Karlov A. A. Smolyakova T. F.
A Morphological Catalogue of Lunar Craters: A Preliminary Study

Monday, March 17, 1986
MARTIAN GEOMORPHOLOGY AND ITS RELATION TO SUBSURFACE VOLATILES
1:30 p.m. Gilruth 104

Pepin R. O.
Volatile Inventory of Mars

Brakenridge G. R.
Small Valley Networks and the Past and Present Distribution of Subsurface Volatiles, Aeolis Quadrangle, Mars

Lucchitta B. K. Ferguson H. M. Summers C.
Northern Sinks on Mars?

Christiansen E. H. Hopler J. A.
Geomorphic Evidence for Subsurface Volatile Reservoirs in the Elysium Region of Mars

Schultz P. H. Britt D.
Early Changes in Gradation Styles and Rates on Mars

Rossbacher L. A.
Ground Patterns on Earth and Mars

Zimbelman J. R.
Spatial Resolution and the Geologic Interpretation of Martian Morphology

Hale-Erlich W. S.
Implications for Substrate Volatile Distributions on Mars from Complex Crater Morphology and Morphometry

Kargel J. S.
Morphologic Variations of Martian Rampart Crater Ejecta and Their Dependencies and Implications

Horner V. M. Greeley R.
Effects of Elevation and Plains Thicknesses on Martian Crater Ejecta Morphologies for the Ridged Plains

Frey H.
Pseudocraters as Indicators of Ground Ice on Mars

Newsom H. E. Graup G. Sewards T. Keil K.
The Role of Fluidization in the Emplacement and Alteration of the Suevite Impact Melt Deposit at the Ries Crater, West Germany

Gooding J. L.
Water-Ice in the Martian Regolith: Experimental Investigation of Lithologic Effects

POSTER PRESENTATIONS

Kochel R. C. Piper J. O.
Morphology of Large Valleys on Hawaii: Implications for Groundwater Sapping and Comparisons to Martian Valleys

Jons H.-P.
Arcuate Ground Undulations, Gelifluxion-like Features and "Front Tori" in the Northern Lowlands on Mars--What Do They Indicate?

Wilhelms D. E.
Lava-ice Interactions on Mars

Tanaka K. L. Scott D. H.
The Youngest Channel System on Mars

PRESENTED BY TITLE ONLY

Rossbacher L. A.
The G-scale and Planetary Megageomorphology: How Big Is It Really?

Monday, March 17, 1986
CHONDRITES AND PARENT BODY PROCESSES
1:30 p.m. Gilruth Gym

Kallemeyn G. W. Wasson J. T.
Compositional Characterization of Enstatite Chondrites

Lusby D. Scott E. R. D. Keil K.
Ubiquitous FeO-rich Pyroxenes in Enstatite Chondrites: Implications for Metamorphism and Brecciation

El Goresy A. Woolum D. S. Ehlers K. Ivanov A. V.
Planetary Metamorphic Events in Unequilibrated EH Chondrites

Fogel R. A. Hess P. C. Rutherford M. J.
Metamorphic Temperatures and Enstatite Chondrites

Guimon R. K. Sears D. W. G. Lofgren G. E.
Laboratory Metamorphism of a Primitive Meteorite

Guimon R. K. Lofgren G. E. Sears D. W. G.
A Study of the Effect of Devitrification on Thermoluminescence in Type 3.4 Ordinary Chondrites

DeHart J. Sears D. W. G.
Cathodoluminescence of Type 3 Ordinary Chondrites

Scott E. R. D. Maggiore P. Taylor G. J. Keil K. Szuwalski D.
Chondritic Impact Melts and Cratering Processes on Asteroids

Sugiura N. Arkani-Hamed J. Strangway D. W.
On the Possible Transport of Volatile Trace Elements in Meteorite Parent Bodies

Kaczaral P. W. Lipschutz M. E.
Volatile/Mobile Trace Elements in LL4-6 Chondrites

Hasan F. A. Haq M. Sears D. W. G.
Natural Thermoluminescence of Antarctic Meteorites: A Study of Thermal/Radiation History and Pairing

Nishiizumi K. Elmore D. Kubik P. W. Bonani G. Suter M.
Wolfli W. Arnold J. R.
Age of Antarctic Meteorites and Ice II

Fireman E. L.
Uranium-series Dates for Ice from Two Allan Hills Locations

PRESENTED BY TITLE ONLY

Grokhovsky V. I. Ivanov A. V.
Kamacite-Perryite-Graphite Assemblages in the Kaidun III Meteorite

Haq M. Hasan F. A. Sears D. W. G.
Shock History of Ordinary Chondrites: Some H and L Antarctic-Non Antarctic Comparisons

Lavrukhina A. K. Ljul A. Yu. Baryshnikova G. V. Kolesov G. M.
Elemental Composition of Chondrules of Some Structural Types in the Ochansk H4, Saratov L3-4, Kainsaz Co Chondrites

Monday, March 17, 1986
IMPACT PHENOMENA: EXPERIMENT AND THEORY
1:30 p.m. Gilruth 206

Weidenschilling S. J. Davis D. R.
Oblique Impacts: Ejecta Mass end Velocity Distributions

Housen K. R. Holsapple K. A.
How Do Collisional Outcomes Depend on Size Scale?

Davis D. R. Weidenschilling S. J. Ryan E. V. Williams B. L.
Experimental Studies of Catastrophic Disruption

Roddy D. J. Schuster S. Rosenblatt M. Grant L. B. Hassig P. J. Kregenhagen K. W.
Analytical Simulation of a 10-km-diameter Asteroid Impact into a Terrestrial Ocean: Part 1--Summary

O'Keefe J. D. Ahrens T. J.
Effect of Planetary Gravity and Impact Size on Crater Maximum Penetration and Excavation Depth

Schultz P. H. Gault D. E.
Experimental Evidence for Non-proportional Growth of Large Craters

Schmidt R. M. Wauchope C. R. Watson H. E.
Experimental Investigation of Crater Formation Dynamics

Cintala M. J. Horz F. See T. H.
Impact Experiments on the NASA KC-135 Reduced-gravity Aircraft Early Results

Holsapple K. A.
The Search for the Scaling Laws of Impact Cratering: Recent Numerical Results

Pearce S. J. Melosh H. J.
Terrace Width Variations in Complex Lunar Craters

Rehfeldt-Oskierski A. Stoffler D. Hornemann U.
Deformation, Transformation, and Thermal Annealing of Experimentally Shocked Single Crystal Quartz

Boslough M. B. Venturini E. L. Graham R. A.
Magnetic Properties of Shocked and Thermally Altered Nontronite

Hartmetz C. P. Sears D. W. G. Ostertag R.
Thermoluminescence Studies of Shock Loaded Oligoclase and Bytownite

PRESENTED BY TITLE ONLY

Schultz P. H. Gault D. E. Crawford D.
Impacts of Hemispherical Granular Targets: Implications for Global Impacts

Schultz P. H. Gault D. E.
Momentum Transfer from Oblique Impacts

Hassig P. J. Rosenblatt M. Roddy D. J.
Analytical Simulation of a 10-km-diameter Asteroid Impact into a Terrestrial Ocean: Part 2--Atmospheric Response

Grant L. B. Schuster S. Roddy D. J.
Analytical Simulation of a 10-km-diameter Asteroid Impact into a Terrestrial Ocean: Part 3--Cratering Mechanics

Schultz P. H. Gault D. E.
Impact Vaporization: Late-time Phenomena from Experiments

Reimold W. U. Horz F.
Textures of Experimentally Shocked (5.1-35.5 GPa) Witwatersrand Quartzite

Monday, March 17, 1986
MARS PANEL DISCUSSION
8:00 p.m. Gilruth 104

Monday, March 17, 1986
SPACE UTILIZATION
8:00 p.m. Gilruth Gym

Duke M. B. McKay D. S. Mendell W. W.
Site Selection for a Lunar Base; Science Considerations

Lindstrom D. J. Haskin L. A. Semkow K. W. Lewis R. H.
Conductivities of Silicate Melts; Applications to Lunar Smelting

Wright R. A. Cocks F. H. Vaniman D. T. Blake R. D. Meek T. T.
Fusing Lunar Materials with Microwave Energy. Part I: Studies of Doping Media

