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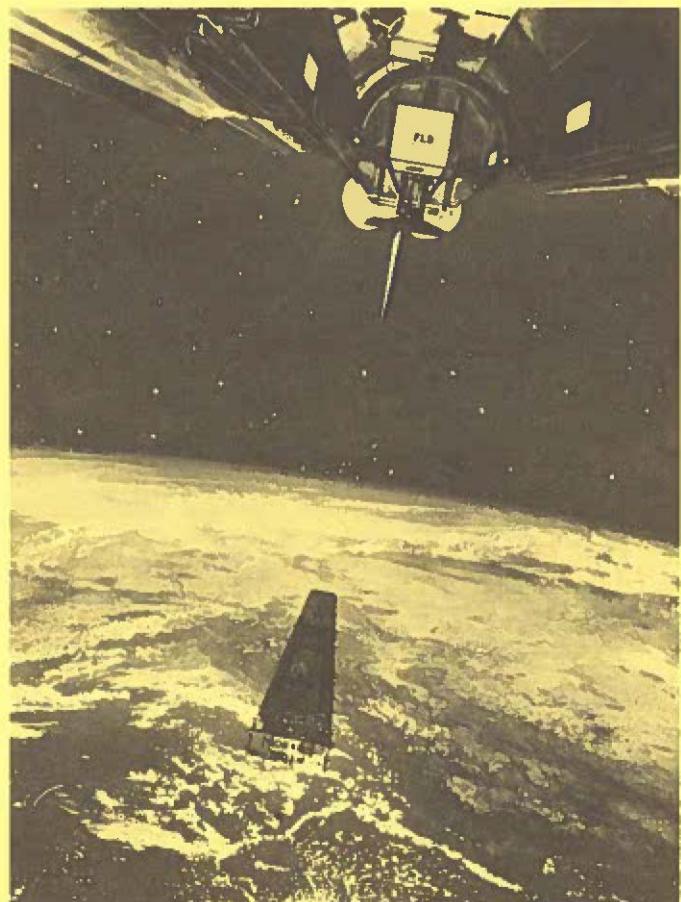
LUNAR AND PLANETARY SCIENCE CONFERENCE XIII

15-19 March 1982

The THIRTEENTH LUNAR AND PLANETARY SCIENCE CONFERENCE will begin Sunday March 14 at 6:00 p.m. with registration and an open house at the Lunar and Planetary Institute. A shuttle bus will run between NASA area hotels and the LPI from 5:45 to 9:30 p.m. Registration will continue throughout the conference on the newly constructed 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 458 abstracts accepted for publication in *Lunar and Planetary Science XIII*, the Program Committee has constructed twenty-five sessions for a total of 299 oral presentations. Session topics are:

- Lunar and asteroid regoliths
- Early evolution of the crust of the terrestrial planets
- Lunar petrology
- Lunar geology
- Planetary physics
- Origin and history of meteorites
- Isotopic anomalies in the early solar system materials
- Irradiation effects
- Meteorite chronology
- Cratering and shock studies
- Major planet satellites
- Mars
- Venus



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. Indexes to the speakers and to the authors of papers in the oral technical sessions will be found following the daily schedules. (See Appendix to this *Bulletin*)

Some CONFERENCE HIGHLIGHTS this year include:

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.

Monday evening's special session will convene in the Gilruth Center auditorium at 8:00p.m. This session will be a presentation of the activities of the NASA Solar System Exploration Committee, chaired by Noel W. Hinnens. Sufficient time will be allowed for reaction from the planetology community. This session will be open to conference attendees only.

Tuesday evening is Chili Cook-Off/Bar-B-Q time. This much heralded event returning for the second time will be held on the grounds of the LPI. Tickets will be available at the Registration desk and will be approximately \$10-12 for the entire evening. In case of bad weather, the cook-off will be Wednesday evening. Team applications are still being accepted. Prizes will be awarded this year based on the best tasting chili not according to absolute "Texas Standards".



2ND ANNUAL Chili Cookoff & BAR-B-Q

TUESDAY, MARCH 16TH
RAIN DATE: WED. 17TH



Wednesday afternoon will be devoted to a special plenary session titled "NEW OPPORTUNITIES FOR EARTH AND PLANETARY RESEARCH IN THE MID 1980'S". Topics to be discussed include future directions for NASA programs, recent advances in remote sensing, Landsat D, the Space Telescope, and the Long Duration Exposure Facility. Members of the panel include: Jesse Moore and Mark Settle, NASA Headquarters; Charles Elachi and Alex Goetz, JPL; Vince Salomonson, Goddard SFC, John Caldwell, SUNY, and William Kinard, Langley. The session will convene in the Gilruth Center auditorium at 1:30 p.m.

The JSC Astronomer's Brownbag Lunch Club will present Bill Agosto discussing Lunar Mining in the Building 31 Conference Room (Room 193) on Wednesday, March 17, at noon.

"Prospects for Man on Mars in the Twenty-First Century" will be the topic of a special session to be held on Wednesday evening. (Time and Place will be announced later. Call 713-486-2135 for information). The topic will be organized by a group from the Laboratory on Atmospheric and Space Physics, University of Colorado, where a three-day colloquium called "The Case for Mars" was held in May 1981. The panelists would include Christopher McKay, Penelope Boston, and Thomas Meyer from UC-LASP, Humboldt Mandel, Karl Henize, and James Oberg from NASA-JSC.

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

Advance sets of Abstracts will *NOT* be mailed out this year. Abstracts will be available at the Conference and by mail for as long as the limited supply lasts. L&PS XIII will be \$3.00 U.S.; Foreign \$35.00 air mail and \$6.00 surface. If you wish to keep your set of conference abstracts complete, send your check or money order made out to the Lunar and Planetary Institute, to the Library/Information Center, LPI. Orders will be handled on a first in-first out basis. An order blank is included with this *Bulletin*.

PRELIMINARY PROGRAM INDEX BULLETIN APPENDIX

Sessions	page i
Posters	page xiii
Author Index	page xiv
Speaker Index	page xvii

VENUS CONFERENCE REPORTS NEW DISCOVERIES

Dramatic new finds about Venus, the Earth's twin planet, were reported at the First International Conference on the Venus Environment, held in Palo Alto, CA, November 2-6, 1981. The conference was jointly sponsored by the University of Arizona and NASA.

These include: evidence for two major, currently active volcanic areas on the planet; the probability that these areas are the principal vents for the planet's internal heat; quantified findings that Venus has a thicker crust than Earth and is a "one plate" planet with little plate tectonics; and complete, self-consistent models of Venus' cloud system and greenhouse effect. Considerable progress has also been made in understanding over-all atmosphere circulation (with implications for Earth); and there is strong new evidence for former Venusian oceans on the scale of the Earth's oceans.

Several hundred scientists from the U. S. and other countries attended the recent Venus conference. Much of the new information comes from data returned by the six Pioneer spacecraft and their 30 experiments. The Pioneers are managed by NASA's Ames Research Center, Mountain View, CA.

Much of the significance of Venus findings in general lies in the fact that the Earth and Venus appear to be almost identical copies of each other. Scientists believe the Earth would become a virtual Venus if you stopped its rotation, removed the Moon, and moved our planet slightly closer to the Sun. Therefore, studies of Venus provide a variety of insights into Earth mechanisms.

New Venus discoveries included:

1. Apparently there are two major volcanic regions on Venus: Beta Regio and the Scorpion Tail of Aphrodite Terra, largest continent-like upland region on the planet. There is evidence for continuous and current volcanic activity at both places.

2. Detailed analysis of Venus' global topography, and detailed comparisons with global crustal-density (derived from gravity data), show that Venus apparently has a thicker crust than Earth and is a "one plate planet." Substantial evidence indicates that its crust is not broken into many continent-bearing plates, floating on the liquid interior, as the Earth's crust is.

3. Because of its thick, planet-wrapping crust, most of Venus' interior heat appears to come out in its two volcanic regions, unlike Earth. Earth vents its heat at many points, especially at the constantly-expanding mid-ocean ridges. Concentration of Venus' lightning over just two volcanic regions suggests fairly frequent current volcanic activity in both places.

4. Though Venus' continents appear not to drift around on crustal plates as Earth's do, crustal density measurements suggest local uplifting of large regions. This is probably due to up-flowing convection plumes, resulting from circulation of interior magma. The most prominent of these are Aphrodite Terra and Ishtar Terra. Vertical motion of the crust also is suggested by the several deep rift valleys, one the lowest point of the planet, at the Scorpion Tail of Aphrodite.

5. Beta Regio, a region larger than the Hawaii-Midway chain, appears to be a huge double-shield volcanic construct, and is apparently the most active region on the planet. This is shown by variations in crustal density, apparent old lavaflows, and the region's 20,000 foot height and huge size. Beta is believed to sit over a powerful, upflowing convective plume, deep in Venus' interior magma.

6. The new topography data show other smaller volcanos and one crustal rift 1500 km long.

7. Venus' clouds are "upside down". There's a smog layer on top, 15 km deep, and Earth-like condensation clouds (made of sulfuric acid droplets) below 57 km, extending down to 48 km. These condensation clouds are patchy and vary in density. They produce drizzle but seldom hard rain, and in general are only ten percent as thick as comparable Earth clouds. Scientists also have now charted and quantified the basic cycle of chemical reactions in the clouds.

8. Unlike Earth, which absorbs most solar heat on its surface, Venus absorbs most solar heat in its clouds. In the cloud layer is a single convective circulation cell which carries heat from equator to pole. Earth has three linked major circulation cells transporting heat between equator and poles.

9. Venus' cloud region is also a shell of high-speed winds which englobes the planet. Above this wind layer, the atmosphere is almost dead calm. There are two explanations for these high speed winds on a planet with no rotation. Both propose wave (eddy)-pumping of the enormous momentum of the planet's dense

lower atmosphere to higher altitudes where the momentum remains. One of these proposed mechanisms involves large horizontal eddies; the other, tidal effects as the lighted hemisphere moves slowly around the planet. Weather theoreticians agree that: wave pumping mechanisms are critical to understanding Earth's weather, are not well understood on any planet, and have been brought into prominence by recent Venus work.

10. Venus appears to have had an ocean and lost it to space. During the solar system's early history (when scientists believe the Sun was 30 percent less hot), Venus' atmosphere and environment could have been Earthlike. Strong evidence for this lost water remains today in the definitive measurement of the ratio of deuterium to hydrogen. (There is 100 times as much deuterium relative to hydrogen on Venus as on Earth. This measurement was found for the first time in the Pioneer data during the recent Venus Conference). With water abundant, the planet may perhaps have sustained life during the early years of the solar system's history. When the runaway greenhouse effect began, it wiped out most existing phenomena on the planet and replaced them with today's furnace-like environment.

NASA Press Release 82-1, Jan. 20, 1982

NASA COMBINES OFFICES AND NAMES NEW HEAD

NASA has completed plans for the combination of its *Office of Space Science* and *Office of Space and Terrestrial Applications*. The new organization was effective on December 3, 1981. The new *Office of Space Science and Applications* will retain the programs and responsibilities of the two program offices with the exception of the Technology Utilization Program, which is transferred to the Government/Industry Affairs Division of the Office of External Relations.

Dr. Burton I. Edelson, senior vice president of COMSAT General Corp. has been named NASA Associate Administrator for Space Science and Applications, effective February 14.

Edelson will be responsible for all of NASA's Space Science and Applications programs, as well as the activities of the Jet Propulsion Laboratory at Pasadena, California, and the Goddard Space Flight Center, Greenbelt, Maryland.

Edelson joined the Communications Satellite Corp. in 1967 as assistant director for COMSAT Laboratories and in 1973 was named director of COMSAT Laboratories.

In March 1979 he was elected vice president of COMSAT, and he assumed his present position in September 1980. Prior to joining COMSAT, he served as an engineering officer in the U.S. Navy with assignments on the staff of the National Aeronautics and Space Council at the White House and in the Office of Naval Research.

A graduate of the U.S. Naval Academy, Edelson earned his master's and doctorate degrees from Yale University.

He is a Fellow of the Institute of Electrical and Electronics Engineers and of the American Institute of Aeronautics and Astronautics. He is a member of several U.S. government advisory committees and recently served on the NASA Transition Team for the Reagan Administration.

NASA Press Releases 81-182, 82-7

COMMITTEE ON COMPARATIVE PLANETOLOGY

The International Union of Geological Sciences (IUGS) has formed an Advisory Committee on Comparative Planetology. The committee advises the IUGS on research initiatives in planetary studies and provides IUGS representation on other scientific organizations with interests in geoscience. Major goals are to stimulate research in comparative planetology and promote communication of these research results to the general geoscience community. Particular emphasis is being placed on the application of planetary studies to problems in terrestrial geology. To achieve these goals, the committee is interested in co-sponsoring symposia within the framework of existing national and international meetings on interplanetary comparisons in such subject areas as crustal evolution, impact and volcanic processes, early Pre-Cambrian geology. For further information, interested parties and organizations should contact Dr. James W. Head, Dept. of Geological Sciences, Brown University, Providence, RI 02912, or Dr. Richard A. F. Grieve, Earth Physics Branch, Dept. of Energy, Mines and Resources, Ottawa, Canada K1A 0Y3.

THE LUNAR AND PLANETARY INSTITUTE
SUMMER INTERN PROGRAM

FOR UNDERGRADUATES
JUNE 14 - AUGUST 20, 1982

The Lunar and Planetary Institute offers selected undergraduates an opportunity to participate actively in lunar and planetary research with scientists at the Institute and at the NASA Johnson Space Center. The ten-week program begins June 14 and ends August 20, 1982, although these dates can be adjusted somewhat to fit individual schedules. The weekly remuneration will be \$225, and assistance with travel costs.

POTENTIAL AREAS OF RESEARCH

Cosmic dust characterization, meteorite fall statistics, meteorites and their origins, planetary regolith studies, Mars soil analog chemistry, trace element partitioning studies, volcano morphology characterization, planetary volcanism and thermal histories, volcanism at subduction zones, thermal and mechanical modelling of planetary interiors, fluid inclusion studies, experimental petrology, petrology and geochemistry of Precambrian rocks, remote sensing data processing, data base management systems, planetary impact cratering processes, image processing, photogeology, studies of continental rift valleys, and special library science. Each project will be coordinated by an LPI or JSC scientist.

ELIGIBILITY AND SELECTION CRITERIA

Undergraduates, including class of 1982 graduates, are eligible and will be considered for appointment without regard for race, creed, color, sex, national origin, age, handicap status or other non-merit factor. Selection is based upon the following criteria: (1) Scholarship, curriculum and experience, (2) career objectives and scientific interests, and (3) match of interests of applicant with available research projects. Notification of selection will be made by April 19, 1982.

APPLICATION DEADLINE IS MARCH 22, 1982

Please send a brief biographical sketch, a description of academic goals, career plans and scientific interests, and a summary of why you wish to participate in the intern program. Application forms may be requested from Mrs. Pam Jones at the LPI. In addition,

arrange for the sending of official transcripts and three letters of recommendation covering academic achievement, career potential and character. Send these materials to:

SUMMER INTERN PROGRAM
The Lunar & Planetary Institute
3303 NASA Road 1
Houston, TX 77058

Questions concerning the program should be directed to Mrs. Pam Jones, (713)486-2150.



LIBRARY NEEDS METEORITICS 1980

In some mysterious way, the bound volume of *Meteoritics* for 1980 has disappeared from the Library at the Lunar and Planetary Institute. If anyone would be interested in donating this volume or a piece of it to us we would greatly appreciate it. Call Laura at 713-486-2134 and let us know about your generosity.

**McGETCHIN VOLCANO FUND:
OPPORTUNITY FOR SUMMER STUDY**

The McGetchin Volcano Fund is supported by friends of Tom McGetchin to: (1) allow special projects in volcanology to be pursued by undergraduate or graduate students not involved in Ph.D. thesis research and (2) encourage characteristic enthusiasm to be developed by active (field) participation in research. Planetary scientists actively involved in volcanology are encouraged to suggest this opportunity to potential applicants.

Applications are invited for this year's program of summer study. Applicants should submit or have sent (a) a brief description of the project; (b) a letter of evaluation of, and concurrence with the project, by a supervising sponsor from a research institution (e.g., faculty); (c) two letters of technical or scholastic reference; and (d) an up-to-date academic transcript and resume.

The project description should include such information as approach, significance, location, duration, and itemized budget of the support requested. The research relation between the student and sponsor should be

defined. Topics in volcanology are non-restrictive but should emphasize participation. The proposal should be limited to no more than four pages. A report discussing the outcome or direction of the project will be required at the end of the project. Funding limitation for each project this summer is likely to be between \$500 and \$1000.

The above application material should be sent by March 15, 1982 to:

McGetchin Volcano Fund
Lunar and Planetary Institute
3303 NASA Road One
Houston TX 77058

Announcement of awards will be made by April 30, 1982.

Three students received awards in 1981 for field work in volcanology. Anticipated funds available for 1982 will allow a similar number of participants. Private contributions to the fund will be gratefully received and will allow the program to be continued in the future.

WRAP-UP — PLANETARY RIFTING CONFERENCE

The most recent LPI Topical Conference, "Processes of Planetary Rifting" cosponsored by the LPI, American Geophysical Union, NASA, and the National Science Foundation, was held at the Christian Brothers' Retreat House, St. Helena, California, on 3-5 December 1981. Sixty-two papers were presented by the seventy attendees to the conference in seven formal sessions:

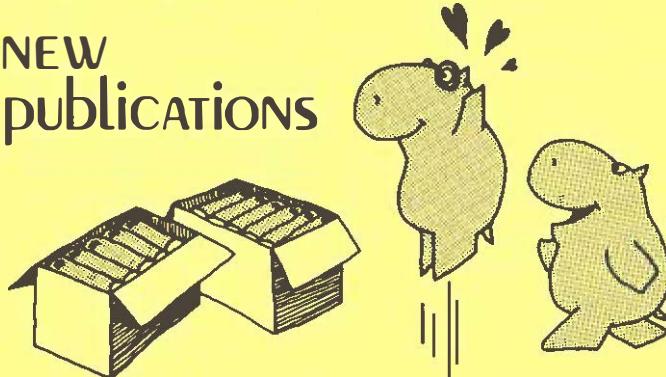
1. Speculation as to the origins and development of rifts
2. Rifts on other planets
3. Tectonics
4. Geology
5. Chemistry of the lithosphere
6. Physics of the lithosphere
7. Resources associated with rifting

Sessions continued late into the evening on all three days of the conference, and concluded with an informal debate on "our state of ignorance and its remedy." Central in the content of the conference was the discussion of active and passive mechanisms of rifting,

active being defined as rifting in response to asthenospheric upwelling, and passive rifting as a response to lithospheric tensional stresses resulting from plate interactions. The main consensus in the final debate was in the need for more theoretical studies, more experimental studies, and more data. Even the value of the active and passive models was questioned in view of the complex response of the continental lithosphere to tectonic processes.

