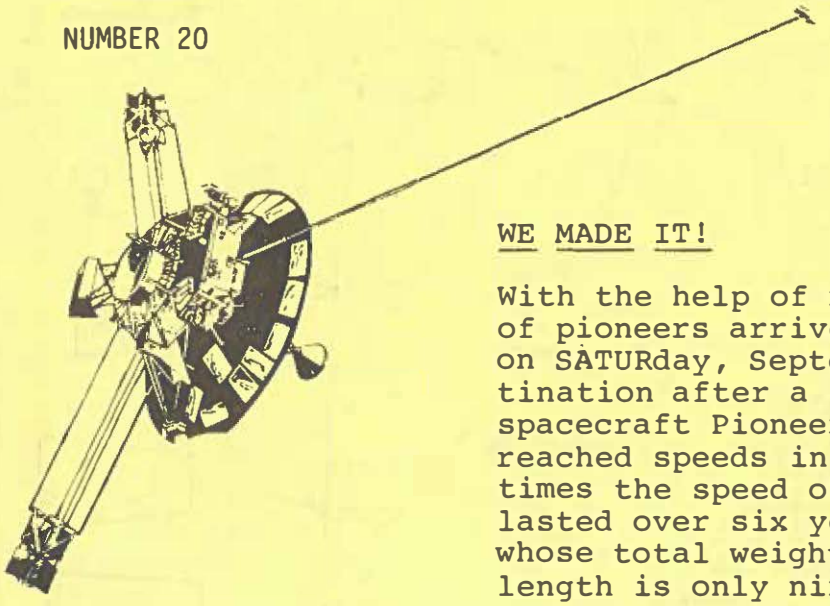
USRA

lunar & planetary information bulletin

NUMBER 20 SEPTEMBER 1979

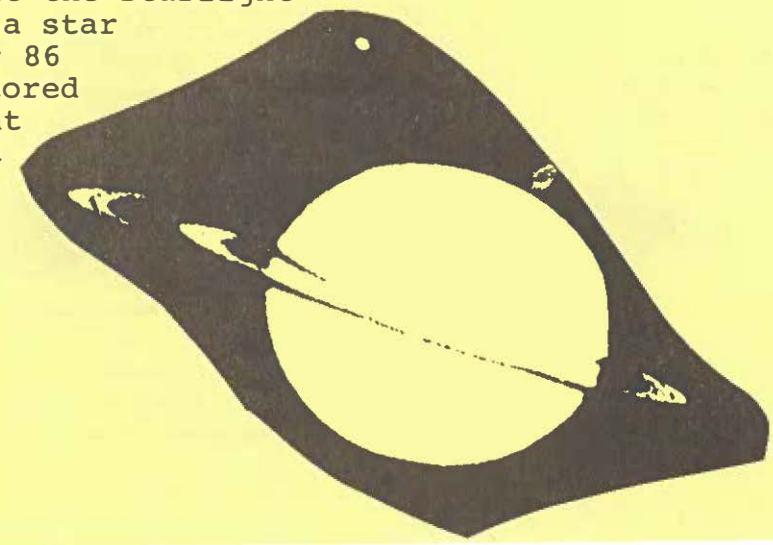


WE MADE IT!

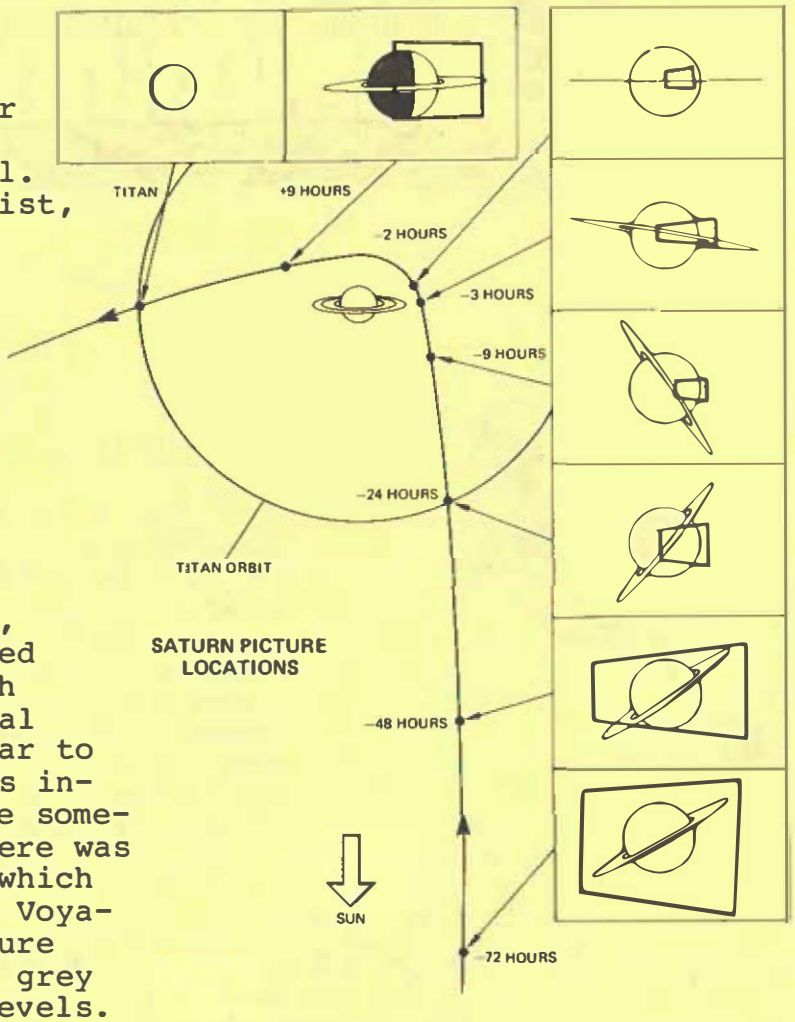
With the help of national television (PBS) thousands of pioneers arrived at the legendary world of Saturn on SATURday, September 1, 1979. We reached our destination after a 2 billion mile journey aboard the spacecraft Pioneer 11. Even though the spacecraft reached speeds in excess of 100,000 miles/hr. (55 times the speed of a rifle bullet), the journey lasted over six years. Pioneer is an amazing machine whose total weight is less than 600 lbs. and whose length is only nine feet. Eleven onboard experiments consume as much power as a 25-watt light bulb; total spacecraft power requires about 100 watts.