Vaniman D. T. Meek T. T. Blake R. D.
Fusing Lunar Materials with Microwave Energy. Part II: Melting of a Simulated Glassy Apollo 11 Soil

Bustin R. Carr R. H. Gibson E. K. Sommer M. A.
The Hydrogen Content of Lunar Soils

Agosto W. N.
Lunar Sourced Inorganic Composites for Space Construction

Briggs R. A. Sacco A.
The Effect of Preoxidation on the Rate and Extent of Reduction of Ilmenite

Tuesday, March 18, 1986
LUNAR HIGHLANDS SAMPLES AND METEORITES
8:30 a.m. Gilruth 104

Takeda H. Miyamoto M. Galindo C. Ishii T.
Mineralogical Studies of Augite-bearing Clasts in Lunar Highland Regolith Breccia, 60019 and Lunar Meteorites

Nakamura N. Unruh D. M. Tatsumoto M. Fujiwara T.
REE Abundances and Pb-Pb Isotopic Systematics of the Lunar Meteorite, Yamato-82192

Stoffler D. Lingner S. Heusser K. Jessberger E. K.
Palme H. Spettel B. Wanke H.
Cone Crater Consortium, Apollo 14: (2) Precursor Igneous Rocks and Ages of Polymict Breccias

Bobe K. Lingner S. Stoffler D.
Cone Crater Consortium, Apollo 14: (1) Identification and Frequency Distribution of Rock Types in the Crater Basement

Lindstrom M. M.
Diversity of Rock Types in Apennine Front Breccias

Marvin U. B. Lindstrom M. M.
Breccia 67015: A Comparison with other North Ray Crater Ejecta

Bernatowicz T. J. Lindstrom M. M. Podosek F. A.
40Ar-39Ar Ages of Apollo 16 North Ray Crater Rocks and Dimict Breccias

McGee J. J.
Precursor(s) of Lunar Granulitic Rock 67415: Monomict Noritic Anorthosite or Polymict Breccia?

McGee J. J.
Petrology of Granulitic Breccia Clasts from Feldspathic Fragmental Breccia 67975

Ryder G.
Diversity of Impact Melt Compositions at the Apennine Front

James O. B.
A New Look at RNAA Data for Lunar Fragment-Laden Impact Melts

Deutsch A.
Rb-Sr Studies of Apollo 16 Impact Melt Rocks

Warren P. H. Jerde E. A. Kallemeyn G. W.
"New" Nonmare Rocks from Apollo 12 and 17: Still Few Ferroan Anorthosites

Smith J. M. Meyer C. Compston W. Williams I. S.
73235,82 (Pomegranate): An Assemblage of Lunar Zircon with Unique Overgrowth

Ryder G.
The Volcanic and Local Origin of Apollo 15 KREEP Basalts

Deutsch A. Palme H. Stoffler D.
On the Age of Lunar Anorthosites

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Eugster O. Niedermann S.
Single-stage Exposure of the Lunar Highland Breccias 60018, 67435, and 67455

Frenkel M. Ya. Korina M. I. Koptev-Dvornikov E. V. Ariskin A. A.
Yaroshevsky A. A.
Apollo 16 Highland Rocks from Sample 63500: Preliminary Results of Geochemical Thermometry

James O. B.
A Review of Recent Research on the Apollo 16 Site

Korina M. I. Kononkova N. N.
Apollo 16 Lunar Highland Rocks from Sample 63500: Bulk Composition and Mineral Chemistry

Salpas P. A. Taylor L. A. Lindstrom M. M.
A Potpourri of Clasts from Apollo 14 Including Troctolite and Granite

Tuesday, March 18, 1986
MARS REMOTE SENSING
8:30 a.m. Gilruth Gym

Agresti D. G. Morris R. V. Newcomb J. A. Lauer H. V.
Spectral Properties of Selected Soils from the Dry Valleys of Antarctica

Roush T. L. Blaney D. McCord T. B. Singer R. B.
Carbonates on Mars: Searching the Mariner 6 and 7 IRS Measurements

Zent A. P. Fanale F. P.
Adsorption of H2O and CO2 on Mauna Kea Palagonites

Roth L. E. Saunders R. S. Downs G. S. Schubert G.
Mars: Seasonally Variable Radar Reflectivity II

Jakosky B. M. Christensen P. R.
Are the Viking Lander Sites Representative of the Surface of Mars?

Presley M. Arvidson R.
Deposition and Erosion on Martian Cratered Terrains as Determined by Viking Orbiter Multispectral Image and Thermal Observations

Leshin L. A. Zimbelman J. R.
Thermal Inertias for the Elysium and Aeolis Quadrangles of Mars

Lee S. W.
IRTM Thermal and Albedo Observations of Syrtis Major

Christensen P. R.
Seasonal Variability of Martian Surface Albedos: Implications for Dust Deposition and Removal

Strickland E. L.
Global Dust-Storm Fallout and Current Dust Accumulation in Low Thermal Inertia Regions on Mars: Not Proven

Drake D. M. Feldman W. C. Jakosky B. M.
Calculations of Martian Cosmic Ray Induced Neutron Spectra

Metzger A. E. Arnold J. R. Reedy R. C. Trombka J. I.
Haines E. L.
The Application of Gamma-ray Spectroscopy to the Climatology of Mars

Jakosky B. M. LaPointe M. R. Zurek R. W.
The Observed Day-to-Day Variability of Mars Water Vapor

POSTER PRESENTATIONS

McEwen A. S.
High-Resolution Color Images of Mars

Clifford S. Bartels C. J.
The Mars Thermal Model (Marstherm): A Fortran 77 Finite-difference Program Designed for General Distribution

Zimbelman J. R. Leshin L. A.
Comparisons Between High Resolution Thermal Inertias and Mars Consortium Data for the Elysium and Aeolis Quadrangles of Mars

Horner V. M. Zimbelman J. R.
Viking IRTM Studies of the Crater Curie

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Burns R. G.
Hisingerite and Iddingsite: Deuteric Alteration Products of Basalts on Mars

Christensen P. R. Zurek R. W. Jaramillo L. L.
Seasonal and Diurnal Variability of Mars Water-ice Clouds

Strickland E. L.
Properties of Surface Units of the Central Equatorial Region of Mars

Strickland E. L.
Color/Albedo Distribution of Soil and Rock Surfaces at the Viking 1 Landing Site

Tuesday, March 18, 1986
COMETS AND ASTEROIDS
8:30 a.m. Gilruth 206

Matson D. L. Veeder G. J. Tedesco E. T. Lebofsky L. A.
The IRAS Asteroid and Comet Survey: A Progress Report

Bender D. F. Tedesco E. F.
IRAS Asteroid and Comet Ground-based Data File

Gehrels T. Frecker J. E. McMillan R. S. Scotti J. V.
The Spacewatch Camera: A Progress Report

Gradie J.
A Search for Circum-asteroidal Material Using a Stellar Coronagraph

Oberst J. Nakamura Y.
Preliminary Identification of Different Meteoroid Families Impacting the Luanr Surface

Ostro S. J. Connelly R.
What Can a Lightcurve Tell Us About an Asteroid's Shape?

Strom R. G.
Are Comets Responsible for the Period of Heavy Bombardment?

Shoemaker E. M. Wolfe R. F. Shoemaker C. S.
Extinct Jupiter-Family Comets and Cratering Rates on the Galilean Satellites

Hartmann W. K. Tholen D. J. Cruikshank D. P.
Suspected "Burnt-Out" Comets: Outer Solar System Origin Confirmed

Vilas F.
Continued Studies of Outer-Belt Asteroids--New CCD Reflectance Spectras

Stern S. A.
The Mechanical Interaction of Comets with the Interstellar Medium

Weissman P. Hut P.
Dynamics of Cometary Showers

Jackson A. A.
Are Hills Comet Showers the Cause of Geologic Cooling Events?