This conference was convened by Brian H. Baker, Center for Volcanology, University of Oregon, and Paul Morgan, LPI, as a preliminary step in developing an LPI project on the study of continental rifts. Abstracts of papers presented to the conference have been published as LPI Contribution No. 457. It is available from the LPI, Library/Information Center, for \$3.00 U.S., Foreign air mail \$9.50, surface \$4.50. Orders should be accompanied by check. The Proceedings of the conference will appear as a special issue of *Tectonophysics* in December 1982.

NEW publications



NASA PUBLICATIONS

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

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

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

Voyager at Saturn Posters

This set of two colorful posters measuring 11 x 17 inches depict photos obtained by Voyager 1 as it swept through the Saturn system in November 1980. *The Planet & Rings* represents a close-up view of Saturn, as well as four smaller shots taken under the rings, closing in, and looking back. The *Satellites* shows the Saturn system and focuses on the satellites Mimas, Dione, and Tethys. Each poster contains descriptive text on the reverse.

Beautifully printed on glossy paper, these two posters are perfect for the classroom or for your favorite space buff.

Order no. S/N033-000-00827-9 \$3.25.

OTHER PUBLICATIONS OF INTEREST

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PLEASE! REMEMBER . . . please do not order any of the publications listed here from the LPI. Contact the source, publisher, or your local book seller to obtain a copy.

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Guide to obtaining information from the USGS 1981

Compiled by Paul F. Clarke, Helen E. Hodgson and Gary W. North this informative booklet tells what kinds of data are available from the USGS in the form of maps, publications, data sets, etc. It is available free from the USGS Publications Distribution Branch, Denver Federal Center, Denver CO 80225, or 1200 South Eads Street, Arlington VA 22202. Ask for Circular 777.

New from the Astronomical Society of the Pacific

The A.S.P. in its continuing efforts to increase public understanding of astronomy, has compiled two new lists and is making them available free for the cost of mailing.

Index to NASA's Astronomy Books includes some of the most interesting and useful books on astronomy which have been published by NASA during the last two decades. Among the books listed are non-technical descriptions of the most recent missions to Mars, Jupiter and Saturn, and summaries of conferences concerning the search for extra-terrestrial life and the building of space habitats. Specific addresses and phone numbers for ordering the publications are included. To receive a copy of this index, send two first-class



stamps with your name, address, and zip code and ask for NASA Index.

Index to Astronomy in Scientific American is a complete subject index to astronomy articles which appeared in SA magazine between 1960 and 1981. These non-technical articles were written by prominent scientists actively engaged in the research they were describing. To obtain a copy of this index send a long, self-addressed envelope with at least two first class stamps on it.

In addition to these indexes, the A.S.P. has a number of other items such as bumper stickers, t-shirts, and educational materials available. To obtain a listing of other Society activities, include a request for their catalog with your request for other indexes. Include at least one extra stamp with your request.

The address of A.S.P. is:

Astronomical Society of the Pacific
1290 24th Avenue
San Francisco CA 94122

SPACE SHUTTLE GUIDEBOOK

The National Space Institute (NSI) is proud to announce a space shuttle guidebook—an exact reproduction of the original NASA press document issued before the first flight of space shuttle Columbia.

Republished for its members by NSI, the nearly 300-page volume contains a comprehensive overview of the entire space shuttle transportation system, from its development history to flight crew training.

Written in a manner for both the lay public and the space aficionado, this invaluable reference described the space shuttle propulsion system, crew accommodations and equipment, the orbiter structure and systems, and the missions operations and support required from launch to landing of the shuttle orbiter.

This superb reference book is liberally illustrated with photos, tables and detailed charts depicting the inner workings of the versatile space shuttle. The NSI guide is appended with a special glossary of terms, acronyms, and abbreviations used in each shuttle mission, and is des-

tined to become a treasured sourcebook as the shuttle era unfolds.

To obtain a copy send your check made payable to NSI, Cost: \$15.00 includes postage and handling to:

NSI/Shuttle Guidebook
West Wing Suite 203
600 Maryland Ave. SW
Washington DC 20024

From NSI Newsletter, Sept-Oct. 1981

SURFACE OF MARS

"The facts about Mars have turned out to be almost as bizarre as the fiction," planetary geologist Michael Carr says in *THE SURFACE OF MARS*, a book published early in 1982 by Yale University Press.

Carr, an expert on martian geology and leader of the Viking Orbiter Imaging Team, has summarized interpretations of 60,000 photographs and other data collected by Mariner and Viking spacecraft between 1970 and 1980.

The Viking mission, the latest episode in Mars exploration, has in the last five years returned an enormous amount of new information about the planet which confirms its surprisingly diverse geology and evolutionary history. Carr's new book is the first work to summarize the Viking results and integrate them into a coherent story. It is expected to be the definitive work on Mars for many years to come. Several recent maps of the planet are included and over 150 Viking pictures are reproduced in large format, some being published for the first time.

The book *SURFACE OF MARS* by Michael H. Carr may be ordered from Yale University Press, 92A Yale Station, New Haven CT 06520 for \$45.00 or contact your local book seller.

From Yale University Press News Release

VOLCANOES OF THE WORLD

A regional directory, gazetteer, and chronology of volcanism during the last 10,000 years compiled by T. Simkin, L. Siebert, L. McClelland, and D. Bridge of the National Museum of Natural History and C. Newhall, Dartmouth College and J. H. Latter, DSIR, New Zealand, features comprehensive and up-to-date data tables of known volcanism over the past 10,000 years. It will be an invaluable source of information for scientists, historians, and students interested in the history

and effects of volcanoes. This book is the result of 10 years of work and draws heavily from the reports of many SEAN correspondents. The authors state that one of their main objectives for the book is to stimulate responses from people who know individual volcanoes better than they can and from people in different disciplines who are also interested in the effects of volcanism during the last 10,000 years. They solicit any help that can be given by you the reader to increasing the information in their data bases.

The book is available from Academic Press, 111 Fifth Avenue, New York NY 10003, or your book seller. Price is \$19.75.

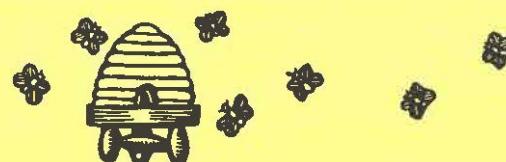
COATTAILS OF GOD—THE ULTIMATE SPACE FLIGHT

In this new book, author Robert M. Powers says "Let us not apologize for loving the stars, for having read and dreamed, plotted and calculated, for having manufactured and flown these pieces of our dreams which have shown us such fantastic reality. Let us build more, go on now, planet to planet, moon to moon, asteroid to asteroid until we try for the great long distance between this sun of ours and some other one and see what the hell is out there."

Robert Powers, award-winning science writer whose *Shuttle—The World's First Spaceship* sold 83,000 copies, now imagines the trip of the future our first interstellar flight. His *Planetary Encounters* and *Shuttle* prepared us for travel within our solar system. The *COATTAILS OF GOD* readies us now for the ultimate grand adventure! On the basis of our present knowledge, technological capacity and the prospects of future development, he envisions the Starship Agamemnon. The Starship is a shining cylinder in which generations of star travelers journey, living and dying in a contained environment designed for human comfort, programmed from launch to landing on a planet circling Epsilon Eridania star located in the sky 10 degrees south of the celestial equator.

The 400-page book is available from Warner Books, 75 Rockefeller Plaza, New York NY 10019 or your local bookstore for \$17.95.

Publishers Press Release



TWELFTH LUNAR & PLANETARY SCIENCE CONFERENCE PROCEEDINGS

This two-volume set of papers presented to the 12th Lunar and Planetary Science Conference in March 1981 is now published. Theories and reports collected from data of remote sensing studies of the planets are presented along with interpretations of Viking data, analysis of recent planetary and meteorite samples, and theories for the origin of the moon and other terrestrial planets.

Contents: Volume One consists of reports on the Moon, under the subject headings: Pristine Rocks, Breccias, Regolith, Surface Geology, Structure and Evolution. Volume Two consists of reports on the Planets, Asteroids, and Satellites, under the subject headings: Meteorites, Mars and Venus, Experimental and Theoretical Studies. 883 illustrations, approximately 4,000 literature references are contained in this 1823 page publication.

Available from Pergamon Press, Fairview Park, Elmsford NY 10523 for \$175.00.

THE PLANETS: A DECADE OF DISCOVERY

In the past few years we have seen most of the planets in our solar system in true close-up for the first time. This explosion of scientific knowledge, the result of a series of spectacular space missions, now enables us to understand much that has puzzled man for centuries.

Traditionally, books on the planets have been written by astronomers, but this Pelican Original comes from a geologist, Peter Francis, whose down-to-earth explanations of the geography, geology and meteorology of each of the planets transforms what were once obscure discs of light into real new worlds.

After a brief review of the solar system, the book begins with the Moon, since this is our nearest neighbor in space, and the one about which most is known. It is not concerned solely with the Apollo missions, but starts by discussing what was known of the Moon before them. This is important because it enables the reader to review the scientific results of the Apollo landings in a much broader perspective. The Moon also provides an ideal starting point for the main function of the book, a review of each of the planets and their attendant satellites. The last chapter attempts to draw all the threads together, to show how all the planets can be considered as a family of related individuals to establish what elements of

common history they may have shared, and how they evolved.

The handy paper-back book is liberally illustrated with figures and photos from various planetary exploration missions and contains a good list of supplementary readings and an index. At this time the book is only available through Penguin Books Ltd, Harmondsworth, Middlesex, England for £3.95 (approximately \$8.00 U.S.)

PLANETARY SCIENCE: A LUNAR PERSPECTIVE

This new book by Stuart Ross Taylor is a continuation of the story begun in *Lunar Science: A Post-Apollo View*. For a full description of the scope and content of this excellent book, see advertisement elsewhere in this *Bulletin*. Page 31



OTHER OBJECTS, DUST, PARTICLES, ETC.

ALEXANDER,W.M. + CORBIN,J.D. (DEPT. OF PHYSICS, BAYLOR UNIV., WACO, TX 76706): SUBMICRON LUNAR EJECTA IN THE MAGNETOSPHERE ASSOCIATED WITH METEOR SHOWERS ADVANCES IN SPACE RESEARCH VOL. 1, 107-110 (1981)

CORBIN,J.D. + ALEXANDER,W.M. (DEPT. OF PHYSICS, BAYLOR UNIV., WACO, TX 76706): ORBITAL DYNAMICS OF MAGNETOSPHERICALLY TRAPPED LUNAR EJECTA ADVANCES IN SPACE RESEARCH VOL. 1, 103-106 (1981)

DANIELS,P.A. + HUGHES,D.W. (DEPT. OF PHYSICS, THE UNIVERSITY, SHEFFIELD S3 7RH, SHEFFIELD, UK): THE ACCRETION OF COSMIC DUST -- A COMPUTER SIMULATION MONTHLY NOTICES OF THE ROYAL ASTRONOMICAL SOCIETY VOL. 195, 1001-1009 (1981)

HICKEY,L.J. (DIV. OF PALEOBOTANY, SMITHSONIAN INSTITUTION, WASHINGTON, DC 20560): LAND PLANT EVIDENCE COMPATIBLE WITH GRADUAL, NOT CATASTROPHIC, CHANGE AT THE END OF THE CRETACEOUS NATURE VOL. 292, 529-531 (1981)

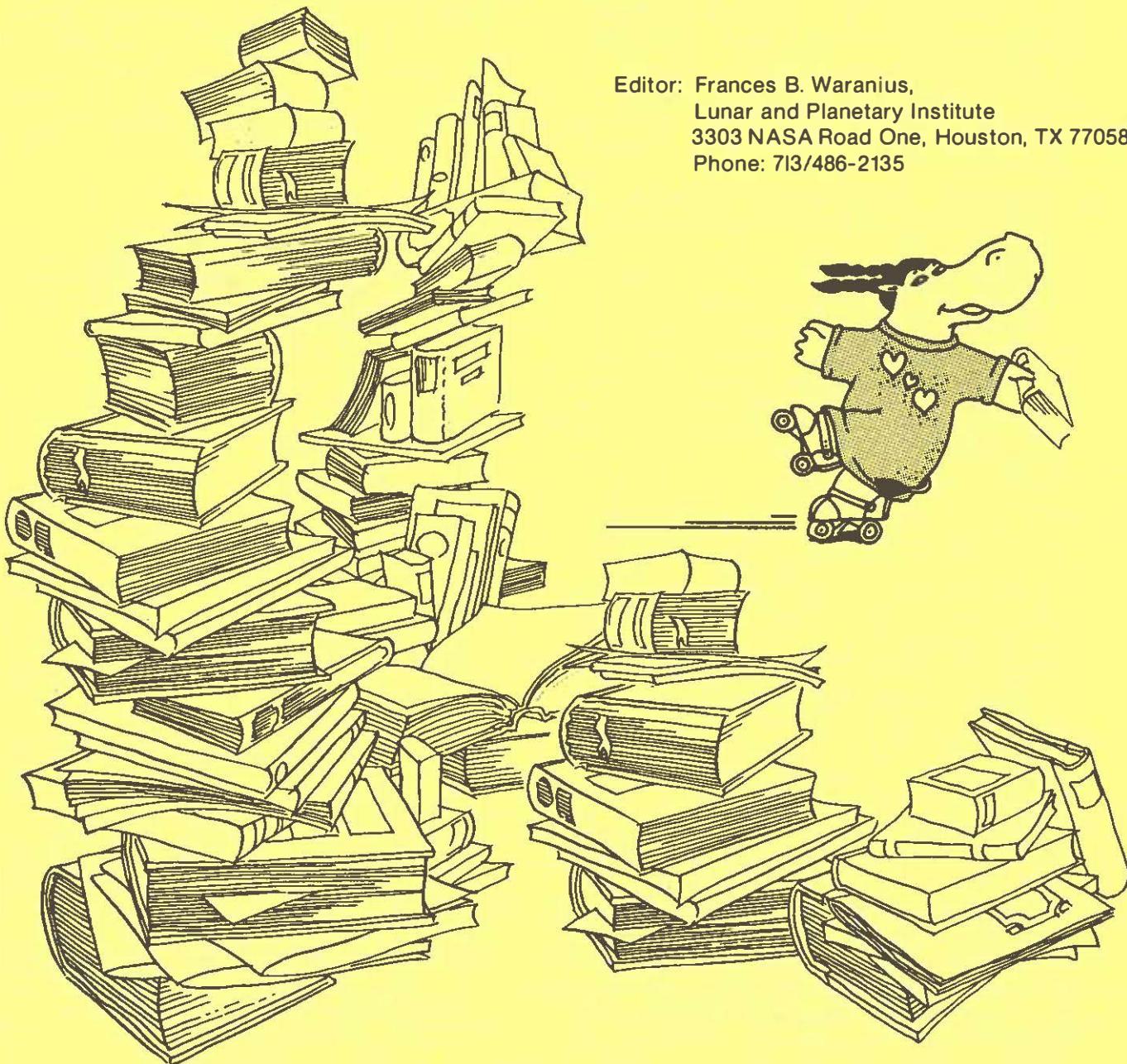
KRESAK,L. (ASTRONOMICAL INST., SLOVAK ACADEMY OF SCIENCES, 89930 BRATISLAVA, CZECHOSLOVAKIA): THE FLUX OF EARTH-CROSSING AND MOON-CRATERING INTERPLANETARY BODIES ADVANCES IN SPACE RESEARCH VOL. 1, 85-90 (1981)

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

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February 19-20

Seventh Symposium on Antarctic Meteorites,
National Institute of Polar Research, Tokyo, Japan
Contact: Dr. Takesi Nagata, Director
National Institute of Polar Research
9-10 Kaga I-Chome
Itabashi-Ku
Tokyo 173 Japan

MARCH 15-19



XIII LUNAR AND PLANETARY SCIENCE CONFERENCE
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April 1

DEADLINE Manuscripts for Continental Rift
Workshop Proceedings Papers
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April 21-23

NASA Planetary Atmospheres Principal Investigators
Fourth Annual Meeting, University of Michigan, Ann Arbor
Contact: Dr. S. K. Atreya
Dept. Atmospheric & Oceanic Science
Space Research Building
University of Michigan
Ann Arbor MI 48109

☆☆☆☆☆
MAY 11-15
NEW DATES
☆☆☆☆☆

Saturn Conference,
Tucson, Arizona
Contact: M. S. Matthews
University of Arizona
Lunar and Planetary Laboratory
Tucson AZ 85721
Telephone: 602/626-2902

May 17-June 3

24th Plenary Meeting of COSPAR, Ottawa,
Ontario, Canada
Contact: T.W. McGrath, Executive Member,
Local Organizing Committee
XXIV COSPAR Conference Secretariat
National Research Council
Ottawa, Ontario K1A OR6, Canada

- | | |
|-------------------|---|
| May 31-June 4 | American Geophysical Union Spring Meeting,
Philadelphia, Pennsylvania
Contact: American Geophysical Union
2000 Florida Avenue NW
Washington DC 20009 |
| August 17-26 | XVIII General Assembly of the International
Astronomical Union, University of Patras, Greece
Contact: Organizing Committee
XVIII General Assembly IAU
University of Patras
Patras, Greece |
| August 23-27 | European Geophysical Society and the European
Seismological Commission, University of Leeds, England.
Contact: J. T. Gleave
Special Courses Division
University of Leeds
Leeds LS2 9JT United Kingdom |
| August 30-Sept. 2 | International Conference on Planetary
Rings (I.A.U. Colloquium no. 75), Toulouse, France
Contact: Centre National d'Etudes Spatiales
Dept. des Affaires Universitaires
18, avenue Edouard-Belin
31055 Toulouse CEDEX France |
| August 31-Sept. 2 | International Conference on Very Large
Baseline Interferometry Techniques, Toulouse, France
Contact: Centre National d'Etudes Spatiales
Dept. des Affaires Universitaires
18, avenue Edouard-Belin
31055 Toulouse CEDEX France |
| August 31-Sept. 2 | First International Eclogite Conference,
Clermont-Ferrand, France
Contact: F.I.E.C.
Museum National d'Histoire Naturelle
Laboratoire de Mineralogie
61 Rue de Buffon
75005 Paris France |
| September 8-11 | Third International Kimberlite Conference,
Clermont-Ferrand, France
Contact: T.I.K.C
Laboratoire de Tectonophysique
Universite de Nantes
2 Rue de la Houssiniere
44072 Nantes CEDEX, France |

- September 13-16 45th Annual Meeting of the Meteoritical Society, St. Louis, Missouri
Contact: Prof. Ghislaine Crozaz
Washington University
Box 1105
St. Louis, MO 63130
- October 1982 Conference on Planetary Volatiles
schedule still tentative. Final dates and place
in next *Bulletin*
Contact: Ms. Pam Jones
Lunar & Planetary Institute
3303 NASA Road One
Houston TX 77058
Telephone: 713/486-2150
- October 18-21 Geological Society of America Annual Meeting, New Orleans, LA
Contact: GSA Headquarters
3300 Penrose Place
Boulder CO 80301
Telephone: 303/447-2020
- October 19-22 Division for Planetary Sciences, American Astronomical Society, Boulder, CO
Contact: L. Esposito or R. West
University of Colorado
Dept. of Astro-Geophysics
Boulder CO 80309
- November 15-19 International Conference on Cometary Exploration, Budapest, Hungary
Contact: Dr. K. Szego
Central Research Inst. for Physics
P.O. Box 49
Budapest, Hungary H-1525

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- FUDALI,R.F. (DEPT. OF MINERAL SCIENCES, SMITHSONIAN INSTITUTION, WASHINGTON, DC 20560): THE MAJOR ELEMENT CHEMISTRY OF LIBYAN DESERT GLASS AND THE MINERALOGY OF ITS PRECURSOR METEORITICS VOL. 16, 247-259 (1981)
- GOSWAMI,J.N. (PHYSICAL RESEARCH LAB., AHMEDABAD 380009, INDIA): SOLAR FLARE IRRADIATION RECORDS IN ANTARCTIC METEORITES NATURE VOL. 293, 124-125 (1981)
- GROSSMAN,L. + OLSEN,E. + DAVIS,A.M. + TANAKA,T. + MACPHERSON,G.J. (DEPT. OF THE GEOPHYSICAL SCIENCES AND ENRICO FERMI INST., UNIV. OF CHICAGO, CHICAGO, IL 60637): THE ANTARCTIC ACHONDRITE ALHA 76005: A POLYMICT EUCRUSTE GEOCHIMICA ET COSMOCHIMICA ACTA VOL. 45, 1267-1279 (1981)

OTHER OBJECTS. METEORITES (Continued)

- HEYMANN,D. + DZICZKANIEC,M. (DEPT. OF GEOLOGY, RICE UNIV., HOUSTON, TX 77001): TELLURIUM: SHOULD IT BE ISOTOPICALLY ANOMALOUS IN THE ALLENDE METEORITE? GEOCHIMICA ET COSMOCHIMICA ACTA VOL. 45, 1829-1834 (1981)
- HOHNERBERG,C.H. + HUDSON,B. + KENNEDY,B.M. + PODOSEK,F.A. (DEPT. OF PHYSICS, BOX 1105, WASHINGTON UNIV., ST LOUIS, MO 63130): XENON SPALLATION SYSTEMATICS IN ANGRA DOS REIS GEOCHIMICA ET COSMOCHIMICA ACTA VOL. 45, 1909-1915 (1981)
- HUGHES,D.W. (DEPT. OF PHYSICS, THE UNIVERSITY, SHEFFIELD, UK): METEORITE FALLS AND FINDS: SOME STATISTICS METEORITICS VOL. 16, 269-281 (1981)
- HUTCHINSON,R. (BRITISH MUSEUM (NATURAL HISTORY), LONDON, UK): HOW 'UNIQUE' CAN METEORITES BE? NATURE VOL. 293, 11 (1981)
- HUTCHISON,R. (BRITISH MUSEUM (NATURAL HISTORY), LONDON, UK): THE SIGNIFICANCE OF UNIQUE OR RARE METEORITES NATURE VOL. 293, 260 (1981)
- KING,E.A. + JAROWICH,E. + DAUGHERTY,F.W. (DEPT. OF GEOLOGY, UNIV. OF HOUSTON, HOUSTON, TX 77004): TIERRA BLANCA: AN UNUSUAL ACHONDRITE FROM WEST TEXAS METEORITICS VOL. 16, 229-237 (1981)
- KNAB,H.-J. (MAX-PLANCK-INSTITUT FUR CHEMIE (OTTO-HAHN-INSTITUT), SAARSTR.23, D-6500 MAINZ, WEST GERMANY): THE DISTRIBUTION OF TRACE ELEMENTS IN CARBONACEOUS CHONDRIES GEOCHIMICA ET COSMOCHIMICA ACTA VOL. 45, 1563-1572 (1981)
- KRACHER,A. + WILLIS,J. (INST. OF GEOPHYSICS AND PLANETARY PHYSICS, UNIV. OF CALIFORNIA, LOS ANGELES, CA 90024): COMPOSITION AND ORIGIN OF THE UNUSUAL OKTIBBEHA COUNTY IRON METEORITE METEORITICS VOL. 16, 239-246 (1981)
- LAMBERT,P. + MCNONE,J.F.JR. + DIETZ,R.S. + BRIEJ.H. + DJENDER.H. (CENTER FOR METEORITE STUDIES, ARIZONA STATE UNIV., TEMPE, AZ 85282): IMPACT AND IMPACT-LIKE STRUCTURES IN ALGERIA. PART II. MULTI-RINGED STRUCTURES METEORITICS VOL. 16, 203-227 (1981)
- LEBEDINETS,V.N. (INSTITUTE OF EXPERIMENTAL METEOROLOGY, STATE COMMITTEE ON HYDROMETEOROLOGY OF THE USSR, USSR): QUASICONTINUOUS FRAGMENTATION OF METEORITES SOLAR SYSTEM RESEARCH VOL. 15, 27-34 (1981)
- LEE,T. (DEPT. OF TERRESTRIAL MAGNETISM, CARNEGIE INST. OF WASHINGTON, WASHINGTON, DC 20015): ISOTOPIC ANOMALIES RESTUDIED GEOTIMES VOL. 26(6) 21-22 (1981)
- MACDOUGALL,J.D. (SCRIPPS INSTITUTION OF OCEANOGRAPHY, LA JOLLA, CA 92093): REFRACTORY SPHERULES IN THE MURCHISON METEORITE: ARE THEY CHONDRULES? GEOPHYSICAL RESEARCH LETTERS VOL. 8, 966-969 (1981)
- MARVIN,U.B. (HARVARD-SMITHSONIAN CENTER FOR ASTROPHYSICS, CAMBRIDGE, MA 02138): THE SEARCH FOR ANTARCTIC METEORITES SKY AND TELESCOPE VOL. 62, 423-427 (1981)
- MOLD,P. + BULL,R.K. + DURRANI,S.A. (DEPT. OF PHYSICS, UNIV. OF BIRMINGHAM, BIRMINGHAM B15 2TT, ENGLAND): CONSTANCY OF 244PU DISTRIBUTION IN CHONDRITIC WHITLOCKITE NUCLEAR TRACKS VOL. 5, 27-31 (1981)
- NO AUTHOR CITED MYSTERY METEORITES MAY COME FROM MARS NEW SCIENTIST VOL. 91, 219 (1981)
- OLSEN,E.J. (FIELD MUSEUM OF NATURAL HISTORY, CHICAGO, IL 60605): ESTIMATES OF TOTAL QUANTITY OF METEORITES IN THE EAST ANTARCTIC ICE CAP NATURE VOL. 292, 516-518 (1981)
- OTT,U. + MACK,R. + CHANG,S. (DEPT. OF PHYSICS, UNIV. OF CALIFORNIA, BERKELEY, CA 94720): NOBLE-GAS-RICH SEPARATES FROM THE ALLENDE METEORITE GEOCHIMICA ET COSMOCHIMICA ACTA VOL. 45, 1751-1788 (1981)
- RAMBALDI,E.R. (INST. OF GEOPHYSICS AND PLANETARY PHYSICS, UNIV. OF CALIFORNIA, LOS ANGELES, CA 90024): RELICT GRAINS IN CHONDRULES NATURE VOL. 293, 558-561 (1981)
- SCOTT,E.R.D. (INST. OF METEORITICS, UNIV. OF NEW MEXICO, ALBUQUERQUE, NM 87131): METEORITES--SOLAR SYSTEM FOSSILS GEOTIMES VOL. 26(6) 22-23 (1981)
- SEARS,D.W. (DEPT. OF CHEMISTRY, UNIV. OF ARKANSAS, FAYETTEVILLE, AR 72701): TERRESTRIAL AGES OF METEORITES NATURE VOL. 293, 433 (1981)
- TSUCHIYAMA,A. + NAGAHARA,H. + KUSHIRO,I. (GEOLOGICAL INST., UNIV. OF TOKYO, HONGO, TOKYO, 113, JAPAN): VOLATILIZATION OF SODIUM FROM SILICATE MELT SPHERES AND ITS APPLICATION TO THE FORMATION OF CHONDRULES GEOCHIMICA ET COSMOCHIMICA ACTA VOL. 45, 1357-1367 (1981)
- TURCO,R.P. + TOON,B.B. + PARK,C. + WHITTEN,R.C. + POLLACK,J.B. + NOERDLINGER,P. (RAND ASSOCIATES, MARINA DEL REY, CA 90291): TUNGUSKA METEOR FALL OF 1908: EFFECTS ON STRATOSPHERIC OZONE SCIENCE VOL. 214, 19-23 (1981)
- USTINOV,A.G. + GORIN,V.D. + LAVRUKHINA,A.K. (INST. OF GEOCHEMISTRY AND ANALYTIC CHEMISTRY, ACADEMY OF SCIENCES OF THE USSR, USSR): RADIATION HISTORY OF THE DHAJALA CHONDRITE AND THE HELIOLATITUDE VARIATIONS OF GALACTIC COSMIC RAYS SOLAR SYSTEM RESEARCH VOL. 15, 43-49 (1981)
- WILLIS,J. + GOLDSTEIN,J.I. (DEPT. OF METALLURGY AND MATERIALS ENGINEERING, LEHIGH UNIV., BETHLEHEM, PA 18015): SOLIDIFICATION ZONING AND METALLOGRAPHIC COOLING RATES OF CHONDRITES NATURE VOL. 293, 126-127 (1981)
- WOOLUM,D.S. + BURNETT,D.S. (HARVARD-SMITHSONIAN CENTER FOR ASTROPHYSICS, HARVARD UNIV., CAMBRIDGE, MA 02138): METAL AND BI/PB MICRODISTRIBUTION STUDIES OF AN L3 CHONDRITE: THEIR IMPLICATIONS FOR A METEORITE PARENT BODY GEOCHIMICA ET COSMOCHIMICA ACTA VOL. 45, 1619-1632 (1981)

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Monday, March 15, 1982

EARLY EVOLUTION OF THE TERRESTRIAL PLANETS

8:30 a.m. Gilruth - 104

McCammon C. A. Ringwood A. E. Jackson I.
A model for core segregation within the earth

Jagoutz E. Wanke H.
Has the Earth's core grown over geologic times?

Jones J. H. Drake M. J.
An experimental geochemical approach to early planetary differentiation

Newson H. E. Drake M. J.
Partitioning of phosphorus between metal and silicate:
Implications for the moon and eucrite parent body

Chou C.-L. Shaw D. M. Crocket J. H.
Siderophile trace elements in the Earth's crust and upper mantle

Tera F.
Isotopic subtleties in galena's Pb -- implications to terrestrial magna sources and early crust

Herzberg C. T.
Mechanisms of heat and mass transfer in a differentiating Earth

Leeman W. P.
Lead and strontium isotope studies of basaltic lavas from North America: Implications for coupled mantle and crust evolution

Dymek R. F. Weed R. Gromet L. P.
Geochemistry of Archean metasedimentary rocks derived from older granitoid gneiss: An example from the Malene Supracrustals, SW Greenland

Boak J. L. Dymek R. F. Gromet L. P.
Early crustal evolution: Constraints from variable REE patterns in metasedimentary rocks from the 3800 Ma Isua supracrustal belt, West Greenland

Henry D. J. Boak J. L. Dymek R. F. Warner J. L.
Continental thickness and tectonic style in the early Archean

Ashwal L. D. Phinney W. C. Morrison D. A. Wooden J. L.
Underplating of Archean continents: Evidence from the Bad Vermillion Lake anorthosite complex, Ontario

Morrison D. A. Ashwal L. D. Henry D. J. Maczuga D. E.
Phinney W. C.
The Mulcahy Lake layered norite

Monday, March 15, 1982

SATELLITES AND RINGS OF OUTER PLANETS I

8:30 a.m. Gilruth Gym

LePoire D. J. Cooper B. H. Melcher C. L. Tombrello T. A.
Sputtering of solid SD_2 by high energy ions

Gradie J. Ostro S. J. Thomas P. Veverka J.
Sulfur on Io: Laboratory measurements of spectral properties

Veverka J. Gradie J. Thomas P. Ostro S. J.
How much S^8 (cyclooctasulfur) is there on the surface of Io?

Whitford-Stark J. L.
The mountains of Io

Matson D. L. Nash D. B.
Io's atmosphere: Comparison of models involving surface frost, cold trapping, and surface venting

McCord T. B. Clark R. N. Meloy A. Nelson M.
Johnson T.V. Matson D. Mosher J.A.
Spectral unit maps of Europa

Schonfeld E.
Organic chemistry on Europa?

Helfenstein P.
Tidal origin of Europa fractures: A refined analysis

Michel F. C.
Dense, but collisionless orbiting rings

Harris A. W. Ward W. R.
On the radial structure of planetary rings

Johnson R. E. Boring J. W. Lanzerotti L. J.
Brown W. L.
Decomposition of ice by incident charged particles: The icy satellites and rings

Watson C. C. Tombrello T. A.
Enhanced ion-erosion of planetary surfaces

Tuesday, March 16, 1982

CONDENSATION, EVAPORATION, AND CAI

8:30 a.m. Gilruth - 104

Fegley M. B.
Hibonite condensation in the solar nebula

MacPherson G. J. Kawabe I. Grossman L. King E. A.
A solar-furnace study of the formation of refractory residues
by evaporation

King E. A.
Refractory residues, condensates and chondrules from solar furnace
experiments

Beckett J. R. Grossman L.
Melting experiments on Allende coarse-grained inclusion
compositions

Stolper E. Pique J. Rossman G. R.
The influence of oxygen fugacity and cooling rate on the
crystallization of Ca-Al-rich inclusions from Allende

Muller W. F. Hornemann U. John R.-J. Kroll H.
Schafer H.
Experimental studies on spinel, melilite and anorthite and their
possible relevance to Ca-Al-rich inclusions from meteorites

Kornacki A. S.
Major and trace element fractionations in fine-grained CAIs:
Evidence for igneous differentiation during melting induced by
partial distillation

Hutcheon I. D. Steele I. M.
Refractory inclusions in the Adelaide carbonaceous chondrite

Martin P. M. Barber D. J. Hutcheon I. D.
The microstructures of minerals in coarse-grained Ca, Al-rich
inclusions from the Allende meteorite

Wark D. A. Wlotzka F.
The paradoxical metal compositions in Leo-1, a type B1
Ca-Al rich inclusion from Leoville

Meeker G. P. Armstrong J. T. Wasserburg G. J.
Evidence of a metamorphic origin for melilite in Allende CAI

Boynton W. V. Hill D. H.
Rare-earth and other trace elements in rim and interior portions of
a peculiar Allende chondrule

Tuesday, March 16, 1982

MAGMA OCEANS, BASALTS AND GLASSES

8:30 a.m. Gilruth Gym

Davies G. F.
Impact disruption of magma ocean crust

Rice A.
Solute banding: Manifestations in solidifying lunar magma
oceans

Herbert F.
On the evolution of the lunar density profile

Consolmagno G. J. Dyar M. D.
Unsampled mare basalts and the evolution of the moon

Binder A. B.
The mare basalt magma source region and mare basalt magma genesis

Unruh D. M. Stille P. Patchett P. J. Tatsumoto M.
Hafnium and neodymium isotopic constraints on mare basalt
genesis

Rutherford M. J. Carroll M. Borthwick A.
Experimental study of silicate-sulfide-Fe metal equilibria in
basalts

Rhodes J. M.
Homogeneity of lava flows: Trace element data for historic
Mauna Loa lavas

Blank H. Nobiling R. Traxel K. El Goresy A.
Quantitative proton microprobe trace element analysis of
coexisting opaque oxides in lunar rocks and their genetic
implications

Stone C. O. Taylor L. A.
Lunar glass beads: A comparison of SEM, FMR(1s), and
compositional features

Delano J. W. Lindsley D. H. Ma M.-S. Schmitt R. A.
Petrology and trace-element chemistry of the Apollo 15 yellow
impact glasses

Fang C.-Y. Yannon H. Uhlmann D. R.
The critical cooling rate for glass formation of lunar compositions

Klein L. C. Fasano B. V.
Viscous flow behavior of four iron-containing silicates with
alumina. Part 2. Effect of oxidation conditions

Tuesday, March 16, 1982

SATELLITES AND RINGS OF OUTER PLANETS II

8:30 a.m. Gilruth - 206

Zuber M. T.

A geometric analysis of the Ganymede furrow system: A test for lateral motion of dark terrain

Golombek M. P.

Limits on the expansion of Ganymede and the thickness of the lithosphere

Allison M. L.

Constraints on the nature and evolution of Ganymede's crust

Pang K. D. Lunne K. Bowell E. Ajello J. M.

Nature of the regolith on Callisto and Ganymede: Inference from Voyager photometry

McKinnon W. B.

Problems pertaining to the internal structures of Ganymede and Callisto

Passey Q. R. Shoemaker E. M.

Early thermal histories of Ganymede and Callisto

Huang P. Y. Solomon S. C.

Thermal history and lithospheric thermal stress for Ganymede and Callisto

Croft S. K.

Hydraulic fracture and flow: An alternate driving mechanism for volcanism on icy satellites

Stevenson D. J.

Migration of fluid-filled cracks: Applications to terrestrial and icy bodies

Squyres S. W. Reynolds R. T. Cassen P. M. Peale S. J.