POSTER PRESENTATIONS

Stern S. A. Barth C. A.
The Spartan and Champs Data Sets--Overview and Assessment

Malin M. C. Zimbelman J. R.
Surface Morphology of Cometary Nuclei

Ostro S. J. Connelly R.
Shapes of Asteroids from Radar

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Jakosky B. M.
Thermal Conductivity of Comet Surface Ice

Tuesday, March 18, 1986
LUNAR EVOLUTION, MARE BASALTS AND EXPERIMENTAL PETROLOGY
1:30 p.m. Gilruth 104

Spudis P. D. Davis P. A.
A Chemical and Petrological Model of the Lunar Crust

Davis P. A. Spudis P. D.
Global Petrologic Variations on the Moon: A Ternary Diagram Approach

Bersch M. G. Taylor G. J. Keil K.
Diversity of Parent Magmas of Pristine Lunar Rocks

Salpas P. A. Taylor L. A. Lindstrom M. M.
The First Apollo 17 Ferroan Anorthosite: Its Significance Relative to Mg-suite Highland Clasts

Korotev R. L.
Non-Chondritic Ni/Co Ratios in Metal Associated with Apollo 16 Regolith and Other Samples from the Lunar Highlands. Part 2. Possible Reasons and Implications

Korotev R. L.
Non-chondritic Ni/Co Ratios in Metal Associated with Apollo 16 Regolith and Other Samples from the Lunar Highlands. Part 1. The Observation and Problem

Dasch E. J. Shih C.-Y. Bansal B. M. Wiesmann H. Nyquist L. E.
Isotopic Provenance of Aluminous Mare Basalt from the Fra Mauro Formation

Longhi J.
Fractional Crystallization of Ultramafic Mare Magmas

Delano J. W. Hughes S. S. Schmitt R. A.
Collaborative Study of the Apollo 15 Pristine Yellow/Brown Glasses: An Interim Report

Tatsumoto M. Premo W. R. Unruh D. M.
Lead Isotopes from Green Glass of an Apollo 15 Soil: A Search for Primitive Lunar Lead

Arndt J. Engelhardt W. v.
Cooling History of Apollo 17 Orange and Black Glasses: Implications for Their Formation

Colson R. O. Taylor L. A. McKay G. A.
Predictive Thermodynamic Modeling for Trace Element Partitioning in Magmatic Systems

Schreiber H. Kozak S. J. McManus K.
Oxygen Diffusion and Redox Kinetics in a Geochemical Melt System

Tauber P. Arndt J.
Viscous Flow in the System Albite-Diopside

POSTER PRESENTATION

Longhi J. Pan V.
The Architecture of the Ol-Pl-Qtz Pseudoternary Liquidus Diagram

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Butler J. C.
Conformity as Measured by a Straight Line--A Petrological Shibboleth Set Straight

Fernandez M. M. Delano J. W.
Discriminant Analysis of the Pristine Lunar Glasses: Implications for a Magma Ocean

Lindstrom D. J. Semkow K. W.
Electrochemical Monitoring of Crystal Growth from Silicate Melts; Preliminary Conductivity Studies

Ryder G.
Apollo 15 Olivine: Normative Mare Basalts on the Apennine Front: Observations and Possible Interpretations

Ryder G.
Analyses of Apollo 15 Green Glasses: Groupings and Their Spatial Relationships

Salpas P. A. Taylor L. A. Lindstrom M. M.
Additional Basalts from Consortium Breccia 14321

Salpas P. A. Taylor L. A. Lindstrom M. M.
Apollo 17 KREEPy Basalts: Pristine Basaltic Breccias

Delano J. W. Verplanck P. L. Hughes S. S. Schmitt R. A.
Warning to Lunar Glass Students: Possible Contamination from Colored Ovoids Produced by Gas Lighter-Misch Metal Flints

Schreiber H. E.
Internal Electron Exchange Reactions in Synthetic Magmas

Shih C.-Y. Bansal B. M. Wiesmann H. Dasch E. J. Nyquist L. E.
Rb-Sr Chronology of Two High-K Mare Basalt Clasts from Breccia 14304

Tanaka T. Shimizu H. Shibata K. Masuda A.
Water in Ancient Moon?: Possible Oxic Alteration of 14310

Tarasov L. S. Kudryashova A. F. Semenova A. S. Ivanov A. V. Baryshev V. B. Kulipanov G. N. Skrinsky A. N.
Geochemistry of Incompatible Elements in Mineral-rock Systems of Luna 24 Basalts

Tarasov L. S. Kudryashova A. F. Baryshev V. B. Kulipanov G. N. Skrinsky A. N.
VLT Basalts from Apollonious Region: Geochemical Identification

Tuesday, March 18, 1986
PLANETARY VOLATILES AND AGGREGATION
1:30 p.m. Gilruth Gym

Hutchison R.
New Data on the Bencubbin Polymict Stony-iron Breccia

Franchi I. A. Wright I. P. Pillinger C. T.
Nitrogen Isotope Studies of the Bencubbin Meteorite

Murty S. V. S. and Marti K.
Pursuit of Solar Nitrogen: Nitrogen Components in the Pesyanoe Meteorite

Huss G. R. Alexander E. C.
On the Origin of Planetary Noble Gases

Heymann D.
Buckminsterfullerene, C60, and Siblings: Their Properties as Traps for Inert Gas Atoms

Porcelli D. R. Stone J. O. H. O'Nions R. K.
Rare Gas Reservoirs and Earth Degassing

Stone J. O. H. Porcelli D. R. O'Nions R. K.
Terrestrial Noble Gas Inventories and Early Earth History

Honda M. McConville P. Reynolds J. H. Roedder E.
Solar-like Noble Gases in Terrestrial Diamonds

Eugster O.
Noble Gases in Grain Size Fractions of Lunar Anorthosite 60018: Trapped Xenon Isotopically Similar to Terrestrial Atmospheric Xenon

Palma R. N. Heymann D.
A Gas-rich Fragment of the Allende Meteorite: "Solar" and "Planetary" Trapped Gases

Wetherill G. W. Stewart G. R.
The Early Stages of Planetesimal Accumulation

Stewart G. R. Wetherill G. W.
New Formulas for the Evolution of Planetesimal Velocities

Greenberg R. Carusi A. Valsecchi G. B.
Two-body Models for Planetary Encounters: Failure Criteria and a Strategy for Their Systematic Evaluation

Leliwa-Kopystynski J. Czechowski Z.
Collisional Sticking Phenomena as Related to Growth of Planetary Embryo

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Lavrukhina A. K. Milnikova Z. K. Pershin S. V.
Minh D. Vu. Shukolyukov Yu. A.
H2O, C, Xe, in the Impact-metamorphosed Specimens of Carbonaceous Chondrites Murray, Murchison CM

Liffman K. Heymann D.
Mass Fractionation of Noble Gases Due to Adsorption

Tuesday, March 18, 1986
MARTIAN TECTONICS/PLANETARY STRESS AND STRAIN
1:30 p.m. Gilruth 206

De Hon R. A. McDaniel E. E.
Ring Furrows of the Martian Highlands

Frey H. V. Schultz R. A. Maxwell T. A.
The Martian Crustal Dichotomy: Product of Accretion and Not a Specific Event?

Semeniuk A. M. Frey H.
Characteristic Structures of the Highland Boundary on Mars: Evidence Against a Single Mega-impact Event?

Phillips R. J. Finnerty A. A.
Isostatic Uplift in Magmatic Systems: Application to the Tharsis Region of Mars

Raitala J. Saunders R. S.
Crustal Block Model of the Tharsis Region, Mars

Francis R. A.
Ancient Fractures in the Tharsis Region

Wichman R. Schultz P. H.
Timing of Ancient Extensional Tectonic Features on Mars

Solomon S. C. Duxbury E. D.
A Test of the Hypothesis that Impact-Induced Fractures are Preferred Sites for Later Tectonic Activity

Golombek M. P.
Lithospheric Flexure and Shallow Faulting on the Moon

Watters T. R. Maxwell T. A.
Strain Estimates for Basalt Plains Ridges on Mars, Earth, and the Moon

Solomon S. C.
Secular Cooling of the Earth as a Source of Intraplate Stress

Sneyd D. S. McSween H. Y. Woodward N. B. Sugiura N.
Strangway D. W.
Refined Strain Analysis and Magnetic Anisotropy Measurements for the Parnallee Chondrite

Stovickova N.
Fault Tectonics of Terrestrial Planetary Bodies

POSTER PRESENTATION

Raitala J. T. Saunders R. S.
Origin of Compressional Lithospheric Stresses of the Tharsis Region, Mars

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Hall J. L. Solomon S. C.
Lithospheric Loading and Tectonics of the Lunar Irregular Maria

Murchie S. L. Head J. W.
Global Reorientation of Ganymede by the Basin Gilgamesh: Models and Evidence from Tectonic Patterns

Plescia J. B.
Tectonics of the Elysium Region, Mars

Wednesday, March 19, 1986
VENERA/VEGA/VENUS
8:30 a.m. Gilruth 104

Surkov Yu. A. Moskalyova L. P. Kharyukova V. P
Dudin A. D. Smirnov G. G. Zaitseva S. Ye.
Venus Rock Composition at the Vega 2 Landing Site

Surkov Yu. A. Kirnozov F. F. Glazov V. N.
Dunchenko A. G. Tatsy L. P. Sobornov O. P.
Uranium, Thorium, and Potassium in the Venusian Rock at the Landing Sites of Vegas 1 and 2

Barsukov V. L. Borunov S. P. Volkov V. P. Zolotov M. Yu.
Sidorov Yu. I. Khodakovsky I. L.
Mineral Composition of Venus' Soil at Venera 13, Venera 14, and VEGA 2 Landing Sites: Thermodynamical Prediction

Head J. W. Garvin J. B. Campbell D. B. Pettengill G. H.
Masursky H. Saunders R. S. V. L. Barsukov Basilevsky A. T.
Surkov Y. A.
Vega Landing Sites: Geological Characteristics of the Surrounding Region, Rusalka Planitia, Venus

Pieters C. M. Patterson W. Pratt S. Head J. W. Garvin J.
Oxidized Basalts on the Surface of Venus: Compositional Implications of Measured Spectral Properties

Bindschadler D. L. Head J. W.
Characterization of Venera 15/16 Units Using Pioneer Venus Reflectivity and RMS Slope

Head J. W.
Venus Global Tectonics: Tectonic Style and Evidence for Latitudinal Distribution of Tectonic Features

Nikolaeva O. V. Ronca L. B. Basilevsky A. T.
The Statistics of Circular Features on the Plains of Venus

Thompson T. W. Saunders R. S.
Lunar and Venusian Radar Bright Rings

POSTER PRESENTATION

Clark P. E. Jurgens R. F. Kobrick M.
Venus: Images of Rolling Hills Terrane from Tristatic S-band Radar Observations

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Garvin J. B. Head J. W.
Characteristics of the Venera and Vega Landing Sites from Pioneer Venus Radar Data

Garvin J. B. Head J. W.
Dielectric Properties of Venus Landing Sites

Wednesday, March 19, 1986
LIGHT ISOTOPES AND NEBULAR CHEMISTRY
8:30 a.m. Gilruth Gym

Zinner E. Epstein S.
Heavy Carbon in Individual Oxide Grains from Murchison Acid Residue CFOc

Clayton D. D.
Carbon Isotopes in Interstellar Aluminium

Kerridge J. F. Shipp R. Chang S.
Deuterium Exchange During Acid-demineralisation

Thiemens M. H. Jackson T.
The Effect of Variable Wavelength Ultraviolet Light on the Production of Oxygen Isotopic Anomalies

Bains S. K. Thiemens M. H.
Mass Independent Oxygen Isotopic Fractionation in the Microwave Region

Robert F.
A Method for Calculating the Non-Mass-Dependent Isotopic Fractionation Factor

Morfill G. E. Clayton R. N.
Oxygen Isotope Fractionation in the Primitive Solar Nebula: Theory

Live D. Beckett J. R. Tsay F.-D. Grossman L. Stolper E.
Ti3(plus) in Meteoritic and Synthetic Hibonite: A New Oxygen Barometer

Beckett J. R. Grossman L.
Oxygen Fugacities in the Solar Nebula During Crystallization of Fassaite in Allende Inclusions

Kring D. A.
O/H in the Solar Nebula Gas in the Zones of C2, C3, and UOC Chondrule Formation

Boynton W. V. Wark D. A. Ulyanov A. A.
Trace Elements in Efremovka Fine-grained Inclusion E14: Evidence for High Temperature, Oxidizing Fractionations in the Solar Nebula

Bischoff A. Palme H.
Oxidation of Refractory Metal-Rich Assemblages at High Temperatures

Fegley B.
A Comparison of REE and Refractory Metal Oxidation State Indicators for the Solar Nebula

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Heidenreich J. E., III Thiemens M. H.
The Effect of Isotopic Abundance on NoMaDic Chemistry

Morfill G. E. Clayton R. N.
Oxygen Isotope Fractionation in the Primitive Solar Nebula: Bulk Properties

Devirts A. L. Ulyanov A. A. Ivanov A. V. Lagutina E. P. Shukolyukov Yu. A.
The Isotopic Composition of Hydrogen in Some Carbonaceous Chondrites

Wednesday, March 19, 1986
INTERPLANETARY DUST
8:30 a.m. Gilruth 206

Shramm L. S. Barrett R. A. Lieurance M. L. McKay D. S.
Wentworth S. J.
Particles Associated with Impact Features in the Main Electronics Box (MEB) Thermal Blanket from the Solar Max Satellite

Barrett R. A. Zook H. A. Warren J. L. Schranm L. S.
McKay D. S.
Impact Features and Projectile Flux on Returned Solar Max Material

Blanford G. E. Rietmeijer F. J. M. Schramm L. S.
McKay D. S.
Extraterrestrial Olivines Brought Back from Space

Bradley J. Carey W. Walker R. M.
Solar Max Impact Particles: Perturbation of Captured Material

Christoffersen R. Buseck P. R.
Spray: A Chondritic Interplanetary Dust Particle Containing Refractory Minerals

Zook H. A. McKay D. S.
On the Asteroidal Component of Cosmic Dust

Rietmeijer F. J. M. McKay D. S.
Fine-grained Silicates in a Chondritic Interplanetary Dust Particle Are Evidence for Annealing in the Early History of the Solar System

Rietmeijer F. J. M.
Silica-rich Glass and Trydimite in a Chondritic Porous Aggregate: Evidence for Stratospheric Contamination of Interplanetary Dust Particles

Lange G. Eigner S. Igenbergs E. Jessberger E. K.
Kuczera H. Maas D. Sutton S. Weishaupt U.
Zinner E.
Ion Microprobe Sensitivities and Their Application to Multielement Analysis of LDEF Impact Residues

Kyte F. T.
Accretion Rate of Extraterrestrial Matter: An Iridium Profile for the Last 67 Ma

Zolensky M. E. Kaczor L.
Stratospheric Particle Abundance and Variations Over the Last Decade

McKeegan K. D.
Hydrogen and Magnesium Isotopic Abundances in Aluminium-rich Stratospheric Dust Particles

Sandford S. A.
The World's Smallest Acid Residue: The Source of the 6.8 um Band Seen in Some IDP Spectra

Chevallier P. Jehano C. Maurette M. Sutton S. Wang J.
Synchrotron X-ray Fluorescence Analysis of Ni, Cu, Zn, Ga, Ge, Se, and Pb(As) in Unpolished Cosmic Spherules

POSTER PRESENTATIONS

Teetsov A. Bradley J. P.
Micromanipulation of Extraterrestrial Particles

Tsou P. Brownlee D. E. Albee A. L.
Capturing of Hypervelocity Particles

Economou T. Simpson J. A. Tuzzolino A. J.
A New Instrument to Measure Charged and Neutral Cometary Dust Particles at Low and High Impact Velocities

Cour-Palais B.
Preliminary Hypervelocity Impact Calibration of Solar Max Thermal Blankets and Louvers

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Gibson E. K. Sommer M. S.
Laser Microprobe Study of Cosmic Dust (IDPs) and Potential Source Materials

Mackinnon I. D. R. McKay D. S.
Refinements and Developments on the Stratospheric Dust Database and Classification Scheme

Steele I. M.
Olivine in Extraterrestrial Samples: Observations Allowing Determination of Affinity of Single Olivine Grains

Sandford S. A.
Laboratory Heating of an Interplanetary Dust Particle: Comparisons with an Atmospheric Entry Model