The tectonics of Enceladus

Moore J. M. Ahern J. L.

Tectonic and geological history of Tethys

Bell J. F. Gaffey M. J. Brown R. H. Cruikshank D. P.

Howell R.

The dark side of Iapetus

Tuesday, March 16, 1982

ISOTOPIC ANOMALIES - EXTINCT RADIONUCLIDES

1:30 p.m. Gilruth - 104

Shimamura T. Lugmair G. W.

Ni isotopic compositions in terrestrial and meteoritic samples

Heymann D.

Barium from a mini R-process in supernovae

Clayton D. D.

Fossil ^{26}Mg : Status of a minority view

Huneke J. C. Armstrong J. T. Shaw H. F. Wasserburg G. J.
High resolution ion microprobe measurements of Mg in Allende plagioclase and standard glass

Chen J. H. Kaiser T. Wasserburg G. J.

Anomalous $^{107}\text{Ag}/^{109}\text{Ag}$ in the Cape York meteorite

Shukolyukov Yu. A. Minh D. V. Simonovsky V. I.

Fugzan M. M. Nazarov M. A. Korina M. I.
Isotopic composition of Xe and Kr in material of the white inclusions from the Efremovka carbonaceous chondrite (C3V)

Jost D. T. Marti K.

Pu-Nd-Xe dating: Progress towards a "solar system"
Pu/Nd ratio

Hudson B. Hohenberg C. M. Kennedy B. M.

Podosek F. A.
 ^{244}Pu in the early solar system

Coffee M. W. Hohenberg C. M. Hudson B. Swindle T. D.
I-Xe ages of individual Bjurbole chondrules

Murrell M. T. Burnett D. S.

Actinide chemistry in chondrites

Melcher C. L. Burnett D. S. Tombrello T. A.

Measurement of xenon diffusion following ion implantation into olivine

Coffee M. W. Hohenberg C. M. Hudson B.

Swindle T. D.
Shock disturbance of I-Xe systematics

Bogard O. D. Horz F. Johnson P. Schall R. Spangler R.

Effects of artificial shock on argon retention in an ordinary chondrite

Tuesday, March 16, 1982

LUNAR ANORTHOSITES, Mg-RICH SUITE AND KREEP

1:30 p.m. Gilruth - Gym

- Nord G. L. Wandless M.-V.
Comparative thermal and mechanical histories of clasts
in breccia 62236
- Kempa M. J. James O. B.
Apollo 16 anorthosites
- Haskin L. A. Salpas P. A. Lindstrom M. M.
Some compositional characteristics of lunar and terrestrial
anorthosites
- Ryder G.
Ferroan anorthosite 60025, adcumulate growth, and bulk moon
considerations
- McKay G. A.
Partitioning of REE between olivine, plagioclase, and
synthetic basaltic melts: Implications for the origin
of lunar anorthosites
- Morse S. A.
Adcumulus growth at the base of the lunar crust
- Shirley D. N.
A partially molten magma ocean model
- James O. B.
Subdivision of the Mg-suite plutonic rocks into Mg-norites
and Mg-Gabbro-norites
- Aeschlimann U. Eberhardt P. Geiss J. Grogler N.
Kurtz J. Harti K.
On the age of cumulate norite 78236: An 39Ar-40Ar study
- Mori H. Takeda H. Miyamoto N.
Comparison of orthopyroxenes in lunar norites and diogenites
- Hunter R. H. Taylor L. A.
The magma ocean as viewed from the Fra Mauro shoreline
- Warren P. H. Taylor G. J. Keil K. Kallemeyn G. W.
Graphic granite from the Moon
- Rosener P. S. Warren P. H. Esbensen K. H. Wilson J. R.
Distributions of trace elements in the extreme differentiates of the
Fongen-Hyllin

Tuesday, March 16, 1982

IN, OUT, AND ABOUT MARS

1:30 p.m. Gilruth - 206

- Schultz P. H. Lutz-Garihan A.
Forgotten satellites of Mars: A possible record from
oblique-angle impacts
- Duxbury T. C. Callahan J. D.
Phobos and Deimos cartography
- Janle P. Ropers J.
Gravity models of the Elysium dome on Mars
- Downs G. S. Mouginis-Mark P. J. Thompson T. W.
New radar-derived topography for the equatorial belt of Mars
- Mouginis-Mark P. J.
Lava flows as slope indicators in the Tharsis region of Mars
- Wadge G.
Distal lobes of lava flows as indicators of magma rheology
on Olympus Mons and Earth
- Frey H. Jarosewich M. McDonald R.
Small volcanoes in Cydonia: Variations in morphometric properties
- Maxwell T. A.
Orientations of structural features in the Lunae Palus -
Coprates region of Mars: Influence of pre-existing
structure
- Leach J. H. J.
The development of elongate structures within the Martian polar
ice caps
- Lucchitta B. K. Ferguson H. M.
Martian outflow channels: Low gradients and ponded flow
- Strickland E. L., III
Eolian stratigraphy of the west central equatorial region
of Mars
- El-Baz F.
Genesis of particulate material in terrestrial deserts and
applications to Mars

Wednesday, March 17, 1982

YOUNG ACHONDrites AND THE PROVENANCE OF METEORITES

8:30 a.m. Gilruth - 104

- McSween H. Y. Jr. Jarosewich E.
Petrogenesis of the Elephant Moraine A79001 achondrite
- Steele I. M. Smith J. V.
Mineralogy of Elephant Moraine EETA 79001 two-component achondrite
with resemblances to Shergotty
- Ma M.-S. Laul J. C. Smith M. R. Schmitt R. A.
Chemistry of the shergottites Elephant Moraine A79001
and Zagami
- Wooden J. Shih C.-Y. Nyquist L. Bansal B.
Wiesmann H. McKay G.
Rb-Sr and Sm-Nd isotopic constraints on the origin of
EETA 79001: A second Antarctic shergottite
- Dreibus G. Palme H. Rammensee W. Spettel B.
Weckwerth G. Wanke H.
Composition of Shergotty parent body: Further evidence for a
two component model of planet formation
- Singer A. V. Melosh H. J.
Possible asteroidal origin of SNC meteorites
- Ashwal L. D. Warner J. L. Wood C. A.
SNC meteorites: Evidence against an asteroidal origin
- Nyquist L. E.
Do oblique impacts produce Martian meteorites?
- Greenberg R. Chapman C. R.
Meteorites from the asteroid belt: Provenance and providence
- Wood C. A.
Fall statistics of H chondrites: Evidence of cometary origins
for ordinary chondrites
- Wood C. A. Mendell W. W.
Comets, asteroids, meteorites, and meteors: A new paradigm of
interrelations
- Helein E. F. Williams J. G.
1981 VA: A new Apollo asteroid

Wednesday, March 17, 1982

REGOLITH II: IRRADIATION EFFECTS

8:30 a.m. Gilruth - Gym

- Ip W.-H. Herbert F.
On solar wind interaction with asteroidal objects
- Borg J. Bibring J. P. Cowsik R. Langevin Y.
Maurette M.
A model for the accumulation of solar wind radiation damage
effects in lunar dust grains
- Frick U. Pepin R. O.
The solar wind record in lunar regolith mineral grains:
Noble gases and nitrogen
- Hodges R. R. Jr.
Adsorption of exospheric argon-40 in lunar regolith
- Bibring J.-P. Rocard F.
Solar wind implantation synthesis
- Ray J. Heymann D.
Long-term solar wind activity as inferred from lunar regolith
samples
- Wegmüller F. Krähenbühl U. von Gunten U. von Gunten H. R.
Evidence for volatilization resulting from solar heating of
the lunar surface
- Kirschbaum C.
Surface trapping of noble gases by unirradiated and irradiated
terrestrial anorthite
- Bernatowicz T. Honda M. Podosek F. Kramer F.
Adsorption and excess fission xenon II: Xe adsorption on a
vacuum crushed mineral
- Wieler R. Etique Ph. Signer P.
Trapped solar flare Ne in lunar soil plagioclases: Secular
decrease of the solar flare/solar wind flux ratio
- Venkatesan T. R. Nautiyal C. M. Padia J. T. Rao M. N.
SCR-proton produced xenon isotopes in lunar rocks

Wednesday, March 1982

ELECTRO MAGNETISM/CRATER CALCULATIONS AND SCALING

8:30 a.m. Gilruth - 206

- Sugiura N. Strangway D. W.
Magnetic properties of primitive non-carbonaceous chondrites
- Wasilewski P. J.
Magnetic characterization of tetrataenite and its role
in the magnetization of meteorites
- Nagata T.
High magnetic coercivity of meteorites containing the ordered
FeNi (tetrataenite) as the major ferromagnetic constituent
- Cisowski S. M. Collinson D. Stephenson A. Runcorn S. K.
A new look at lunar paleomagnetic data: Evidence for a well-
defined lunar "magnetic epoch" 3.65 - 3.85 Gy BP
- Runcorn S. K.
The interpretation of lunar paleomagnetic directions
- Anderson K. A.
Magnetic dipole moment estimates for an ancient lunar dynamo
- Herbert F. Smith L. D. Hood L. L. Sonett C. P.
Waves in the Earth's magnetosheath, the high frequency
electromagnetic response of the moon and the shallow
(150-250 km depth) lunar electrical conductivity profile
- Schultz P. H.
Atmospheric effects on impact cratering efficiency
- Holsapple K. A.
A comparison of scaling laws for planetary impact cratering:
Experiments, calculations, and theory
- Schmidt R. M.
Dynamic scaling relationships for impact crater formation
- Austin M. G.
Gravitational and other effects on impact cratering flow fields
deduced from computer simulation studies
- Orphal O. L. Borden W. F. Larson S. A. Schultz P. H.
Generation and transport of impact melt

Wednesday, March 17, 1982

PLINARY - NEW OPPORTUNITIES FOR EARTH AND PLANETARY

RESEARCH IN THE MID-1980's

1:30 p.m. Gilruth - 104

- Moore J.
Future direction of NASA programs
- Settle M. Taranik J. V.
Recent advances in geological remote sensing of the earth
- Elachi C.
Geologic investigations with the Shuttle Imaging Radar (SIR-A)
- Goetz A. F. H.
Reflectance radiometry of the earth: Preliminary results from
the shuttle multispectral infrared radiometer
- Salomonson V. V.
Landsat-D and earth exploration
- Caldwell J.
Space Telescope and planetary science
- Kinard W. H. Jones J. L. Jr.
Long duration exposure facility --Research opportunities
in the 1980's

Thursday, March 18, 1982

COSMIC DUST AND CARBONACEOUS CHONORITES

8:30 a.m. Gilruth - 104

Clanton U. S. Gooding J. L. McKay D. S.
 Mackinnon I. D. R. Isaacs A. M. Nace G. A. Gabel E. M.
 Warren J. L. Oardano C. B.
 Possible comet samples: The NASA cosmic dust program

Zinner E. Kuczera H. Pailer N.
 Simulation experiments for the chemical and isotopic
 measurements of interplanetary dust on LOEF

Brownlee D. E. Olszewski E. Wheelock M.
 A working taxonomy for micrometeorites

Fraundorf P. McKeegan K. O. Patel R. I. Sandford S. A.
 Swan P. Walker R. M.
 Multidisciplinary studies of individual stratospheric
 micrometeorites

Mackinnon I. O. R. Nance G. Isaacs A. M. McKay D. S.
 Electron microscopy of stratospheric particles

Bradley J. P. Brownlee D. E.
 Analytical SEM/TEM studies of individual grains of disaggregated
 CP interplanetary dust

Scott E. R. D. Taylor G. J. Keil K.
 Origins of ordinary and carbonaceous Type 3 chondrites and
 their components

Clayton R. N. Mayeda T. K.
 Oxygen isotopes in carbonaceous chondrites and in achondrites

Macdougall J. D. Lugmair G. W. Kerridge J. F.
 Time of aqueous activity on CI parent body

Muller W. F. Wlotzka F.
 Mineralogical study of the Leoville meteorite (CV3):
 Macroscopic texture and transmission electron microscopic
 observations

Housley R. M. Cirlin E. H.
 On the origin of Allende chondrules and mafic inclusions

Cirlin E. H. Housley R. M.
 On the distribution of Zn in Allende chondrules, inclusions,
 and matrix

Tomeoka K. Buseck P. R.
 An unusual Fe- and O-rich layered material in chondrules and
 aggregates of carbonaceous chondrites

Thursday, March 18, 1982

PLANETARY INTERIORS AND VENUS

8:30 a.m. Gilruth - Gym

Wood B. J. Holloway J. R.
 Theoretical prediction of phase relationships in planetary mantles

Longhi J.
 Modeling high pressure partial melting of the Martian mantle

Spetzler H. Mizutani M. Getting I. C.
 Crustal strength of the terrestrial planets

Turcotte D. L.
 Thermal stresses in planetary elastic lithospheres

Hood L. L. Herbert F. Sonett C. P.
 On inferring lunar internal temperatures from electrical
 conductivity determinations

Nakamura Y.
 Apollo lunar seismic experiment - Final summary

Goettel K. A.
 Is the intrinsic density of Venus greater than the intrinsic
 density of Earth?

Warner J. L.
 Venus: Model for exchange between crust and mantle

Head J. W. Wilson L.
 Volcanic processes on Venus

Garvin J. B. Head J. W. Wilson L.
 Magma vesiculation and pyroclastic volcanism on Venus

Spetzler H. Mizutani H.
 A case for a weak crust on Venus

Solomon S. C. Head J. W.
 Mechanisms for lithospheric heat transfer on Venus: Implications
 for tectonic style and volcanism

Thursday, March 18, 1982

CRATERING AND SHOCK

8:30 a.m. Gilruth - 206

- Matsu T., Waza T., Kani K., Suzuki S.
Phenomena associated with low-velocity (10 - 300 m/sec) impact against rock
- Davis D. R., Weldenschilling S. J.
Catastrophic disruption and momentum transfer in high-speed impacts
- Cintala M. J., Horz F., Thompson T. D.
The role of target size and geometry in impact events: An experimental study
- Mizutani H., Kawakami S., Takagi Y., Kato M., Kumazawa M.
Cratering experiments in sand
- Hartmann W. K.
Experimental impacts: Continued study of ejecta velocities from impacts into powdery regoliths
- Lange M. A., Ahrens T. J.
Shock induced dehydration of serpentine: First quantitative results and implication for a primary planetary atmosphere
- Mizutani H., Kawakami S., Takagi Y., Kato M., Kumazawa M.
Low velocity impact experiments on ice and basalt
- Allen C. C., Jercinovic M. J., See T. H., Keil K.
Effects of target water on shock lithification
- Lambert P.
Difference of shock pressure recorded in minerals of shocked rocks
- Ostertag R.
Annealing behaviour of diapelectic plagioclase glass
- Diemann E., Arndt J.
X-ray diffraction study of the structure of diapelectic anorthosite glass from Manicouagan impact crater, Canada
- Nagle J. S.
Petrographic evidence of processes in subcrater lithification

Thursday, March 18, 1982

DIFFERENTIATED METEORITES: ACHONDRITES AND IRONS

1:30 p.m. Gilruth - 104

- Takeda H., Mori H., Yanai K., Wooden J. L.
Three different basalt types in Antarctic polymict eucrites, a view from pyroxene chemical zoning trends
- Delaney J. S., Prinz M., O'Neill C., Harlow G. E., Nehru C. E.
New type of polymict eucrite from Elephant Moraine, Antarctica
- Smith M. R., Schmitt R. A.
Mafic rock clasts found in the Howardite, Kapoeta: A chemical study
- Bergman S. C., Warner J. L., Henry D. J., Ashwal L. O., Lee-Berman R.
Fluid inclusions in diogenite ALHA-77256
- Hewins R. H.
Origin of mesosiderites during asteroidal accretion
- Berkley J. L., Jones J. H.
Primary igneous carbon in ureilites: Petrologic and geochemical evidence
- Straif M. M.
Trace element and REE analyses from the Bishopville and Norton County enstatite achondrites
- Nehru C. E., Prinz M., Delaney J. S.
The Tucson iron and the aubrites
- Daode W., Malvin D. J., Wasson J. T.
Classification of ten Chinese, eleven Antarctic and ten other iron meteorites
- Prinz M., Nehru C. E., Delaney J. S.
Sombrerete: An iron with highly fractionated amphibole-bearing Na-P-rich silicate inclusions
- Kracher A., Wasson J. T.
The role of S in the evolution of iron meteorite parent melts
- Willis J., Goldstein J. I.
The effects of P, C, and S on trace element partitioning during solidification in the Fe-Ni system
- Kissin S. A., Schwarcz H. P.
Application of the sphalerite cosmobarometer to group IAB iron meteorites

Thursday, March 18, 1982

PLANETARY CRATERING

1:30 p.m. Gilruth Gym

- Croft S. K.
Impacts in ice and snow: Implications for crater scaling
on icy satellites
- Mims S. S. Nummedal D.
Crater frequencies on Ganymede and their implications
- Woronow A.
Theoretical crater-density asymmetries on Ganymede and Callisto
- Neukum G.
Ancient cratering records of the terrestrial-type planets
- Strom R. G. Woronow A.
Solar system cratering populations
- Pike R. J.
Morphologic transitions for craters and basins on 13
solar system bodies
- Clow G. D. Pike R. J.
Statistical test of the $\sqrt{2}$ spacing rule for basin rings
- Hale W. S. Grieve R. A. F.
Central peak and peak ring development: Constraints from
lunar peak volumes
- Grieve R. A. F. Head J. W.
Constraints on the original dimensions and form
of the Manicouagan impact structure
- Robertson P. B. Butler M. D.
New evidence for the impact origin of KilMichael Mississippi
- Fink J. H. Greeley R. Gault D. E.
The effect of viscosity on the volume and shape of experimental
impact craters
- Melosh H. J. Goetz P.
The rheology of acoustically fluidized debris: Experiments
and application to crater slumping
- Gaffney E. S.
A model for scale dependence of crater collapse with
acoustic fluidization