Wednesday, March 19, 1986
VENUS
1:30 p.m. Gilruth 104

Schaber G. G. Kozak R. C. Masursky H.
Cleopatra Crater on Venus: New Evidence for a Volcanic Origin

Vorder Bruegge R. W. Head J. W. Campbell D. B.
Cross-strike-discontinuities on Maxwell Montes, Venus: Evidence for Large-scale Strike-slip Faulting

Lowman P. D., Jr. Garvin J. B.
Physiographic Features on Venus and Earth: A Photogeologic Comparison

Kozak R. C. Schaber G. G.
Gravity-spreading Origin of the Venusian Tesserae

Wood C. A. Amsbury D. L.
Salt Tectonics on Venus

Zuber M. T.
A Dynamic Model for Ridge Belts on Venus and Constraints on Lithospher Structure

Banerdt W. B. Golombek M. P.
Lithospheric Modelling of Venus

Parmentier E. M
Topography due to Horizontal Stresses in a Ductile Lithosphere of Variable Thickness: Application to Venus

Kiefer W. Richards M. A. Hager B. H. Bills B. G.
Dynamic Models for Venus' Long-Wavelength Geoid

Bougan S. J. Greeley R. Marshall J.
The Aeolian Environment on Venus

Bogard D.
Does Venus' Atmosphere Contain a Terrestrial-Like Component?

Surkov Yu. A. Shcheglov O. P. Ryvkin M. L.
Water Vapor Content Profile in the Venusian Atmosphere According to the Results of Measurements from Vegas 1 and 2

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Nikishin A. M.
Hot Spot Tectonics on Venus: Implications for Rifting and Doming

Bockstein I. Chochia P. Kronrod M.
Interactive Processing of Venus Images

Bindschadler D. L. Head J. W. Garvin J. B.
Vega Landing Sites: Venera 15/16 Unit Analogs from Pioneer Venus Reflectivity and RMS Slope

Volkov V. P.
Sulfur Cycle on Venus

Zolotov M. Yu.
Venus Weathering Crust: Structure and Development

Zolotov M. Yu.
Oxidation of Iron-Bearing Silicates on Venus Surface

Head J. W.
Ishtar Terra, Venus: A Simple Model of Large-scale Tectonic Convergence, Crustal Thickening, and Possible Delamination

Wednesday, March 19, 1986
DIFFERENTIATED METEORITES
1:30 p.m. Gilruth 104

Delaney J. S.
The Basaltic Achondrite Planetoid

Mittlefehldt D. W. Bansal B. M. Shih C.-Y. Wiesmann H. Nyquist L. E.
Petrology, Chronology and Chemistry of Basaltic Clasts from Mesosiderites

Prinz M. Weisberg M. K. Nehru C. E. Delaney J. S.
ALHA84025: A Second Brachina-like Meteorite

Kracher A.
Microdistribution of Germanium in the Allan Hills A77081 Winonaite

Prinz M. Weisberg M. K. Nehru C. E. Delaney J. S.
North Haig and Nilpena: Paired Polymict Ureilites with Angra Dos Reis-related and Other Clasts

Takeda H. Tachikawa O. Toyoda H.
Mineralogy of Augite-Bearing Ureilites, and Some Hypotheses on the Origin of Ureilites

Goodrich C. A.
Trapped Primary Silicate Liquid in Ureilites

Miura Y.
Differences in Formation Condition and Process of Terrestrial and Extraterrestrial Plagioclases

Clayton R. N. Mayeda T. K. Prinz M. Nehru C. E. Delaney J. S.
Oxygen Isotope Confirmation of a Genetic Association Between Achondrites and IIIAB Iron Meteorites

Wasson J. T. Wang J.
A Nonmagmatic Origin of Group-IIE Iron Meteorites

Sutton S. R. Delaney J. S. Smith J. V. Prinz M.
Pixe Trace Element Analyses of Metal, Troilite and Schreibersite in Iron Meteorites

Reuter K. B. Kowalik J. A. Goldstein J. I.
Low Temperature Structures in the Iron Meteorite Dayton

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Delaney J. S.
Phase Equilibria for Basaltic Achondrites

Jones J. H. Benjamin T. M. Maggiore C. M. Duffy C. J. Hart S. R.
Experimental Partitioning of Ag, Mo, Pb and Pd Between Iron Metal and Troilite

Miura Y.
Terrestrial and Extraterrestrial Osumilite-group Minerals and Potash Feldspars

Miyamoto M. McKay D. S. Lofgren G. E. Duke M. B.
Melting Experiments on an LL Chondrite

Mori H.
Dislocation Substructures of Olivine Crystals from Pallasite Meteorites

Prinz M. Weisberg M. K. Nehru C. E. Delaney J. S. Yanai K.
Mineralogical Studies of Ureilites: Minor Phases and Inclusions and Their Implications

Zaslavskaya N. I. Migdisova L. F. Kononkova N. N.
Burkhala: A New Anomalous Iron Meteorite

Wednesday, March 19, 1986
COSMIC RAYS AND CARBON
1:30 p.m. Gilruth 206

Reedy R. C.
Nuclide Production by Primary Galactic-Cosmic-Ray Protons

McDowell A. F. Nyquist L. E.
Cosmogenic Nuclide Production in Ellipsoidal Meteorites

Theis S. Englert P. Michel R. Aylmer D. Herzog G. F.
Kruse T. H. Moniot R. K. Tuniz C. Jermakian A.
Klein J. Middleton R.
10Be and 26Al Production from Mg, Al, Si, and O by 600-Mev Protons in Granodiorite Spheres

Nishiizumi K. Elmore D. Kubik P. W. Arnold J. R.
Depth Variation in Cosmogenic Radionuclide Production in Very Large Meteorites: Allende and DRP78002-9

Bourot-Denise M. Pellas P. Perron C.
Cosmic-ray Tracks Versus 60Co: A Strong Discrepancy in Shielding Depths

Kirschbaum C.
Identification of Cosmogenic Argon Components in Allende by Laser Microprobe

Caffee M. W. Goswami J. N. Hohenberg C. M. Swindle T. D.
Pre-compaction Irradiation of Meteorite Grains

Shimamura T. Nagai H. Honda M.
Elemental Analysis of Iron Meteorites by Glow Discharge Mass Spectrometer

Gooding J. L.
Carbonaceous Chondrites: Thermal Analysis by Differential Scanning Calorimetry (DSC)

Lumpkin G. R.
High Resolution Electron Microscopy of Carbonaceous Material from CI, CM, CV, and H Chondrites

Heymann D. Van Der Stap C. C. A. H. Vis R. D. Verheul H.
Carbon in Dark Inclusions of the Allende Meteorite

Ludicky R. Nelson J. Matthews C.
Hydrogen Cyanide Polymers in the Solar System

POSTER PRESENTATION

Heymann D. Burke E. Touret J.
A Qualitative Laser-raman Study of Graphitic Carbon in Allende

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Marti K. Murty S. V. S. Nishiizumi K.
Neutron Exposure Age of the Cape York Iron Meteorite

Thomas-Ver Ploeg K. L. Rietmeijer F. J. M.
The Role of Alumina Polymorphs as Catalysts for Hydrocarbon Reactions in the Solar Nebula and Early Solar System

Lumpkin G. R.
Influence of Pressure and Temperature on Natural Graphitization: Thermal Histories of Some Carbonaceous Meteorites

Thursday, March 20, 1986
THE DYNAMIC EARTH: ITS EARLY ATMOSPHERE, CRUST, MANTLE AND CORE
8:30 a.m. Gilruth 104

Gibson E. K. Carr L. P. Gilmour I. Pillinger C. T.
Earth's Atmosphere During the Archean as Seen from Carbon and Nitrogen Isotopic Analysis of Sediments

Sommer M. A. II Gibson E. K. Jr.
Volatile Determinations of Individual Fluid Inclusions Within the 3.4 B.Y. North Pole Barites from the Warrawoona Group, Northwestern Australia

Fisher D. E.
Distribution Coefficient of Argon in a Basalt/Felspar System

Chalokwu C. I.
Monte Carlo Simulation of Trapped Liquid Density: Implications for the Compaction of Igneous Cumulates

Patchett J. Arndt N.
Continental Crust Genesis on Earth: Need for Systematic Nd Isotopic Study of Terrains 3.8 Ga to Present

Galer S. J. G. Goldstein S. L. O'Nions R. K.
Limits on the Extent of Chemical and Convective Isolation in the Earth's Interior

Anderson W. W. Ahrens T. J.
Shock Wave Experiments on Iron Sulfide and Sulfur in Planetary Cores

Malvin D. J. Drake M. J. Benjamin T. M. Duffy C. J.
Hollander M. Rogers P. S. Z.
Experimental Partitioning Studies of Siderophile Elements Amongst Lithophile Phases: Preliminary Results Using PIXE Microprobe Analysis

Elthon D.
High-pressure Crystal-liquid Fractionation of Basaltic Magmas: A Phase-Equilibria Framework

De Wit M. J. Tredoux M. Hart R. J. Armstrong R.
Sellschop J. P. F.
de Wit M. J. Tredoux M. Hart R. J. Armstrong R.
for Terrestrial Evolution and Iridium Anomalies

Sylvester P. J. Attoh K. Schulz K.
Melting of Mafic and Felsic Sources to Produce the HREE-depleted Dacites of the Michipicoten Greenstone Belt, Ontario

McGill G. E. Shrady C. H.
Nature of Early Deformation in the Southwestern Part of the Michipicoten Greenstone Belt, Ontario

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Nagasawa H. Kakiuchi M. Fukuoka T. Suwa K.
CE Anomaly in Chemically Separated Fractions of Sedimentary Rocks as an Indicator for Redox Environment: A Preliminary Study

Boudreau A. E. Mathez E. A. McCallum I. S.
Composition of Apatite and Biotite from the Stillwater and Bushveld Complexes. Part II.

Dunn J. T. McCallum I. S.
The Oxygen Isotope Geochemistry of the Stillwater Complex

Haskin L. A. Salpas P. A.
Chemical Trends in Anorthosites of the Etagaulet Massif

de Wit M. J.
A Possible Origin for Chondrule-like Particles in the 3.6-3.32 Ga Barberton Greenstone Belt, South Africa

Kochemasov G. G.
St. Helena Island, Cameroon, Darfur, Rungwe Volcanoes, Walvis Ridge, Benue Trough, Bangui Anomaly: Different Features Tied to One Radial-Concentric Superstructure of the Congo Craton

Liffman K. Heymann D.
Diffusive Mass Fractionation of Atmospheric Xenon

Thursday, March 20, 1986
ISOTOPIC ANOMALIES
8:30 a.m. Gilruth Gym

Hashimoto A. Hinton R. W. Davis A. M. Grossman L. Mayeda T. K. Clayton R. N.
A Hibonite-rich Murchison Inclusion with Anomalous Oxygen Isotopic Composition

Mayeda T. K. Clayton R. N. Nagasawa H.
Oxygen Isotope Variations Within Allende Refractory Inclusions

Clayton R. N. Mayeda T. K. Palme H. Laughlin J.
Oxygen, Silicon, and Magnesium Isotopes in Leoville Refractory Inclusions

Prombo C. A. Lugmair G. W.
Search for Correlated Isotope Effects in Allende CAIs

Hutcheon I. D. Armstrong J. T. Wasserburg G. J. El Goresy A.
Mg Isotopic Studies of CAI in C3V Chondrites

Brigham C. A. Hutcheon I. D. Papanastassiou D. A. Wasserburg G. J.
Evidence for 26Al and Mg Isotopic Heterogeneity in a Fine-Grained CAI

Ireland T. R.
Aluminium in a Murchison Hibonite?

Ireland T. R. Esat T. M. Compston W.
Magnesium Isotopic Systematics of Murchison Refractory Inclusions

Esat T. M. Taylor S. R.
Anomalies Induced in Mg Isotopes by Sputtering

Fahey A. Goswami J. N. McKeegan K. D. Zinner E.
Ti and Mg Isotopic Measurements in CM and CV Meteorites

Niemeyer S.
Titanium Isotopes in Chondrules and Other "Separates" from Carbonaceous Chondrites

Papanastassiou D. A. Wasserburg G. J.
Cr Isotopic Anomalies in FUN and non-FUN Refractory Inclusions

Nier A. O. Schlutter D. J.
Mass Spectrometric Study of the Mercury Isotopes in the Allende Meteorite: A Preliminary Investigation

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Esat T. M. Taylor S. R.
Mg Isotope Composition of Ivory Coast Microtektites

Thursday, March 20, 1986
THE LUNAR REGOLITH
8:30 a.m. Gilruth 206

See T. H. Smrekar S. Cardenas F. Horz F. Cintala M. J.
Experimental Regolith Evolution at High Impact Velocities

Korotev R. See T. H. Horz F.
Trace Element Concentrations in the Fine Grain-Size Fractions of Experimental Regoliths

Simon S. B. Papike J. J. Horz F. See T. H.
Agglutinate Melting Mechanisms II: Shocked Lunar Soil Mixtures

Laul J. C. Rode O. D.
Chemistry of Luna 24 Grain Size Separates

Wentworth S. J. McKay D. S.
Grain Size and Petrographic Analysis of Disaggregated Apollo 15 and 16 Regolith Breccias

Delano J. W.
A New Aspect of Apollo 14 Regolith Breccias: Different Glass Populations and Their Potential for Charting Space/Time Variations

Jerde E. A. Warren P. H. Heiken G. H. Vaniman D. T.
A Potpourri of Regolith Breccias: Distinctive "New" Samples of the Lunar Surface

Basu A. Bhattacharya R. N.
A Probabilistic Approach to Ballistic Differentiation of Surfacial Soils on Moon-like Planets

Higdon J. C. Plechaty E. F. Canfield E. H. Lingenfelter R. E.
Lunar Surface Neutrons and Gamma Rays Revisited

Schneider R. J.
Determination of Carbon Isotopes in Lunar Soil by Accelerator Mass Spectrometry

Grabowska-Olszewska B. Zbik M.
Micromorphometry of Lunar Breccias

Bogatikov O. A. Ashikhmina N. A. Frikh-Khar D. I.
The Lunar Endogenic "Monomineralic" Glasses

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Cimbalnikova A. Frait Z. Rode O. D. Zemcik T.
FMR and Mossbauer Measurements of the Iron Distribution in the Luna 16, 20 and 24 Grain Size Fractions

Simon S. B. Papike J. J. Gosselin D. C.
Petrology of Luna 24 Grain Size Separates

Thursday, March 20, 1986
LUNAR ORIGIN(S)
1:30 p.m. Gilruth 104

Ringwood A. E.
The Making of the Moon

Ringwood A. E.
The Earth-Moon Connection

Taylor S. R.
Cutting the Gordian Knot: Lunar Compositions and Mars-sized Impactors

Kipp M. E. Melosh H. J.
Origin of the Moon: A Preliminary Numerical Study of Colliding Planets

Benz W. Slattery W. L. Cameron A. G. W.
The Origin of the Moon: 3D Numerical Simulations of a Giant Impact

Jones J. H. Hood L. L.
Lunar Composition and Structure: I. A Method for Calculating Mantle Mineralogies

Hood L. L. Jones J. H.
Lunar Composition and Structure: II. Theoretical Seismic Velocity Models

Hood L. L. Jones J. H.
Lunar Composition and Structure: III. Mantle Density Models and Implications for the Existence of a Metallic Core

Mueller S. W. Phillips R. J.
Implications for Lunar Composition from an Investigation of the Nakamura Seismic Velocity Model

Lin R. P. Anderson K. A. Hood L. L.
Lunar Magnetization Concentrations (Magcons) Antipodal to Young Large Impact Basins

Hooper D. M. Maxwell T. A.
Distribution of Lunar Craters and Multi-ring Basins: A Test for Lunar Polar Wandering

Chowdhary S. K. Runcorn S. K. Collinson D. W. Stephenson A.
Further Aspects of Lunar Palaeointensity Determinations and the Origin of the Ancient Lunar Magnetic Field

Runcorn S. K.
Primaevel Lunar Satellites

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Seifert S. Ringwood A. E.
Depletions of Chromium and Vanadium in the Lunar Mantle

Thursday, March 20, 1986
PRIMITIVE CHONDRITIC COMPONENTS
1:30 p.m. Gilruth Gym

Peck J. A.
The Origin of Ferrous Zoning in Allende Chondrule Olivines

Wark D. A. Kornacki A. S. Boynton W. V. Ulyanov A. A.
Efremovka Fine-grained Inclusion E14: Comparisons with Allende

Kornacki A. S.
Was Hibonite the Carrier of the Super-Refractory REE Component in the Solar Nebula?