Thursday, March 18, 1982

C, H AND N ISOTOPES IN METEORITES

1:30 p.m. Gilruth - 206

- Feigelson E. D. Consolmagno G. J.
X-ray emission from young solar-type stars: Implications for
the early solar system
- Tamhane A. S. Rajan R. S.
Amino acid contents and irradiation histories of two
carbonaceous chondrites
- McNaughton N. J. Borthwick J. Fallick A. E. Pillinger C. T.
Deuterium enrichments in primitive meteorites
- Yang J. Epstein S.
The concentration and isotopic composition of hydrogen and
carbon in meteorites
- Kerridge J. F.
Isotopic composition of C, H and N in carbonaceous chondrite
polymer using stepwise combustion
- Grady M. M. Swart P. K. Pillinger C. T.
Carbon isotopic composition of some type 3 ordinary chondrites
- Swart P. K. Grady M. M. Pillinger C. T.
Step-wise carbon isotopic analyses of the Allende
meteorite
- Becker R. H. Pepin R. O.
Nitrogen and spallation-produced noble gases in the Pinon
iron meteorite
- Moniot R. K. Kruse T. H. Savin W. Tuniz C. Milazzo T.
Hall G. S. Pal D. Herzog G. F.
Beryllium-10 contents of stony meteorites and the Neon-21
production rate
- Spergel M. S. Reedy R. C. Lazareth O. W.
Levy P. W.
Cosmic-ray-produced cobalt-60 in chondrites
- Nautiyal C. M. Padia J. T. Rao M. N. Venkatesan T. R.
Goswami J. N.
Irradiation history of Antarctic gas-rich meteorites
- Goswami J. N.
Multiple fall of Antarctic meteorites: Results from
nuclear track studies
- Englert P. Osadnik G. Herpers U. Herr W.
Cosmogenic ^{53}Mn and ^{26}Al in meteorite finds
- Fireman E. L. Andrews H. R. Ball G. C. Brown R. M.
Milton J. C. D.
 ^{14}C terrestrial ages of Antarctic meteorites with counters and
with a Van der Graaf accelerator

Friday, March 19, 1982

ASTEROIDAL REGOLITHS AND CHONDRITES

8:30 a.m. Gilruth - 104

- Taylor G. J. Scott E. R. D. Rubin A. E. Maggiore P.
Keil K.
Structure and fragmentation of the parent asteroids of ordinary chondrites
- Lipschutz M. E. Biswas S. McSween H. Y. Jr.
Chemical-petrologic characteristics and origin of gas-rich H-chondrites
- Housen K. R. Wilkening L. L.
The irradiation histories of asteroidal regoliths: A Monte Carlo simulation
- Jensen J. H. Haff P. K.
Effect of impact gardening on the depth distribution of regolith materials
- Wacker J. F. Wilkening L. L.
The size distribution of clasts in the ABEE E-chondrite and other meteorite breccias
- Sheng Z. Sallee W. Sears D. W. G.
Trace element data on enstatite chondrite components and the Qingzhen enstatite chondrite
- Rubin A. E. Scott E. R. D. Keil K. Okada A.
Microchondrules: Their occurrence in new kinds of Type 3 chondrites and their bearing on the origin of chondrules
- Fredriksson K.
Chondrule compositions in different type chondrites
- Rambaldi E. R.
New evidence of relict grains in chondrules of highly unequilibrated ordinary chondrites
- Grossman J. N.
The abundance and distribution of moderately volatile elements in Semarkona chondrules
- Gooding J. L. Mayeda T. K. Clayton R. N. Keil K.
Fukuoka T. Schmitt R. A.
Oxygen isotopic compositions of chondrules in unequilibrated chondrites: Further petrological interpretations
- Sparks M. H. Sears D. W.
Mechanism for metamorphism-induced TL changes in UOC: Evidence from separated Dhajala chondrules
- Duba A. Boland T. Akella J.
Precipitate distribution in reduced olivine

Friday, March 19, 1982

ORIGIN OF SOLAR SYSTEM

8:30 a.m. Gilruth Gym

- Wetherill G. W. Cox L. P.
Gravitational cross sections and "runaway accretion"
- Kochemasov G. G.
Sorting of dust particles in the protoplanet cloud as the cause of forming primary zoned cosmic bodies of various compositions in the solar system
- Torbett M. Smoluchowski R. Greenberg R.
Planetary formation sites
- Stevenson D. J.
Structure of the giant planets: Evidence for nucleated instabilities and post-formational accretions
- Cameron A. G. W. Fegley M. B.
Condensation events near the total evaporation front within the primitive solar nebula
- Weidenschilling S. J.
Coagulation and settling of dust in giant gaseous protoplanets
- Magni G.
Dynamical evolution of a protosatellitary disk
- Mendis D. A. Hill J. R. Houpis H. L. F.
Charged dust in the Saturnian magnetosphere
- Zook H. A. Su S.-Y.
Dust particles in the Jovian system
- Smoluchowski R.
Heat transport in H₂O-ice cometary nuclei
- Buck W. R.
Lunar breakup and capture close to the earth

Friday, March 19, 1982

LUNAR GEOLOGY: IMPACT LANDFORMS AND REMOTE SENSING
8:30 a.m. Gilruth - 206

- Neukum G. Wilhelms D. E.
Ancient lunar impact record
- Spudis P. D.
Orientale Basin ejecta: Depths of derivation and implications for the basin-forming process
- McGill G. E. Golombek M. P.
Kinematics of basin subsidence, grabens, and lunar expansion
- Sharpton V. L. Head J. W.
Mare ridge morphology at structural and stratigraphic boundaries: Implications for determining age sequence
- Eppler D. T. Ehlich R. Nummedal O. Schultz P. H.
Sources of shape variation in lunar impact craters -- Fourier shape analysis
- Pieters C. M. Adams J. B. Head J. W. McCord T. B.
Zisk S. H.
Primary ejecta in crater rays: The Copernicus example
- Lucey P. G. Hawke B. R. McCord T. B. Pieters C. Head J. W.
Visible and near infrared spectral studies of the Aristarchus region of the Moon
- Hawke B. R. Spudis P. D. Clark P. E.
The origin of selected geochemical anomalies on the lunar surface
- Clark P. E. Hawke B. R.
Relationship between geology and geochemistry in the Undarum/Spumans region
- Andre C. G. Strain P. L. Dove W. J.
Additional evidence of lunar terra volcanism
- Dyar M. D. Consolmagno G. J.
Ferric iron in lunar glasses and the interpretation of lunar spectra

March 15-19, 1982
POSTER SESSION
Registration Area

- Blanford G. E.
Solar wind irradiation effects on ilmenite
- Campbell O. B. Harmon J. K. Hine A. A. Head J. W.
Venus radar images
- Christensen P. R.
Kasei Vallia revisited
- Clark P. E.
A new look at magnesium variations on the moon
- Davis P. A. Soderblom L. A. Eliason E. M.
Rapid extraction of relative topography from Viking Orbiter imagery
- Duxbury T. C. Callahan J. D.
Phobos and Deimos cartography
- Takeda H.
Antarctic ureilites, and some hypotheses for their origin and evolution
- Lange M. A. Ahrens T. J.
Impact fragmentation of ice-silicate bodies
- Lange M. A. Ahrens T. J.
Impact cratering in ice- and ice-silicate targets: An experimental assessment
- Nuth J. A. Donn B.
Laboratory studies of the condensation and properties of amorphous silicate smokes
- Hyman M. Rowe M. W.
Magnetite in carbonaceous chondrites
- Lindsley D. H.
A two-pyroxene thermometer
- Andersen D. J. Lindsley D. H.
Application of a two-pyroxene thermometer
- Drean R. J.
Saturn and Titan probes in the 1990s
- Weiblen P. W. Miller J. D. Jr.
The effect of country rocks and tectonics on variations of plagioclase-mafic mineral compositions in layered intrusions
- Longhi J.
Mineral composition trends and cumulate processes

Author Index

- Aeschlimann U.
 Ahrens T. J.
 Allen C. C.
 Allison M. L.
 Anderson K. A.
 Andre C. G.
 Ashwal L. O.
 Ashwal L. D.
 Austin M. G.
 Becker R. H.
 Beckett J. R.
 Bell J. F.
 Bergman S. C.
 Berkley J. L.
 Bernatowicz T.
 Bibring J.-P.
 Binder A. B.
 Blair E.
 Blank H.
 Boak J. L.
 Bogard D. D.
 Booth M. C.
 Borchardt R.
 Borg J.
 Boynton W. V.
 Bradley J. P.
 Brownlee D. E.
 Brownlee D. E.
 Buck W. R.
 Caffee M. W.
 Caffee M. W.
 Caldwell J.
 Cameron A. G. W.
 Chen J. H.
 Chou C.-L.
 Christensen P. R.
 Cintala M. J.
 Cirlin E. H.
 Cisowski S. M.
 Clanton U. S.
 Clark P. E.
 Clayton O. O.
 Clayton R. N.
 Clow G. O.
 Conca J.
 Consolmagno G. J.
 Croft S. K.
 Croft S. K.
 Daode W.
 Davies G. F.
 Davis D. R.
 DePaolo D. J.
 Delaney J. S.
 Delano J. W.
 Devine J. M.
 Diemann E.
 Dollfus A.
 Downs G. S.
 Dreibus G.
 Duba A.
 Duxbury T. C.
 Dyer M. O.
 Dynek R. F.
 El-Baz F.
 Elachi C.
 Englert P.
 Eppler D. T.
 Epstein S.
 Fang C.-Y.
 Fegley M. B.
 Feigelson E. D.
 Fink J. H.
 Fireman E. L.
 Fraundorf P.
 Fredriksson K.
 Frey H.
 Frick U.
 Fruchter J. S.
- LUNAR ANORTHOSITES, MG-RICH SUITE AND KREEP TUES. P.M. GILRUTH GYM
 TERRESTRIAL IMPACTS AND C-T EXTINCTIONS MON. P.M. G104
 CRATERING AND SHOCK THURS. A.M. G206
 SATELLITES AND RINGS OF OUTER PLANETS II TUES. A.M. G206
 ELECTRO MAGNETISM/CRATER CALCULATIONS AND SCALING WED. A.M. G206
 LUNAR GEOLGY: IMPACT LANDFORMS AND REMOTE SENSING FRI. A.M. G206
 YOUNG ACHONDRITES AND THE PROVENANCE OF METEORITES WED. A.M. G104
 EARLY EVOLUTION OF THE TERRESTRIAL PLANETS MON. A.M. G104
 ELECTRO MAGNETISM/CRATER CALCULATIONS AND SCALING WED. A.M. G206
 C,H AND N ISOTOPES IN METEORITES THURS. P.M. G206
 CONDENSATION, EVAPORATION AND CAI WED. A.M. G104
 SATELLITES AND RINGS OF OUTER PLANETS II TUES. A.M. G206
 DIFFERENTIATED METEORITES THURS. P.M. G104
 DIFFERENTIATED METEORITES THURS. P.M. G104
 REGOLITH II: IRRADIATION EFFECTS WED. A.M. GILRUTH GYM
 REGOLITH II: IRRADIATION EFFECTS WED. A.M. GILRUTH GYM
 MAGMA OCEANS, BASALTS AND GLASSES TUES. A.M. GILRUTH GYM
 APOLLO 16 MON. P.M. GILRUTH GYM
 MAGMA OCEANS, BASALTS AND GLASSES TUES. A.M. GILRUTH GYM
 EARLY EVOLUTION OF THE TERRESTRIAL PLANETS MON. A.M. G104
 ISOTOPIC ANOMALIES -EXTINCT RAOIONUCLIOES TUES. P.M. G104
 MARS DIRT MON. P.M. G206
 APOLLO 16 MON. P.M. GILRUTH GYM
 REGOLITH II: IRRADIATION EFFECTS WED. A.M. GILRUTH GYM
 CONDENSATION, EVAPORATION AND CAI WED. A.M. G104
 COSMIC DUST AND CARBONACEOUS CHONDRITES THURS. A.M. G104
 COSMIC DUST AND CARBONACEOUS CHONDRITES THURS. A.M. G104
 TERRESTRIAL IMPACTS AND C-T EXTINCTIONS MON. P.M. G104
 ORIGIN OF SOLAR SYSTEM FRI. A.M. GILRUTH GYM
 ISOTOPIC ANOMALIES -EXTINCT RAOIONUCLIDES TUES. P.M. G104
 ISOTOPIC ANOMALIES -EXTINCT RAOIONUCLIDES TUES. P.M. G104
 RESEARCH IN THE MID 1980'S WED. P.M. G104
 ORIGIN OF SOLAR SYSTEM FRI. A.M. GILRUTH GYM
 ISOTOPIC ANOMALIES -EXTINCT RAOIONUCLIDES TUES. P.M. G104
 EARLY EVOLUTION OF THE TERRESTRIAL PLANETS MON. A.M. G104
 MARS DIRT MON. P.M. G206
 CRATERING AND SHOCK THURS. A.M. G206
 COSMIC DUST AND CARBONACEOUS CHONDRITES THURS. A.M. G104
 ELECTRO MAGNETISM/CRATER CALCULATIONS AND SCALING WED. A.M. G206
 COSMIC DUST AND CARBONACEOUS CHONDRITES THURS. A.M. G104
 LUNAR GEOLGY: IMPACT LANDFORMS AND REMOTE SENSING FRI. A.M. G206
 ISOTOPIC ANOMALIES -EXTINCT RADIONUCLIOES TUES. P.M. G104
 COSMIC DUST AND CARBONACEOUS CHONDRITES THURS. A.M. G104
 PLANETARY CRATERING THURS. P.M. GILRUTH GYM
 MARS DIRT MON. P.M. G206
 MAGMA OCEANS, BASALTS AND GLASSES TUES. A.M. GILRUTH GYM
 PLANETARY CRATERING THURS. P.M. GILRUTH GYM
 SATELLITES AND RINGS OF OUTER PLANETS II TUES. A.M. G206
 DIFFERENTIATED METEORITES THURS. P.M. G104
 MAGMA OCEANS, BASALTS AND GLASSES TUES. A.M. GILRUTH GYM
 CRATERING AND SHOCK THURS. A.M. G206
 TERRESTRIAL IMPACTS AND C-T EXTINCTIONS MON. P.M. G104
 DIFFERENTIATED METEORITES THURS. P.M. G104
 MAGMA OCEANS, BASALTS AND GLASSES TUES. A.M. GILRUTH GYM
 REGOLITH I: LUNAR SOILS AND CORE MON. A.M. G206
 CRATERING AND SHOCK THURS. A.M. G206
 MARS DIRT MON. P.M. G206
 IN, OUT, AND ABOUT MARS TUES. P.M. G206
 YOUNG ACHONDRITES AND THE PROVENANCE OF METEORITES WED. A.M. G104
 ASTEROIDAL REGOLITHS AND CHONDRITES FRI. A.M. G104
 IN, OUT, AND ABOUT MARS TUES. P.M. G206
 LUNAR GEOLGY: IMPACT LANDFORMS AND REMOTE SENSING FRI. A.M. G206
 EARLY EVOLUTION OF THE TERRESTRIAL PLANETS MON. A.M. G104
 IN, OUT, AND ABOUT MARS TUES. P.M. G206
 RESEARCH IN THE MID 1980'S WED. P.M. G104
 C,H AND N ISOTOPES IN METEORITES THURS. P.M. G206
 LUNAR GEOLGY: IMPACT LANDFORMS AND REMOTE SENSING FRI. A.M. G206
 TERRESTRIAL IMPACTS AND C-T EXTINCTIONS MON. P.M. G104
 MAGMA OCEANS, BASALTS AND GLASSES TUES. A.M. GILRUTH GYM
 CONDENSATION, EVAPORATION AND CAI WED. A.M. G104
 C,H AND N ISOTOPES IN METEORITES THURS. P.M. G206
 PLANETARY CRATERING THURS. P.M. GILRUTH GYM
 C,H AND N ISOTOPES IN METEORITES THURS. P.M. G206
 COSMIC DUST AND CARBONACEOUS CHONDRITES THURS. A.M. G104
 ASTEROIDAL REGOLITHS AND CHONDRITES FRI. A.M. G104
 IN, OUT, AND ABOUT MARS TUES. P.M. G206
 REGOLITH II: IRRADIATION EFFECTS WED. A.M. GILRUTH GYM
 REGOLITH I: LUNAR SOILS AND CORE MON. A.M. G206

Gaffney E. S.
 Garvin J. B.
 Gibson E. K. Jr.
 Glass B. P.
 Goettel K. A.
 Goetz A. F. H.
 Golombek M. P.
 Gooding J. L.
 Goswami J. N.
 Gradie J.
 Grady M. M.
 Greenberg R.
 Grieve R. A. F.
 Grossman J. N.
 Hale W. S.
 Harris A. W.
 Hartmann W. K.
 Haskin L. A.
 Hawke B. R.
 Head J. W.
 Helfenstein P.
 Helin E. F.
 Henry D. J.
 Herbert F.
 Herbert F.
 Herzberg C. T.
 Hewins R. H.
 Heymann D.
 Hodges R. R. Jr.
 Holsapple K. A.
 Hood L. L.
 Houck K. J.
 Houck K. J.
 Housen K. R.
 Housley R. M.
 Huang P. Y.
 Hudson B.
 Hunke J. C.
 Hunter R. H.
 Hutcheon I. D.
 Ip W.-H.
 Jagoutz E.
 James O. B.
 Janie P.
 Jensen J. H.
 Johnson R. E.
 Jones E. M.
 Jones J. H.
 Jost D. T.
 Kempe M. J.
 Kerridge J. F.
 Kinard W. H.
 King E. A.
 Kirschbaum C.
 Kissin S. A.
 Klein L. C.
 Kochemasov G. G.
 Kornacki A. S.
 Korotev R. L.
 Kracher A.
 Kyte F. T.
 Lambert P.
 Lange M. A.
 Laul J. C.
 LePotre O. J.
 Leach J. H. J.
 Leeman W. P.
 Lindstrom M. M.
 Lipschutz M. E.
 Longhi J.
 Lucchitta B. K.
 Lucey P. G.
 Ma M.-S.
 MacPherson G. J.
 Macdougall J. D.
 Mackinnon I. D. R.
 Magni G.
 Martin P. M.

PLANETARY CRATERING THURS. P.M. GILRUTH GYM
 PLANETARY INTERIORS AND VENUS THURS. A.M. GILRUTH GYM
 MARS DIRT MON. P.M. G206
 TERRESTRIAL IMPACTS AND C-T EXTINCTIONS MON. P.M. G104
 PLANETARY INTERIORS AND VENUS THURS. A.M. GILRUTH GYM
 RESEARCH IN THE MID 1980'S WED. P.M. G104
 SATELLITES AND RINGS OF OUTER PLANETS II TUES. A.M. G206
 ASTEROIDAL REGOLITHS AND CHONDRITES FRI. A.M. G104
 C,H AND N ISOTOPES IN METEORITES THURS. P.M. G206
 SATELLITES AND RINGS OF OUTER PLANETS I MON. A.M. GILRUTH GYM
 C,H AND N ISOTOPES IN METEORITES THURS. P.M. G206
 YOUNG ACHONORITES AND THE PROVENANCE OF METEORITES WED. A.M. G104
 PLANETARY CRATERING THURS. P.M. GILRUTH GYM
 ASTEROIDAL REGOLITHS AND CHONDRITES FRI. A.M. G104
 PLANETARY CRATERING THURS. P.M. GILRUTH GYM
 SATELLITES AND RINGS OF OUTER PLANETS I MON. A.M. GILRUTH GYM
 CRATERING AND SHOCK THURS. A.M. G206
 LUNAR ANORTHOSITES, MG-RICH SUITE AND KREEP TUES. P.M. GILRUTH GYM
 LUNAR GEOLGY: IMPACT LANDFORMS AND REMOTE SENSING FRI. A.M. G206
 PLANETARY INTERIORS AND VENUS THURS. A.M. GILRUTH GYM
 SATELLITES AND RINGS OF OUTER PLANETS I MON. A.M. GILRUTH GYM
 YOUNG ACHONORITES AND THE PROVENANCE OF METEORITES WED. A.M. G104
 EARLY EVOLUTION OF THE TERRESTRIAL PLANETS MON. A.M. G104
 ELECTRO MAGNETISM/CRATER CALCULATIONS AND SCALING WED. A.M. G206
 MAGMA OCEANS, BASALTS AND GLASSES TUES. A.M. GILRUTH GYM
 EARLY EVOLUTION OF THE TERRESTRIAL PLANETS MON. A.M. G104
 DIFFERENTIATED METEORITES THURS. P.M. G104
 ISOTOPIC ANOMALIES -EXTINCT RADIONUCLIDES TUES. P.M. G104
 REGOLITH II: IRRADIATION EFFECTS WED. A.M. GILRUTH GYM
 ELECTRO MAGNETISM/CRATER CALCULATIONS AND SCALING WED. A.M. G206
 PLANETARY INTERIORS AND VENUS THURS. A.M. GILRUTH GYM
 REGOLITH I: LUNAR SOILS AND CORE MON. A.M. G206
 REGOLITH I: LUNAR SOILS AND CORE MON. A.M. G206
 ASTEROIDAL REGOLITHS AND CHONDRITES FRI. A.M. G104
 COSMIC DUST AND CARBONACEOUS CHONDRITES THURS. A.M. G104
 SATELLITES AND RINGS OF OUTER PLANETS II TUES. A.M. G206
 ISOTOPIC ANOMALIES -EXTINCT RADIONUCLIDES TUES. P.M. G104
 ISOTOPIC ANOMALIES -EXTINCT RADIONUCLIDES TUES. P.M. G104
 LUNAR ANORTHOSITES, MG-RICH SUITE AND KREEP TUES. P.M. GILRUTH GYM
 CONDENSATION, EVAPORATION AND CAI WED. A.M. G104
 REGOLITH II: IRRADIATION EFFECTS WED. A.M. GILRUTH GYM
 EARLY EVOLUTION OF THE TERRESTRIAL PLANETS MON. A.M. G104
 LUNAR ANORTHOSITES, MG-RICH SUITE AND KREEP TUES. P.M. GILRUTH GYM
 IN, OUT, AND ABOUT MARS TUES. P.M. G206
 ASTEROIDAL REGOLITHS AND CHONDRITES FRI. A.M. G104
 SATELLITES AND RINGS OF OUTER PLANETS I MON. A.M. GILRUTH GYM
 TERRESTRIAL IMPACTS AND C-T EXTINCTIONS MON. P.M. G104
 ISOTOPIC ANOMALIES -EXTINCT RADIONUCLIDES TUES. P.M. G104
 LUNAR ANORTHOSITES, MG-RICH SUITE AND KREEP TUES. P.M. GILRUTH GYM
 C,H AND N ISOTOPES IN METEORITES THURS. P.M. G206
 RESEARCH IN THE MID 1980'S WED. P.M. G104
 CONDENSATION, EVAPORATION AND CAI WED. A.M. G104
 REGOLITH II: IRRADIATION EFFECTS WED. A.M. GILRUTH GYM
 DIFFERENTIATED METEORITES THURS. P.M. G104
 MAGMA OCEANS, BASALTS AND GLASSES TUES. A.M. GILRUTH GYM
 ORIGIN OF SOLAR SYSTEM FRI. A.M. GILRUTH GYM
 CONDENSATION, EVAPORATION AND CAI WED. A.M. G104
 REGOLITH I: LUNAR SOILS AND CORE MON. A.M. G206
 SATELLITES AND RINGS OF OUTER PLANETS I MON. A.M. GILRUTH GYM
 IN, OUT, AND ABOUT MARS TUES. P.M. G206
 EARLY EVOLUTION OF THE TERRESTRIAL PLANETS MON. A.M. G104
 APOLLO 16 MON. P.M. GILRUTH GYM
 ASTEROIDAL REGOLITHS AND CHONDRITES FRI. A.M. G104
 PLANETARY INTERIORS AND VENUS THURS. A.M. GILRUTH GYM
 IN, OUT, AND ABOUT MARS TUES. P.M. G206
 LUNAR GEOLGY: IMPACT LANDFORMS AND REMOTE SENSING FRI. A.M. G206
 YOUNG ACHONORITES AND THE PROVENANCE OF METEORITES WED. A.M. G104
 CONDENSATION, EVAPORATION AND CAI WED. A.M. G104
 COSMIC DUST AND CARBONACEOUS CHONDRITES THURS. A.M. G104
 COSMIC DUST AND CARBONACEOUS CHONDRITES THURS. A.M. G104
 ORIGIN OF SOLAR SYSTEM FRI. A.M. GILRUTH GYM
 CONDENSATION, EVAPORATION AND CAI WED. A.M. G104

Marvin U. B.
 Matsen D. L.
 Matsui T.
 Maxwell T. A.
 McCammon C. A.
 McCord T. B.
 McGill G. E.
 McKay D. S.
 McKay D. S.
 McKay G. A.
 McKinley J. P.
 McInnon W. B.
 McNaughton N. J.
 McSween H. Y. Jr.
 Meeker G. P.
 Melcher C. L.
 Melosh H. J.
 Mendell W. W.
 Mendis D. A.
 Michel F. C.
 Mims S. S.
 Miyamoto M.
 Mizutani H.
 Mizutani H.
 Mizutani H.
 Moniot R. K.
 Moore J. M.
 Mori H.
 Morris R. V.
 Morris R. V.
 Morrison D. A.
 Morse S. A.
 Mouginis-Mark P. J.
 Muller W. F.
 Muller W. F.
 Murrell M. T.
 Nagata T.
 Nagle J. S.
 Nagle J. S.
 Nakamura Y.
 Nautiyal C. M.
 Nehru C. E.
 Neukum G.
 Neukum G.
 Newsom H. E.
 Nishizumi K.
 Nishizumi K.
 Nord G. L.
 Nyquist L. E.
 O'Keefe J. D.
 Orphal O. L.
 Ostertag R.
 Palme H.
 Pang K. D.
 Papastassiou D. A.
 Passey Q. R.
 Pieters C. M.
 Pieters C. M.
 Pike R. J.
 Prinz M.
 Rambaldi E. R.
 Ray J.
 Reimold W. U.
 Reimold W. U.
 Rhodes J. M.
 Rice A.
 Robertson P. B.
 Rosener P. S.
 Roush T. L.
 Rubin A. E.
 Runcorn S. K.
 Rutherford M. J.

APOLLO 16 MON. P.M. GILRUTH GYM
 SATELLITES AND RINGS OF OUTER PLANETS I MON. A.M. GILRUTH GYM
 CRATERING AND SHOCK THURS. A.M. G206
 IN, OUT, AND ABOUT MARS TUES. P.M. G206
 EARLY EVOLUTION OF THE TERRESTRIAL PLANETS MON. A.M. G104
 SATELLITES AND RINGS OF OUTER PLANETS I MON. A.M. GILRUTH GYM
 LUNAR GEOLGY: IMPACT LANDFORMS AND REMOTE SENSING FRI. A.M. G206
 REGOLITH I: LUNAR SOILS AND CORE MON. A.M. G206
 REGOLITH I: LUNAR SOILS AND CORE MON. A.M. G206
 LUNAR ANORTHOSITES, MG-RICH SUITE AND KREEP TUES. P.M. GILRUTH GYM
 APOLLO 16 MON. P.M. GILRUTH GYM
 SATELLITES AND RINGS OF OUTER PLANETS II TUES. A.M. G206
 C,H AND N ISOTOPES IN METEORITES THURS. P.M. G206
 YOUNG ACHONDRITES AND THE PROVENANCE OF METEORITES WED. A.M. G104
 CONDENSATION, EVAPORATION AND CAI WED. A.M. G104
 ISOTOPIC ANOMALIES -EXTINCT RADIONUCLIDES TUES. P.M. G104
 PLANETARY CRATERING THURS. P.M. GILRUTH GYM
 MARS DIRT MON. P.M. G206
 ORIGIN OF SOLAR SYSTEM FRI. A.M. GILRUTH GYM
 SATELLITES AND RINGS OF OUTER PLANETS I MON. A.M. GILRUTH GYM
 PLANETARY CRATERING THURS. P.M. GILRUTH GYM
 MARS DIRT MON. P.M. G206
 CRATERING AND SHOCK THURS. A.M. G206
 PLANETARY INTERIORS AND VENUS THURS. A.M. GILRUTH GYM
 CRATERING AND SHOCK THURS. A.M. G206
 C,H AND N ISOTOPES IN METEORITES THURS. P.M. G206
 SATELLITES AND RINGS OF OUTER PLANETS II TUES. A.M. G206
 LUNAR ANORTHOSITES, MG-RICH SUITE AND KREEP TUES. P.M. GILRUTH GYM
 REGOLITH I: LUNAR SOILS AND CORE MON. A.M. G206
 MARS DIRT MON. P.M. G206
 EARLY EVOLUTION OF THE TERRESTRIAL PLANETS MON. A.M. G104
 LUNAR ANORTHOSITES, MG-RICH SUITE AND KREEP TUES. P.M. GILRUTH GYM
 IN, OUT, AND ABOUT MARS TUES. P.M. G206
 COSMIC DUST AND CARBONACEOUS CHONORITES THURS. A.M. G104
 CONDENSATION, EVAPORATION AND CAI WED. A.M. G104
 ISOTOPIC ANOMALIES -EXTINCT RADIONUCLIOES TUES. P.M. G104
 ELECTRO MAGNETISM/CRATER CALCULATIONS AND SCALING WED. A.M. G206
 REGOLITH I: LUNAR SOILS AND CORE MON. A.M. G206
 CRATERING AND SHOCK THURS. A.M. G206
 PLANETARY INTERIORS AND VENUS THURS. A.M. GILRUTH GYM
 C,H AND N ISOTOPES IN METEORITES THURS. P.M. G206
 DIFFERENTIATED METEORITES THURS. P.M. G104
 LUNAR GEOLGY: IMPACT LANDFORMS AND REMOTE SENSING FRI. A.M. G206
 PLANETARY CRATERING THURS. P.M. GILRUTH GYM
 EARLY EVOLUTION OF THE TERRESTRIAL PLANETS MON. A.M. G104
 TERRESTRIAL IMPACTS AND C-T EXTINCTIONS MON. P.M. G104
 REGOLITH I: LUNAR SOILS AND CORE MON. A.M. G206
 LUNAR ANORTHOSITES, MG-RICH SUITE AND KREEP TUES. P.M. GILRUTH GYM
 YOUNG ACHONDRITES AND THE PROVENANCE OF METEORITES WEO. A.M. G104
 TERRESTRIAL IMPACTS AND C-T EXTINCTIONS MON. P.M. G104
 ELECTRO MAGNETISM/CRATER CALCULATIONS AND SCALING WEO. A.M. G206
 CRATERING AND SHOCK THURS. A.M. G206
 APOLLO 16 MON. P.M. GILRUTH GYM
 SATELLITES AND RINGS OF OUTER PLANETS II TUES. A.M. G206
 TERRESTRIAL IMPACTS AND C-T EXTINCTIONS MON. P.M. G104
 SATELLITES AND RINGS OF OUTER PLANETS II TUES. A.M. G206
 LUNAR GEOLGY: IMPACT LANDFORMS AND REMOTE SENSING FRI. A.M. G206
 MARS DIRT MON. P.M. G206
 PLANETARY CRATERING THURS. P.M. GILRUTH GYM
 DIFFERENTIATED METEORITES THURS. P.M. G104
 ASTEROIDAL REGOLITHS AND CHONDRITES FRI. A.M. G104
 REGOLITH II: IRRADIATION EFFECTS WED. A.M. GILRUTH GYM
 APOLLO 16 MON. P.M. GILRUTH GYM
 APOLLO 16 MON. P.M. GILRUTH GYM
 MAGMA OCEANS, BASALTS AND GLASSES TUES. A.M. GILRUTH GYM
 MAGMA OCEANS, BASALTS AND GLASSES TUES. A.M. GILRUTH GYM
 PLANETARY CRATERING THURS. P.M. GILRUTH GYM
 MARS DIRT MON. P.M. G206
 ASTEROIDAL REGOLITHS AND CHONDRITES FRI. A.M. G104
 ELECTRO MAGNETISM/CRATER CALCULATIONS AND SCALING WED. A.M. G206
 MAGMA OCEANS, BASALTS AND GLASSES TUES. A.M. GILRUTH GYM

Ryder G.
 Ryder G.
 Salomonson V. Y.
 Salpas P. A.
 Salpas P. A.
 Schmidt R. M.
 Schonfeld E.
 Schonfeld E.
 Schultz P. H.
 Schultz P. H.
 Schultz P. H.
 Scott E. R. D.
 Settle M.
 Sharpton V. L.
 Shaw H. F.
 Sheng Z.
 Shimamura T.
 Shirley D. N.
 Shukolyukov Yu. A.
 Simon S. B.
 Singer A. V.
 Smith M. R.
 Smoluchowski R.
 Solomon S. C.
 Sparks M. H.
 Spergel M. S.
 Spetzler H.
 Spudis P. D.
 Squyres S. W.
 Steele I. M.
 Stevenson D. J.
 Stevenson D. J.
 Stolper E.
 Stone C. D.
 Strait M. M.
 Strickland E. L., III
 Strom R. G.
 Sugiura N.
 Swart P. K.
 Takeda H.
 Tamhane A. S.
 Taylor G. J.
 Tera F.
 Tomeoka K.
 Torbett M.
 Turcotte O. L.
 Unruh D. M.
 Venkatesan T. R.
 Veverka J.
 Wacker J. F.
 Wade G.
 Wark D. A.
 Warner J. L.
 Warren P. H.
 Wasilewski P. J.
 Watson C. C.
 Wegmuller F.
 Weidenschilling S. J.
 Wentworth S. J.
 Wetherill G. W.
 Whitford-Stark J. L.
 Wieler R.
 Willis J.
 Wood B. J.
 Wood C. A.
 Wood C. A.
 Wooden J.
 Woronow A.
 Yang J.
 Zimbelman J. R.
 Zinner E.
 Zook H. A.
 Zuber M. T.

APOLLO 16 MON. P.M. GILRUTH GYM
 LUNAR ANORTHOSITES, MG-RICH SUITE AND KREEP TUES. P.M. GILRUTH GYM
 RESEARCH IN THE MID 1980'S WED. P.M. G104
 LUNAR ANORTHOSITES, MG-RICH SUITE AND KREEP TUES. P.M. GILRUTH GYM
 LUNAR ANORTHOSITES, MG-RICH SUITE AND KREEP TUES. P.M. GILRUTH GYM
 ELECTRO MAGNETISM/CRATER CALCULATIONS AND SCALING WED. A.M. G206
 APOLLO 16 MON. P.M. GILRUTH GYM
 SATELLITES AND RINGS OF OUTER PLANETS I MON. A.M. GILRUTH GYM
 ELECTRO MAGNETISM/CRATER CALCULATIONS AND SCALING WED. A.M. G206
 IN, OUT, AND ABOUT MARS TUES. P.M. G206
 TERRESTRIAL IMPACTS AND C-T EXTINCTIONS MON. P.M. G104
 COSMIC DUST AND CARBONACEOUS CHONORITES THURS. A.M. G104
 RESEARCH IN THE MID 1980'S WED. P.M. G104
 LUNAR GEOLOGY: IMPACT LANDFORMS AND REMOTE SENSING FRI. A.M. G206
 TERRESTRIAL IMPACTS AND C-T EXTINCTIONS MON. P.M. G104
 ASTEROIDAL REGOLITHS AND CHONDrites FRI. A.M. G104
 ISOTOPIC ANOMALIES -EXTINCT RADIONUCLIOES TUES. P.M. G104
 LUNAR ANORTHOSITES, MG-RICH SUITE AND KREEP TUES. P.M. GILRUTH GYM
 ISOTOPIC ANOMALIES -EXTINCT RADIONUCLIOES TUES. P.M. G104
 REGOLITH I: LUNAR SOILS AND CORE MON. A.M. G206
 YOUNG ACHONDRITES AND THE PROVENANCE OF METEORITES WED. A.M. G104
 DIFFERENTIATED METEORITES THURS. P.M. G104
 ORIGIN OF SOLAR SYSTEM FRI. A.M. GILRUTH GYM
 PLANETARY INTERIORS AND VENUS THURS. A.M. GILRUTH GYM
 ASTEROIDAL REGOLITHS AND CHONDRITES FRI. A.M. G104
^{C,H AND N} ISOTOPES IN METEORITES THURS. P.M. G206
 PLANETARY INTERIORS AND VENUS THURS. A.M. GILRUTH GYM
 LUNAR GEOLOGY: IMPACT LANDFORMS AND REMOTE SENSING FRI. A.M. G206
 SATELLITES AND RINGS OF OUTER PLANETS II TUES. A.M. G206
 YOUNG ACHONDRITES AND THE PROVENANCE OF METEORITES WED. A.M. G104
 ORIGIN OF SOLAR SYSTEM FRI. A.M. GILRUTH GYM
 SATELLITES AND RINGS OF OUTER PLANETS II TUES. A.M. G206
 CONDENSATION, EVAPORATION AND CAI WED. A.M. G104
 MAGMA OCEANS, BASALTS AND GLASSES TUES. A.M. GILRUTH GYM
 DIFFERENTIATED METEORITES THURS. P.M. G104
^{C,H AND N} ISOTOPES IN METEORITES THURS. P.M. G206
 ASTEROIDAL REGOLITHS AND CHONDRITES FRI. A.M. G104
 EARLY EVOLUTION OF THE TERRESTRIAL PLANETS MON. A.M. G104
 COSMIC DUST AND CARBONACEOUS CHONDRITES THURS. A.M. G104
 ORIGIN OF SOLAR SYSTEM FRI. A.M. GILRUTH GYM
 PLANETARY INTERIORS AND VENUS THURS. A.M. GILRUTH GYM
 MAGMA OCEANS, BASALTS AND GLASSES TUES. A.M. GILRUTH GYM
 REGOLITH II: IRRADIATION EFFECTS WED. A.M. GILRUTH GYM
 SATELLITES AND RINGS OF OUTER PLANETS I MON. A.M. GILRUTH GYM
 ASTEROIDAL REGOLITHS AND CHONDrites FRI. A.M. G104
 IN, OUT, AND ABOUT MARS TUES. P.M. G206
 CONDENSATION, EVAPORATION AND CAI WED. A.M. G104
 PLANETARY INTERIORS AND VENUS THURS. A.M. GILRUTH GYM
 LUNAR ANORTHOSITES, MG-RICH SUITE AND KREEP TUES. P.M. GILRUTH GYM
 ELECTRO MAGNETISM/CRATER CALCULATIONS AND SCALING WED. A.M. G206
 SATELLITES AND RINGS OF OUTER PLANETS I MON. A.M. GILRUTH GYM
 REGOLITH II: IRRADIATION EFFECTS WED. A.M. GILRUTH GYM
 ORIGIN OF SOLAR SYSTEM FRI. A.M. GILRUTH GYM
 MARS DIRT MON. P.M. G206
 ORIGIN OF SOLAR SYSTEM FRI. A.M. GILRUTH GYM
 SATELLITES AND RINGS OF OUTER PLANETS I MON. A.M. GILRUTH GYM
 REGOLITH II: IRRADIATION EFFECTS WED. A.M. GILRUTH GYM
 DIFFERENTIATED METEORITES THURS. P.M. G104
 PLANETARY INTERIORS AND VENUS THURS. A.M. GILRUTH GYM
 YOUNG ACHONDRITES AND THE PROVENANCE OF METEORITES WED. A.M. G104
 YOUNG ACHONDRITES AND THE PROVENANCE OF METEORITES WED. A.M. G104
 YOUNG ACHONDRITES AND THE PROVENANCE OF METEORITES WED. A.M. G104
 PLANETARY CRATERING THURS. P.M. GILRUTH GYM
^{C,H AND N} ISOTOPES IN METEORITES THURS. P.M. G206
 MARS DIRT MON. P.M. G206
 COSMIC DUST AND CARBONACEOUS CHONDRITES THURS. A.M. G104
 ORIGIN OF SOLAR SYSTEM FRI. A.M. GILRUTH GYM
 SATELLITES AND RINGS OF OUTER PLANETS II TUES. A.M. G206