Davis A. M. Hinton R. W.
Magnesium and Titanium Isotopic Compositions and Trace Element Chemistry of Refractory Inclusions in the Ornans Carbonaceous Chondrite

Misawa K. Nakamura N.
Precise Determination of REE and Other Elements in Individual Chondrules from the Allende (CV3) Chondrite

Hinton R. W. Davis A. M.
Trace Elements and Calcium Isotopes in the Murchison Corundum-Hibonite Inclusion GR-1

Grossman L. Davis A. M. Ekambaram V. Armstrong J. T.
Hutcheon I. D. Wasserburg G. J.
Bulk Chemical Composition of a Fremdling from an Allende Type B Inclusion

Armstrong J. T. Hutcheon I. D. Wasserburg G. J.
Zelda's Neighborhood: Xenophagia of an Equilibrated Fremdling by Spinel

Murrell M. T. Burnett D. S.
Spinel-perovskite Rims: Constraints on the Thermal Histories of Ca-Al-rich Inclusions

Paque J. M. Beckett J. R. Stolper E.
A New Ca-Al-Ti-Silicate in Coarse-grained Ca-Al-rich Inclusions

Ireland T. R. Esat T. M.
Laboratory Synthesis of Calcium Dialuminate and Hibonite

Nuth J. A. Nelson R. Donn B. Khanna R. K.
Kinetic Studies of the Hydration of Amorphous Mg-SiO Smokes

POSTER PRESENTATION

Kornacki A. S. Fegley B.
Fractionation Patterns Among Siderophile and Lithophile Refractory Trace Elements in CAI's: Implications for Grain Transport in the Solar Nebula

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Fegley B.
A Calculated Relative Volatility Sequence for Lithophile Refractory Trace Elements in the Solar Nebula

Dyar M. D. Solberg T. C. Burns R. G.
The Effects of Composition, Oxygen Fugacity, and Crystal Structure on the Color of Hibonite

Fisenko A. V. Ignatenko K. I. Semjonova L. F. Lavrukhina A. K.
The Assemblage Metal-Ca-Al-rich Inclusion in the Efremovka CV Chondrite

Thursday, March 20, 1986
VOLCANIC PLAINS/MARS SEDIMENTS
1:30 p.m. Gilruth 206

Whitford-Stark J. L.
The Geology of the Lunar Mare Fecunditatis

Swann G. A.
Collapse Structures in the Appenine Bench Formation and Their Influence on the Formation of Mozart and Haley Rilles

Kiefer W. Murray B.
Smooth Plains Formation on Mercury

Albin E. F. Greeley R.
Mars: Volcanic Plains in the Cratered Uplands and Possible Tectonic Associations

Cattermole P.
High Volume Volcanic Flows at Alba Patera, Mars

Theilig E. Greeley R.
Modeling of Pressure Ridge Formation on Compound Pahoehoe Lava Flows

Barlow N. G. Strom R. G.
Relative Ages of Martian Terrain Units

Masursky H. Chapman M. G. Dial A. L. Strobell M. E.
Ages of Rocks and Channels in Prospective Martian Landing Sites of Mangala Valles Region

Frey H. Semeniuk A. M. Semeniuk J. Tokarcik S.
Crater Counts in the Transition Zone in Eastern Mars: Evidence for Common Resurfacing Events

Williams S. H. Greeley R.
Wind Erosion on Mars: Impairment by Poor Saltation Cloud Development

MacKinnon D. J.
Sand-grain Response in Planetary Atmospheres

Arvidson R. E.
On the Rate of Formation of Sedimentary Debris on Mars

Plaut J. Guinness E. Arvidson R. Kahn R.
Secular Change in South Polar Sedimentary Processes Inferred from the Morphologies and Ages of Layered and Pitted Terrain

POSTER PRESENTATIONS

Bertka C. Holloway J. R.
Partial Melting of a Martian Mantle

Cattermole P.
Linear Volcanic Features at Alba Patera, Mars

Cattermole P.
Effusion Rates of High-volume Lavas, Alba Patera, Mars

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Heslop S. E. Pinkerton H. Head J. W.
Dynamics of a Confined Lava Flow on Kilauea Volcano -- Determination of Rheology and Eruption Conditions

Davies A. G. Wilson L.
Eruption Pressures During Phase 23 of the Pu'u 'o'o Eruption on Kilauea, Hawaii: Planetary Implications

Wilhelms D. E. Baldwin R. J.
Relation Between Gullying and Crater Degradation in the Martian Uplands

Wilhelms D. E. Hayden C. J.
Areas of Gullied Terrain and Possible Volcanic Deposits in the Martian Uplands

Roddy D. J. Robertson N. K. Mardock C. L.
Digital Inventory of Martian Impact Craters, Ejecta Blankets and Selected Morphological Parameters

Suleimenov O. M. Zolotov M. Yu. Khodakovsky I. L.
Stability of Salt Hydrates in Martian Regolith

Zolotov M. Yu. Sidorov Yu. I.
Nitrates in Martian Soil?

Tanaka K. L. Witbeck N. E. Scott D. H.
Valles Marineris -- Gravity and Tectonics

Lucchitta B. K.
More on Recent(?) Dark Volcanic Patches in the Valles Marineris, Mars

Friday, March 21, 1986
DIFFERENTIATED METEORITES II. SNCs
8:30 a.m. Gilruth 104

Melosh H. J. Vickery A. M.
A Martian Large-crater Origin for the SNC Meteorites

Warren P. H.
Compositional Contrast Between Martian Regolith and SNC Meteorites: Evidence for Buried Massive Carbonates?

Chen J. H. Wasserburg G. J.
S = N = c

Jagoutz E.
Sm-Nd and Rb-Sr Systematics of the SNC Meteorite ALHA 77005

Nyquist L. Wiesmann H. Shih C.-Y. Bansal B.
Sr Isotopic Systematics of EETA 79001 Glass

Bogard D. D. Horz F. Johnson P. Schmidt R.
Noble Gases Implanted by Artificial Shock: Implications for Trapped Martian Gases in the EETA79001 Meteorite

Wiens R. C. Pepin R. O.
Laboratory Shock Emplacement of Nitrogen and Noble Gases into Basalt

Laul J. C.
An Overview of the Shergotty Consortium Studies

Laul J. C. Smith M. R.
Rare Earth Patterns in Shergottite Phosphates

McKay G. Wagstaff J. Le L.
Pyroxene Distribution Coefficients, the Shergotty Parent Melt, and Metasomatic Alteration

McSween H. Y.
Complex Igneous Processes on the Shergottite Parent Body

Wanke H. Dreibus G. Jagoutz E. Palme H. Spettel B.
Weckwerth G.
ALHA 77005 and on the Chemistry of the Shergotty Parent Body (Mars)

Treiman A. H. Jones J. H. Drake M. J.
Core Formation in the Shergottite Parent Body (SPB)

Friday, March 21, 1986
PLANETARY PHYSICS
8:30 a.m. Gilruth Gym

Rice A.
Layered Convection in Proto-Stellar Nebula: Implications for Planetary Formation and Titus-Bode Laws

Cameron A. G. W. Fegley B.
Density and Composition of the Mercury Mantle After Evaporative Mass Loss

Matsui T. Abe Y.
Evolution of the Terrestrial Planets: Accretion, Atmosphere Formation and Thermal History

Tyburczy J. A. Frisch B. Ahrens T. J.
Impact-induced Devolitization of Murchison Carbonaceous Chondrite

Lange M. A. Ahrens T. J.
Impact Vaporization and the Accretion of Icy Planets

Bills B. G. Richards M. A. Kiefer W. S.
Mars: Gravity, Topography, and Dynamic Compensation

Turcotte D. L.
A Fractal Approach to Planetary Spectra

Hood L. L.
Magnetospheric Influences on the Evolution of Planetary Rings

Oberbeck V. R. O'Hara D. P. Carle G. C.
Design Considerations for a Titan Aerosol Collector