Speaker Index

Adams J. or Pieters C.
Ahrens T. J.
Ahrens T. J.
Allen C. C.
Allison M. L.
Anderson K. A.
Andre C. G.
Arndt J.
Arnold J. R.
Ashwal L. D.
Ashwal L. D.
Austin M. G.
Barber D. J.
Becker R. H.
Beckett J. R.
Bell J. F.
Berkley J. L.
Bibring J.-P.
Binder A. B.
Blair E.
Blank H.
Boak J. L.
Bogard O. D.
Booth M. C.
Borchardt R.
Borg J.
Boynton W. V.
Bradley J. P.
Brownlee D. E.
Brownlee D. E.
Buck W. R.
Caffee M. W.
Caldwell J.
Cameron A. G. W.
Chen J. H.
Chou C.-L.
Christensen P. R.
Cintala M. J.
Cirlin E. H.
Clanton U. S.
Clark P. E.
Clayton D. D.
Clayton R. N.
Conca J.
Consolmagno G. J.
Consolmagno G. J.
Croft S. K.
Croft S. K.
Daode W.
Davies G. F.
Davis D. R.
DePaolo D. J.
Delaney J. S.
Devine J.
Dollfus A.
Downs G. S.
Duba A.
Duxbury T. C.
Dyar M. O.
Dymek R. F.
Eberhardt P.
Elachi C.
Englert P.
Epstein S.
Fegley M. B.
Fink J.
Fireman E. L.
Fraundorf P.
Fredriksson K.
Frey H.
Frick U.
Fruchter J. S.
Gaffney E. S.
Garvin J. B.
Gibson E. K. Jr.
Glass B. P.
Goettel K. A.

LUNAR GEOLOGY: IMPACT LANDFORMS AND REMOTE SENSING FRI. A.M. G206
TERRESTRIAL IMPACTS AND C-T EXTINCTIONS MON. P.M. G104
CRATERING AND SHOCK THURS. A.M. G206
CRATERING AND SHOCK THURS. A.M. G206
SATELLITES AND RINGS OF OUTER PLANETS II TUES. A.M. G206
ELECTRO MAGNETISM/CRATER CALCULATIONS AND SCALING WED. A.M. G206
LUNAR GEOLOGY: IMPACT LANDFORMS AND REMOTE SENSING FRI. A.M. G206
CRATERING AND SHOCK THURS. A.M. G206
REGOLITH I: LUNAR SOILS AND CORE MON. A.M. G206
YOUNG ACHEONDRITES AND THE PROVENANCE OF METEORITES WED. A.M. G104
EARLY EVOLUTION OF THE TERRESTRIAL PLANETS MON. A.M. G104
ELECTRO MAGNETISM/CRATER CALCULATIONS AND SCALING WED. A.M. G206
CONDENSATION, EVAPORATION AND CAI WED. A.M. G104
C,H AND N ISOTOPES IN METEORITES THURS. P.M. G206
CONDENSATION, EVAPORATION AND CAI WED. A.M. G104
SATELLITES AND RINGS OF OUTER PLANETS II TUES. A.M. G206
DIFFERENTIATED METEORITES THURS. P.M. G104
REGOLITH II: IRRADIATION EFFECTS WED. A.M. GILRUTH GYM
MAGMA OCEANS, BASALTS AND GLASSES TUES. A.M. GILRUTH GYM
APOLLO 16 MDN. P.M. GILRUTH GYM
MAGMA OCEANS, BASALTS AND GLASSES TUES. A.M. GILRUTH GYM
EARLY EVOLUTION OF THE TERRESTRIAL PLANETS MON. A.M. G104
ISOTOPIC ANOMALIES -EXTINCT RADIONUCLIDES TUES. P.M. G104
MARS DIRT MON. P.M. G206
APOLLO 16 MON. P.M. GILRUTH GYM
REGOLITH II: IRRADIATION EFFECTS WED. A.M. GILRUTH GYM
CONDENSATION, EVAPORATION AND CAI WED. A.M. G104
COSMIC DUST AND CARBONACEOUS CHONDRITES THURS. A.M. G104
TERRESTRIAL IMPACTS AND C-T EXTINCTIONS MON. P.M. G104
COSMIC DUST AND CARBONACEOUS CHONDRITES THURS. A.M. G104
ORIGIN OF SOLAR SYSTEM FRI. A.M. GILRUTH GYM
ISOTOPIC ANOMALIES -EXTINCT RADIONUCLIDES TUES. P.M. G104
RESEARCH IN THE MID 1980'S WED. P.M. G104
ORIGIN OF SOLAR SYSTEM FRI. A.M. GILRUTH GYM
ISOTOPIC ANOMALIES -EXTINCT RADIONUCLIDES TUES. P.M. G104
EARLY EVOLUTION OF THE TERRESTRIAL PLANETS MON. A.M. G104
MARS DIRT MON. P.M. G206
CRATERING AND SHOCK THURS. A.M. G206
COSMIC DUST AND CARBONACEOUS CHONDRITES THURS. A.M. G104
COSMIC DUST AND CARBONACEOUS CHONDRITES THURS. A.M. G104
LUNAR GEOLOGY: IMPACT LANDFORMS AND REMOTE SENSING FRI. A.M. G206
ISOTOPIC ANOMALIES -EXTINCT RADIONUCLIDES TUES. P.M. G104
COSMIC DUST AND CARBONACEOUS CHONDRITES THURS. A.M. G104
MARS DIRT MON. P.M. G206
C,H AND N ISOTOPES IN METEORITES THURS. P.M. G206
MAGMA OCEANS, BASALTS AND GLASSES TUES. A.M. GILRUTH GYM
PLANETARY CRATERING THURS. P.M. GILRUTH GYM
SATELLITES AND RINGS OF OUTER PLANETS II TUES. A.M. G206
DIFFERENTIATED METEORITES THURS. P.M. G104
MAGMA OCEANS, BASALTS AND GLASSES TUES. A.M. GILRUTH GYM
CRATERING AND SHOCK THURS. A.M. G206
TERRESTRIAL IMPACTS AND C-T EXTINCTIONS MON. P.M. G104
DIFFERENTIATED METEORITES THURS. P.M. G104
REGOLITH I: LUNAR SOILS AND CORE MON. A.M. G206
MARS DIRT MON. P.M. G206
IN, OUT, AND ABOUT MARS TUES. P.M. G206
ASTEROIDAL REGOLITHS AND CHONDRITES FRI. A.M. G104
IN, OUT, AND ABOUT MARS TUES. P.M. G206
LUNAR GEOLOGY: IMPACT LANDFORMS AND REMOTE SENSING FRI. A.M. G206
EARLY EVOLUTION OF THE TERRESTRIAL PLANETS MON. A.M. G104
LUNAR ANORTHOSITES, MG-RICH SUITE AND KREEP TUES. P.M. GILRUTH GYM
RESEARCH IN THE MID 1980'S WED. P.M. G104
C,H AND N ISOTOPES IN METEORITES THURS. P.M. G206
TERRESTRIAL IMPACTS AND C-T EXTINCTIONS MON. P.M. G104
CONDENSATION, EVAPORATION AND CAI WED. A.M. G104
PLANETARY CRATERING THURS. P.M. GILRUTH GYM
C,H AND N ISOTOPES IN METEORITES THURS. P.M. G206
COSMIC DUST AND CARBONACEOUS CHONDRITES THURS. A.M. G104
ASTEROIDAL REGOLITHS AND CHONDRITES FRI. A.M. G104
IN, OUT, AND ABOUT MARS TUES. P.M. G206
REGOLITH II: IRRADIATION EFFECTS WED. A.M. GILRUTH GYM
REGOLITH I: LUNAR SOILS AND CORE MON. A.M. G206
PLANETARY CRATERING THURS. P.M. GILRUTH GYM
PLANETARY INTERIORS AND VENUS THURS. A.M. GILRUTH GYM
MARS DIRT MON. P.M. G206
TERRESTRIAL IMPACTS AND C-T EXTINCTIONS MON. P.M. G104
PLANETARY INTERIORS AND VENUS THURS. A.M. GILRUTH GYM

Goetz A. F. H.
 Golombek M. P.
 Gooding J. L.
 Gradie J.
 Grady M. M.
 Greenberg R.
 Grieve R. A. F.
 Grossman J. N.
 Haff P. K.
 Hale W. S.
 Harris A. W.
 Hartmann W. K.
 Haskin L. A.
 Haskin L. A.
 Haskin L. A.
 Hawke B. R.
 Helfenstein P.
 Helin E. F.
 Henry D. J.
 Herbert F.
 Herbert F.
 Herzberg C. T.
 Hewins R. H.
 Heymann D.
 Hodges, Jr. R. R.
 Holsapple K. A.
 Hood L. L.
 Houck K.
 Houck K. J.
 Housen K.
 Housley R. M.
 Huang P. Y.
 Hudson B.
 Hunkele J. C.
 Hunter R. H.
 Hutcheon I. D.
 Ip W.-H.
 Jagoutz E.
 James O. B.
 Janke P.
 Johnson R. E.
 Johnson T. V.
 Jones E. M.
 Jones J. H.
 Jost D. T. Marti K.
 Kempa M. J.
 Kerridge J. F.
 Kinard W. H.
 King E. A.
 Kirschbaum C.
 Kissin S. A.
 Klein L. C.
 Kochmasov G. G.
 Kornacki A. S.
 Korotev R. L.
 Kracher A.
 Krahenbuhl U.
 Kyte F. T.
 Lambert P.
 Laul J. C.
 Leach J. H. J.
 Leeman W. P.
 Lindsley D. or Schmitt R.
 Lindstrom M. M.
 Lipschutz M. E.
 Longhi J.
 Lucchitta B. K.
 Lucey P.
 Ma M.-S.
 MacPherson G. J.
 Macdougall J. D.
 Mackinnon I. D. R.
 Magni G.
 Marvin U. B.
 Matson D. L.
 Matsui T.
 Maxwell T. A.
 McGill G. E.
 McKay D.
 McKay D. S.

RESEARCH IN THE MID 1980'S WED. P.M. G104
 SATELLITES AND RINGS OF OUTER PLANETS II TUES. A.M. G206
 ASTEROIDAL REGOLITHS AND CHONORITES FRI. A.M. G104
 SATELLITES AND RINGS OF OUTER PLANETS I MON. A.M. GILRUTH GYM
 C, H AND N ISOTOPES IN METEORITES THURS. P.M. G206
 YOUNG ACHONDrites AND THE PROVENANCE OF METEORITES WED. A.M. G104
 PLANETARY CRATERING THURS. P.M. GILRUTH GYM
 ASTEROIDAL REGOLITHS AND CHONORITES FRI. A.M. G104
 ASTEROIDAL REGOLITHS AND CHONORITES FRI. A.M. G104
 PLANETARY CRATERING THURS. P.M. GILRUTH GYM
 SATELLITES AND RINGS OF OUTER PLANETS I MON. A.M. GILRUTH GYM
 CRATERING AND SHOCK THURS. A.M. G206
 LUNAR ANORTHOSITES, MG-RICH SUITE AND KREEP TUES. P.M. GILRUTH GYM
 LUNAR ANORTHOSITES, MG-RICH SUITE AND KREEP TUES. P.M. GILRUTH GYM
 LUNAR ANORTHOSITES, MG-RICH SUITE AND KREEP TUES. P.M. GILRUTH GYM
 LUNAR GEOLOGY: IMPACT LANDFORMS AND REMOTE SENSING FRI. A.M. G206
 SATELLITES AND RINGS OF OUTER PLANETS I MON. A.M. GILRUTH GYM
 YOUNG ACHONDrites AND THE PROVENANCE OF METEORITES WED. A.M. G104
 EARLY EVOLUTION OF THE TERRESTRIAL PLANETS MON. A.M. G104
 ELECTRO MAGNETISM/CRATER CALCULATIONS AND SCALING WED. A.M. G206
 MAGMA OCEANS, BASALTS AND GLASSES TUES. A.M. GILRUTH GYM
 EARLY EVOLUTION OF THE TERRESTRIAL PLANETS MON. A.M. G104
 DIFFERENTIATED METEORITES THURS. P.M. G104
 ISOTOPIC ANOMALIES -EXTINCT RADIONUCLIDES TUES. P.M. G104
 REGOLITH II: IRRADIATION EFFECTS WED. A.M. GILRUTH GYM
 ELECTRO MAGNETISM/CRATER CALCULATIONS AND SCALING WED. A.M. G206
 PLANETARY INTERIORS AND VENUS THURS. A.M. GILRUTH GYM
 REGOLITH I: LUNAR SOILS AND CORE MON. A.M. G206
 REGOLITH I: LUNAR SOILS AND CORE MON. A.M. G206
 ASTEROIDAL REGOLITHS AND CHONDRITES FRI. A.M. G104
 COSMIC DUST AND CARBONACEOUS CHONDRITES THURS. A.M. G104
 SATELLITES AND RINGS OF OUTER PLANETS II TUES. A.M. G206
 ISOTOPIC ANOMALIES -EXTINCT RADIONUCLIDES TUES. P.M. G104
 ISOTOPIC ANOMALIES -EXTINCT RADIONUCLIDES TUES. P.M. G104
 LUNAR ANORTHOSITES, MG-RICH SUITE AND KREEP TUES. P.M. GILRUTH GYM
 CONDENSATION, EVAPORATION AND CAI WED. A.M. G104
 REGOLITH II: IRRADIATION EFFECTS WED. A.M. GILRUTH GYM
 EARLY EVOLUTION OF THE TERRESTRIAL PLANETS MON. A.M. G104
 LUNAR ANORTHOSITES, MG-RICH SUITE AND KREEP TUES. P.M. GILRUTH GYM
 IN, OUT, AND ABOUT MARS TUES. P.M. G206
 SATELLITES AND RINGS OF OUTER PLANETS I MON. A.M. GILRUTH GYM
 SATELLITES AND RINGS OF OUTER PLANETS I MON. A.M. GILRUTH GYM
 TERRESTRIAL IMPACTS AND C-T EXTINCTIONS MON. P.M. G104
 EARLY EVOLUTION OF THE TERRESTRIAL PLANETS MON. A.M. G104
 ISOTOPIC ANOMALIES -EXTINCT RADIONUCLIDES TUES. P.M. G104
 LUNAR ANORTHOSITES, MG-RICH SUITE AND KREEP TUES. P.M. GILRUTH GYM
 C, H AND N ISOTOPES IN METEORITES THURS. P.M. G206
 RESEARCH IN THE MID 1980'S WED. P.M. G104
 CONDENSATION, EVAPORATION AND CAI WED. A.M. G104
 REGOLITH II: IRRADIATION EFFECTS WED. A.M. GILRUTH GYM
 DIFFERENTIATED METEORITES THURS. P.M. G104
 MAGMA OCEANS, BASALTS AND GLASSES TUES. A.M. GILRUTH GYM
 ORIGIN OF SOLAR SYSTEM FRI. A.M. GILRUTH GYM
 CONDENSATION, EVAPORATION AND CAI WED. A.M. G104
 REGOLITH I: LUNAR SOILS AND CORE MON. A.M. G206
 DIFFERENTIATED METEORITES THURS. P.M. G104
 REGOLITH II: IRRADIATION EFFECTS WED. A.M. GILRUTH GYM
 TERRESTRIAL IMPACTS AND C-T EXTINCTIONS MON. P.M. G104
 CRATERING AND SHOCK THURS. A.M. G206
 REGOLITH I: LUNAR SOILS AND CORE MON. A.M. G206
 IN, OUT, AND ABOUT MARS TUES. P.M. G206
 EARLY EVOLUTION OF THE TERRESTRIAL PLANETS MON. A.M. G104
 MAGMA OCEANS, BASALTS AND GLASSES TUES. A.M. GILRUTH GYM
 APOLLO 16 MON. P.M. GILRUTH GYM
 ASTEROIDAL REGOLITHS AND CHONDRITES FRI. A.M. G104
 PLANETARY INTERIORS AND VENUS THURS. A.M. GILRUTH GYM
 IN, OUT, AND ABOUT MARS TUES. P.M. G206
 LUNAR GEOLOGY: IMPACT LANDFORMS AND REMOTE SENSING FRI. A.M. G206
 YOUNG ACHONDrites AND THE PROVENANCE OF METEORITES WED. A.M. G104
 CONDENSATION, EVAPORATION AND CAI WED. A.M. G104
 COSMIC DUST AND CARBONACEOUS CHONDRITES THURS. A.M. G104
 ORIGIN OF SOLAR SYSTEM FRI. A.M. GILRUTH GYM
 APOLLO 16 MON. P.M. GILRUTH GYM
 SATELLITES AND RINGS OF OUTER PLANETS I MON. A.M. GILRUTH GYM
 CRATERING AND SHOCK THURS. A.M. G206
 IN, OUT, AND ABOUT MARS TUES. P.M. G206
 LUNAR GEOLOGY: IMPACT LANDFORMS AND REMOTE SENSING FRI. A.M. G206
 REGOLITH I: LUNAR SOILS AND CORE MON. A.M. G206
 REGOLITH I: LUNAR SOILS AND CORE MON. A.M. G206

McKay G. A.
 McKinley J. P.
 McKinnon W. B.
 McNaughton N. J.
 McSween H. Y.
 Meeker G. P.
 Melcher C. L.
 Melcher C. L.
 Melosh H. J.
 Mendell W. W.
 Mendell W. W.
 Mendis D. A.
 Michel F. C.
 Mims S. S.
 Mizutani H.
 Mizutani H.
 Moniot R. K.
 Moore J.
 Moore J. M.
 Morris R. V.
 Morris R. V.
 Morrison D. A.
 Morse S. A.
 Mouginis-Mark P. J.
 Muller W. F.
 Muller W. F.
 Murrell M. T.
 Nagata T.
 Nagle J. S.
 Nagle J. S.
 Nakamura Y.
 Nehru C. E.
 Neukum G.
 Newsom H. E.
 Nishizumi K.
 Nord G. L.
 Nummedal D.
 Nyquist L. E.
 O'Keefe J. D.
 Orphal O. L.
 Ostertag R.
 Pang K. D.
 Papanastassiou O. A.
 Passey Q. R.
 Pieters C. M.
 Pike R. J.
 Pike R. J.
 Podosek F.
 Prinz M.
 Rajan R. S.
 Rambaldi E. R.
 Rao M. N.
 Rao M. N.
 Rao M. N.
 Ray J.
 Reedy R. C.
 Reimold W. U.
 Reimold W. U.
 Rhodes J. M.
 Rice A.
 Ringwood A. E.
 Robertson B.
 Rosener P. S.
 Roush T. L.
 Rubin A.
 Runcorn S. K.
 Runcorn S. K. or Cisowski S.
 Rutherford M. J.
 Ryder G.
 Salomonson V. V.
 Schmidt R. M.
 Schonfeld E.
 Schonfeld E.
 Schultz P. H.
 Schultz P. H.
 Schultz P. H.

LUNAR ANORTHOSITES, MG-RICH SUITE AND KREEP TUES. P.M. GILRUTH GYM
 APOLLO 16 MON. P.M. GILRUTH GYM
 SATELLITES AND RINGS OF OUTER PLANETS II TUES. A.M. G206
 C,H AND N ISOTOPES IN METEORITES THURS. P.M. G206
 YOUNG ACHONDRITES AND THE PROVENANCE OF METEORITES WED. A.M. G104
 CONDENSATION, EVAPORATION AND CAI WED. A.M. G104
 ISOTOPIC ANOMALIES -EXTINCT RADIONUCLIDES TUES. P.M. G104
 SATELLITES AND RINGS OF OUTER PLANETS I MON. A.M. GILRUTH GYM
 PLANETARY CRATERING THURS. P.M. GILRUTH GYM
 MARS DIRT MON. P.M. G206
 YOUNG ACHONDRITES AND THE PROVENANCE OF METEORITES WED. A.M. G104
 ORIGIN OF SOLAR SYSTEM FRI. A.M. GILRUTH GYM
 SATELLITES AND RINGS OF OUTER PLANETS I MON. A.M. GILRUTH GYM
 PLANETARY CRATERING THURS. P.M. GILRUTH GYM
 CRATERING AND SHOCK THURS. A.M. G206
 CRATERING AND SHOCK THURS. A.M. G206
 C,H AND N ISOTOPES IN METEORITES THURS. P.M. G206
 RESEARCH IN THE MID 1980'S WED. P.M. G104
 SATELLITES AND RINGS OF OUTER PLANETS II TUES. A.M. G206
 REGOLITH I: LUNAR SOILS AND CORE MON. A.M. G206
 MARS DIRT MON. P.M. G206
 EARLY EVOLUTION OF THE TERRESTRIAL PLANETS MON. A.M. G104
 LUNAR ANORTHOSITES, MG-RICH SUITE AND KREEP TUES. P.M. GILRUTH GYM
 IN, OUT, AND ABOUT MARS TUES. P.M. G206
 CONDENSATION, EVAPORATION AND CAI WED. A.M. G104
 COSMIC DUST AND CARBONACEOUS CHONDRITES THURS. A.M. G104
 ISOTOPIC ANOMALIES -EXTINCT RADIONUCLIDES TUES. P.M. G104
 ELECTRO MAGNETISM/CRATER CALCULATIONS AND SCALING WED. A.M. G206
 CRATERING AND SHOCK THURS. A.M. G206
 REGOLITH I: LUNAR SOILS AND CORE MON. A.M. G206
 PLANETARY INTERIORS AND VENUS THURS. A.M. GILRUTH GYM
 DIFFERENTIATED METEORITES THURS. P.M. G104
 PLANETARY CRATERING THURS. P.M. GILRUTH GYM
 EARLY EVOLUTION OF THE TERRESTRIAL PLANETS MON. A.M. G104
 TERRESTRIAL IMPACTS AND C-T EXTINCTIONS MON. P.M. G104
 LUNAR ANORTHOSITES, MG-RICH SUITE AND KREEP TUES. P.M. GILRUTH GYM
 LUNAR GEOLOGY: IMPACT LANDFORMS AND REMOTE SENSING FRI. A.M. G206
 YOUNG ACHONDRITES AND THE PROVENANCE OF METEORITES WED. A.M. G104
 TERRESTRIAL IMPACTS AND C-T EXTINCTIONS MON. P.M. G104
 ELECTRO MAGNETISM/CRATER CALCULATIONS AND SCALING WED. A.M. G206
 CRATERING AND SHOCK THURS. A.M. G206
 SATELLITES AND RINGS OF OUTER PLANETS II TUES. A.M. G206
 TERRESTRIAL IMPACTS AND C-T EXTINCTIONS MON. P.M. G104
 SATELLITES AND RINGS OF OUTER PLANETS II TUES. A.M. G206
 MARS DIRT MON. P.M. G206
 PLANETARY CRATERING THURS. P.M. GILRUTH GYM
 PLANETARY CRATERING THURS. P.M. GILRUTH GYM
 REGOLITH II: IRRADIATION EFFECTS WED. A.M. GILRUTH GYM
 DIFFERENTIATED METEORITES THURS. P.M. G104
 C,H AND N ISOTOPES IN METEORITES THURS. P.M. G206
 ASTEROIDAL REGOLITHS AND CHONORITES FRI. A.M. G104
 REGOLITH II: IRRADIATION EFFECTS WED. A.M. GILRUTH GYM
 C,H AND N ISOTOPES IN METEORITES THURS. P.M. G206
 C,H AND N ISOTOPES IN METEORITES THURS. P.M. G206
 REGOLITH II: IRRADIATION EFFECTS WED. A.M. GILRUTH GYM
 C,H AND N ISOTOPES IN METEORITES THURS. P.M. G206
 APOLLO 16 MON. P.M. GILRUTH GYM
 APOLLO 16 MON. P.M. GILRUTH GYM
 MAGMA OCEANS, BASALTS AND GLASSES TUES. A.M. GILRUTH GYM
 MAGMA OCEANS, BASALTS AND GLASSES TUES. A.M. GILRUTH GYM
 EARLY EVOLUTION OF THE TERRESTRIAL PLANETS MON. A.M. G104
 PLANETARY CRATERING THURS. P.M. GILRUTH GYM
 LUNAR ANORTHOSITES, MG-RICH SUITE AND KREEP TUES. P.M. GILRUTH GYM
 MARS DIRT MON. P.M. G206
 ASTEROIDAL REGOLITHS AND CHONORITES FRI. A.M. G104
 ELECTRO MAGNETISM/CRATER CALCULATIONS AND SCALING WED. A.M. G206
 ELECTRO MAGNETISM/CRATER CALCULATIONS AND SCALING WED. A.M. G206
 MAGMA OCEANS, BASALTS AND GLASSES TUES. A.M. GILRUTH GYM
 LUNAR ANORTHOSITES, MG-RICH SUITE AND KREEP TUES. P.M. GILRUTH GYM
 RESEARCH IN THE MID 1980'S WED. P.M. G104
 ELECTRO MAGNETISM/CRATER CALCULATIONS AND SCALING WED. A.M. G206
 APOLLO 16 MON. P.M. GILRUTH GYM
 SATELLITES AND RINGS OF OUTER PLANETS I MON. A.M. GILRUTH GYM
 ELECTRO MAGNETISM/CRATER CALCULATIONS AND SCALING WED. A.M. G206
 TERRESTRIAL IMPACTS AND C-T EXTINCTIONS MON. P.M. G104
 IN, OUT, AND ABOUT MARS TUES. P.M. G206

Scott E. R. D.
 Sears D.
 Settle M.
 Seymour R.
 Sharpton V. L.
 Shaw H. F.
 Sheng Z.
 Shimamura T.
 Shirley D. N.
 Shukolyukov Yu. A.
 Signer P.
 Simon S. B.
 Singer A. V.
 Smith M. R.
 Smoluchowski R.
 Solomon S. C.
 Spetzler H.
 Spetzler H.
 Spudis P. D.
 Squyres S. W.
 Steele I. M.
 Stevenson D. J.
 Stevenson D. J.
 Stolpher E.
 Stone C. D.
 Strait M. M.
 Strickland E. L., III
 Strom R. G.
 Sugiura N.
 Swart P. K.
 Swindle T. D.
 Takeda H.
 Takeda H.
 Takeda H.
 Taylor G. J.
 Tera F.
 Tomeoka K.
 Torbett M.
 Turcotte D. L.
 Uhlmann D. R.
 Unruh D. M.
 Veverka J.
 Wacker J. F.
 Wadge G.
 Wanke H.
 Wanke H.
 Wark D. A.
 Warner J. L.
 Warner J. L.
 Warren P. H.
 Wasilewski P.
 Watson C. C.
 Weidenschilling S. J.
 Wentworth S. J.
 Wetherill G. W.
 Whitford-Stark J. L.
 Wilhelms D. E. or Neukum G.
 Willis J.
 Wilson L.
 Wood B. J.
 Wood C. A.
 Wooden J.
 Woronow A.
 Yang J.
 Zimbelman J. R.
 Zinner E.
 Zook H. A.
 Zuber M. T.

COSMIC DUST AND CARBONACEOUS CHONDRITES THURS. A.M. G104
 ASTEROIDAL REGOLITHS AND CHONDRITES FRI. A.M. G104
 RESEARCH IN THE MID 1980'S WED. P.M. G104
 APOLLO 16 MON. P.M. GILRUTH GYM
 LUNAR GEOLOGY: IMPACT LANDFORMS AND REMOTE SENSING FRI. A.M. G206
 TERRESTRIAL IMPACTS AND C-T EXTINCTIONS MON. P.M. G104
 ASTEROIDAL REGOLITHS AND CHONDRITES FRI. A.M. G104
 ISOTOPIC ANOMALIES -EXTINCT RADIONUCLIDES TUES. P.M. G104
 LUNAR ANORTHOSITES, MG-RICH SUITE AND KREEP TUES. P.M. GILRUTH GYM
 ISOTOPIC ANOMALIES -EXTINCT RADIONUCLIDES TUES. P.M. G104
 REGOLITH II: IRRADIATION EFFECTS WED. A.M. GILRUTH GYM
 REGOLITH I: LUNAR SOILS AND CORE MON. A.M. G206
 YOUNG ACHONDRITES AND THE PROVENANCE OF METEORITES WED. A.M. G104
 DIFFERENTIATED METEORITES THURS. P.M. G104
 ORIGIN OF SOLAR SYSTEM FRI. A.M. GILRUTH GYM
 PLANETARY INTERIORS AND VENUS THURS. A.M. GILRUTH GYM
 PLANETARY INTERIORS AND VENUS THURS. A.M. GILRUTH GYM
 PLANETARY INTERIORS AND VENUS THURS. A.M. GILRUTH GYM
 LUNAR GEOLOGY: IMPACT LANDFORMS AND REMOTE SENSING FRI. A.M. G206
 SATELLITES AND RINGS OF OUTER PLANETS II TUES. A.M. G206
 YOUNG ACHONDRITES AND THE PROVENANCE OF METEORITES WED. A.M. G104
 SATELLITES AND RINGS OF OUTER PLANETS II TUES. A.M. G206
 ORIGIN OF SOLAR SYSTEM FRI. A.M. GILRUTH GYM
 CONDENSATION, EVAPORATION AND CAI WED. A.M. G104
 MAGMA OCEANS, BASALTS AND GLASSES TUES. A.M. GILRUTH GYM
 DIFFERENTIATED METEORITES THURS. P.M. G104
 IN, OUT, AND ABOUT MARS TUES. P.M. G206
 PLANETARY CRATERING THURS. P.M. GILRUTH GYM
 ELECTRO MAGNETISM/CRATER CALCULATIONS AND SCALING WED. A.M. G206
^{C, H AND N ISOTOPES IN METEORITES} THURS. P.M. G206
 ISOTOPIC ANOMALIES -EXTINCT RADIONUCLIDES TUES. P.M. G104
 LUNAR ANORTHOSITES, MG-RICH SUITE AND KREEP TUES. P.M. GILRUTH GYM
 MARS DIRT MON. P.M. G206
 DIFFERENTIATED METEORITES THURS. P.M. G104
 ASTEROIDAL REGOLITHS AND CHONDRITES FRI. A.M. G104
 EARLY EVOLUTION OF THE TERRESTRIAL PLANETS MON. A.M. G104
 COSMIC DUST AND CARBONACEOUS CHONDRITES THURS. A.M. G104
 ORIGIN OF SOLAR SYSTEM FRI. A.M. GILRUTH GYM
 PLANETARY INTERIORS AND VENUS THURS. A.M. GILRUTH GYM
 MAGMA OCEANS, BASALTS AND GLASSES TUES. A.M. GILRUTH GYM
 MAGMA OCEANS, BASALTS AND GLASSES TUES. A.M. GILRUTH GYM
 SATELLITES AND RINGS OF OUTER PLANETS I MON. A.M. GILRUTH GYM
 ASTEROIDAL REGOLITHS AND CHONDRITES FRI. A.M. G104
 IN, OUT, AND ABOUT MARS TUES. P.M. G206
 APOLLO 16 MON. P.M. GILRUTH GYM
 YOUNG ACHONDRITES AND THE PROVENANCE OF METEORITES WED. A.M. G104
 CONDENSATION, EVAPORATION AND CAI WED. A.M. G104
 PLANETARY INTERIORS AND VENUS THURS. A.M. GILRUTH GYM
 DIFFERENTIATED METEORITES THURS. P.M. G104
 LUNAR ANORTHOSITES, MG-RICH SUITE AND KREEP TUES. P.M. GILRUTH GYM
 ELECTRO MAGNETISM/CRATER CALCULATIONS AND SCALING WED. A.M. G206
 SATELLITES AND RINGS OF OUTER PLANETS I MON. A.M. GILRUTH GYM
 ORIGIN OF SOLAR SYSTEM FRI. A.M. GILRUTH GYM
 MARS DIRT MON. P.M. G206
 ORIGIN OF SOLAR SYSTEM FRI. A.M. GILRUTH GYM
 SATELLITES AND RINGS OF OUTER PLANETS I MON. A.M. GILRUTH GYM
 LUNAR GEOLOGY: IMPACT LANDFORMS AND REMOTE SENSING FRI. A.M. G206
 DIFFERENTIATED METEORITES THURS. P.M. G104
 PLANETARY INTERIORS AND VENUS THURS. A.M. GILRUTH GYM
 PLANETARY INTERIORS AND VENUS THURS. A.M. GILRUTH GYM
 YOUNG ACHONDRITES AND THE PROVENANCE OF METEORITES WED. A.M. G104
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 PLANETARY CRATERING THURS. P.M. GILRUTH GYM
^{C, H AND N ISOTOPES IN METEORITES} THURS. P.M. G206
 MARS DIRT MON. P.M. G206
 COSMIC DUST AND CARBONACEOUS CHONDRITES THURS. A.M. G104
 ORIGIN OF SOLAR SYSTEM FRI. A.M. GILRUTH GYM
 SATELLITES AND RINGS OF OUTER PLANETS II TUES. A.M. G206

Conference Planning Notes

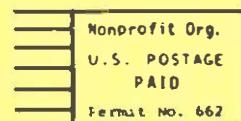
Conference Planning Notes

Table of Contents

XIIIth LUNAR & PLANETARY SCIENCE CONFERENCE	page 1
Venus Conference Report	3
NASA Combines Offices and Names New Head	4
Committee on Comparative Planetology	4
LPI Summer Intern Program	5
Library needs <i>Meteoritics</i>	5
McGetchin Fund--Summer Study Opportunities	5
Wrap-up--Planetary Rifting Conference	6
New Publications	6
Editorial Notes	10
Calendar	11
Lunar and Planetary Bibliography	14
Order Form - LPI Publications	29
ANNOUNCEMENT - <i>Planetary Science by S.R. Taylor</i> - ORDER FORM	31
Appendix - XIII L&PSC - Preliminary Program	i
Author Index	xiv
Speaker Index	xviii



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