Carle G. C. Kojiro D. R. O'Hara B. J. Scattergood T. W.
Valentin J. R.
Gas Chromatographic Instrumentation for the Analysis of Aerosols and Gases in Titan's Atmosphere

Fegley B. Prinn R. G.
Predicted Chemical Models of the Deep Atmosphere of Uranus

Nellis W. J. Hamilton D. C. Holmes N. C. Mitchell A. C.
Radousky H. B. Ree F. H. Ross M. Nicol M.
Properties of Materials in the Interiors of Uranus and Neptune

PRESENTED BY TITLE ONLY

Lang B. Vityazev A. V.
Fractal Phenomena in the Solar System: A Heuristic Suggestion

Krass M. S.
Ice in Solar System

Friday, March 21, 1986
IO, EUROPA, GANYMEDE, AND CALLISTO
8:30 a.m. Gilruth 206

Greeley R. Lee S. W.
Observations of Active Sulfur Flows: Implications for Io

Schaber G. G.
Io: Shield Volcanism, Tidally Forced Viscous Heating, and the Shift of Active Volcanism Eastward from the Sub-Jupiter and Anti-Jupiter Points

Spohn T. Fischer H. J.
Io's Present High Dissipation State May Be Stable: Results of a Coupled Orbital-Thermal Evolution Calculation

Ross M. N. Schubert G.
Tidal Heating in Viscoelastic Models of Io and Europa

Helfenstein P.
Photometrically Determined Physical Properties of Terrains on Ganymede

Thomas P. J. Schubert G.
Non-Newtonian Crater Relaxation in Ice

Murchie S. L. Head J. W. Helfenstein P. Plescia J. B.
Sequence of Grooved Terrain Formation on Ganymede

Golombek M. P. Banerdt W. B.
Extensional Tectonic Features as Indicators of Lithospheric Strength and Early Thermal Profiles on Ganymede

Underwood J. R. Woronow A. Casacchia R.
Teeling M. J.
Possible Point Source of Mantle Upwelling, Galileo Regio, Ganymede

Croft S. K.
Thermal Models of Marginal Differentiation on Ganymede and Callisto

Chrisey D. Phipps J. Boring J. W. Johnson R. E.
Lanzerotti L. I. Brown W. L.
Charged-particle Alteration of Volatiles on Outer Solar System Bodies

Chrisey D. Boring J. W. Johnson R. E. Brown W. L.
Lanzerotti L. J. Foti G.
New Molecular Species Ejected from Residues of Irradiated Volatiles: Implications for COMETS

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Helfenstein P.
Dark-floored Craters on Ganymede: Evidence for Devolatilized Impact Melt

Schenk P. M. McKinnon W. B.
The Geometry of Furrows on Ganymede

Murchie S. L. Head J. W.
Break-up of Dark Terrain and the Formation of Bright Terrain on Ganymede: Evidence for Strike-Slip Faulting

Murchie S. L. Head J. W.
CO_2-driven Water Volcanism on Ganymede and its Implications for Volcanic and Tectonic Styles

Meier T. A.
Spectral Classification of Dark Lineations on Europa and Evidence for Plume-style Water Eruption Resurfacing

Meier T. A.
Evidence for Liquid Water "Lava" Eruptions on Europa in the White Line Feature Agenor Linea

Agosto W. N.	SPACE UTILIZATION, MON. EVE., GYM
Agresti D. G.	MARS REMOTE SENSING, TUES. AM, GYM
Agresti D. G.	CHONDRULES, CARBONACEOUS CHONORITES, MON. AM, GYM
Ahrens T. J.	IMPACT PHENOMENA: EXPERIMENT & THEORY, MON. PM, G206
Albin E. F.	VOLCANIC PLAINS/MARS SEDIMENTS, THURS. PM, G206
Anderson W. W.	THE DYNAMIC EARTH THURS. AM, G104
Armstrong J. T.	PRIMITIVE CHONORITIC COMPONENTS, THURS. PM, GYM
Arndt J.	LUNAR EVOLUTION, MARE BASALTS & EXP. PETROLOGY, TUES. PM, G104
Arnold J. R.	COSMIC RAYS AND CARBON, WED. PM, G206
Arvidson R. E.	VOLCANIC PLAINS/MARS SEDIMENTS, THURS. PM, G206
Banerdt W. B.	VENUS, WED. PM, G104
Barlow N. G.	VOLCANIC PLAINS/MARS SEDIMENTS, THURS. PM, G206
Barrett R. A.	INTERPLANETARY DUST, WED. AM, G206
Basu A.	THE LUNAR REGOLITH, THURS. AM, G206
Beckett J. R.	LIGHT ISOTOPES & NEBULAR CHEMISTRY, WED. AM, GYM
Bender D. F.	COMETS & ASTEROIDS, TUES. AM, G206
Benz W.	LUNAR ORIGIN(S), THURS. PM, G104
Bersch M. G.	LUNAR EVOLUTION, MARE BASALTS & EXP. PETROLOGY, TUES. PM, G104
Bills B. G.	PLANETARY PHYSICS, FRI. AM, GYM
Bindschadler D. L.	VENERA/VEGA/VENUS, WED. AM, G104
Bischoff A.	LIGHT ISOTOPES & NEBULAR CHEMISTRY, WED. AM, GYM
Blanford G. E.,	INTERPLANETARY DUST, WED. AM, G206
Bogard D.	VENUS, WED. PM, G104
Bogard D. D.	DIFFERENTIATED METEORITES II. SNCs, FRI. AM, G104
Bogatikov, O. A.	THE LUNAR REGOLITH, THURS. AM, G206
Bohor B. F.	IMPACT PHENOMENA; OBSERVATIONAL DATA, MON. AM, G206
Boslough M. B.	IMPACT PHENOMENA: EXPERIMENT & THEORY, MON. PM, G206
Bougan S. J.	VENUS, WED. PM, G104
Boynton W. V.	LIGHT ISOTOPES & NEBULAR CHEMISTRY, WED. AM, GYM
Bradley J.	INTERPLANETARY DUST, WED. AM, G206
Brakenridge G. R.	MARTIAN GEOMORPHOLOGY, MON. PM, G104
Briggs R. A.	SPACE UTILIZATION, MON. EVE., GYM
Brigham C. A.	ISOTOPIC ANOMALIES, THURS. AM, GYM
Bruckenthal E. A.	MARS & OTHER REMOTE SENSING, MON. AM, G104
Bunch T.	CHONDRULES, CARBONACEOUS CHONORITES, MON. AM, GYM
Burns R. G.	MARS & OTHER REMOTE SENSING, MON. AM, G104
Caffee M. W.	COSMIC RAYS AND CARBON, WED. PM, G206
Cameron A. G. W.	PLANETARY PHYSICS, FRI. AM, GYM
Cattermole P.	VOLCANIC PLAINS/MARS SEDIMENTS, THURS. PM, G206
Chalokwu C. I.	THE DYNAMIC EARTH THURS. AM, G104
Chen J. H.	DIFFERENTIATED METEORITES II. SNCs, FRI. AM, G104
Christensen P.	MARS REMOTE SENSING, TUES. AM, GYM
Christiansen E.	MARTIAN GEOMORPHOLOGY, MON. PM, G104
Christoffersen R.	INTERPLANETARY DUST, WED. AM, G206
Cintala M. J.	IMPACT PHENOMENA: EXPERIMENT & THEORY, MON. PM, G206
Clark P. E.	MARS & OTHER REMOTE SENSING, MON. AM, G104
Clayton D. D.	LIGHT ISOTOPES & NEBULAR CHEMISTRY, WED. AM, GYM
Clayton R. N.	ISOTOPIC ANOMALIES, THURS. AM, GYM
Clayton R. N.	DIFFERENTIATED METEORITES I, WED. PM, GYM
Colson R. O.	LUNAR EVOLUTION, MARE BASALTS & EXP. PETROLOGY, TUES. PM, G104
Croft S. K.	Io, EUROPA, GANYMEDE, AND CALLISTO, FRI. AM, G206
Dasch E. J.	LUNAR EVOLUTION, MARE BASALTS & EXP. PETROLOGY, TUES. PM, G104
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