The Pioneer 11 trajectory permitted the first measurements of light transmitted through Saturn's rings. Using a gravitational assist from Jupiter, Pioneer was hurled one billion miles above the plane of the ecliptic, across the solar system where it traversed the plane of Saturn's rings. Although this ring plane crossing took less than one second, it was the most dramatic moment of the mission. Some earthbased observations had indicated that there was debris outside the "A" ring. Size of the debris particles was an important unknown. If they were large boulders, they would be far apart and Pioneer would probably not encounter one. The most dangerous sized particles were thought to be around one mm. Even particles this small would destroy the spacecraft which was traveling at 50,000 mph.

Remember when you were first told that the starlight you were seeing could have come from a star which was no longer there. Well, for 86 minutes on Saturday, scientists monitored telemetry from a spacecraft that might already have been destroyed, since it takes that long for data traveling at the speed of light to reach the Earth from Saturn.



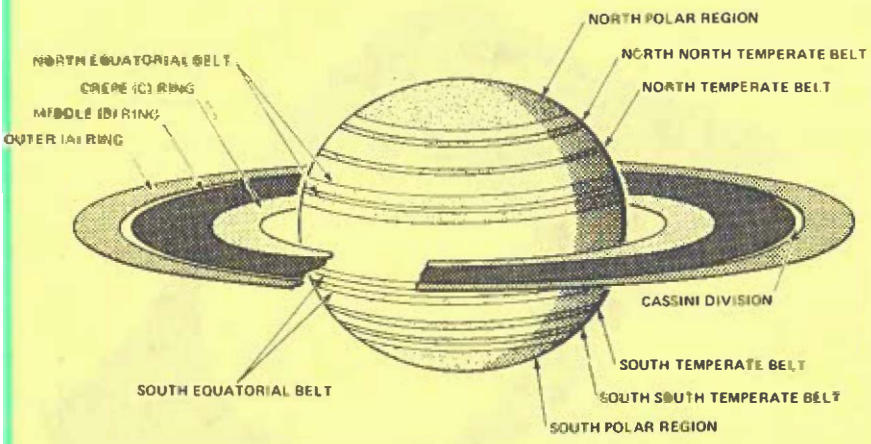
Mission controllers and observers breathed a sigh of relief; smiles and handclaps greeted the news that Pioneer 11 had survived the most dangerous moment of the mission. The way was now clear for the two Voyagers which will arrive at Saturn in November 1980 and August 1981. Dr. John Wolfe, Pioneer Project Scientist, remarked: "Come on Voyagers. The rings are fine!".



Data from the spacecraft are initially received at one of the 210' antennas located at Goldstone, Madrid, and Australia. The antenna spacing permits 24 hour data reception. Data are then relayed via satellite to JPL and NASA/Ames. Preliminary examination of the images revealed a dark polar region with a bright zone immediately below it. Dr. Tom Gehrels, Imaging Principal Investigator, detected four faint zones and belts in the north temperate region and a bright equatorial zone. Some scalloping features (similar to Jupiter's) were also seen. Dr. Gehrels indicated that low contrast features were somewhat surprising, but explained that there was probably a high altitude ammonia haze which was masking the features. Next year's Voyagers should be able to improve on feature definition since they can register 256 grey levels in comparison to Pioneer's 64 levels.

First look at Saturn's ring system resulted in the discovery of the "F" ring, just outside the "A" ring, indicated that Cassini's and Enke's divisions may have more debris in them than previously thought, and proved the existence of a gap between the "B" and "C" rings. In addition, the imaging system detected a possible new satellite of Saturn.

In addition to providing photographs, the experiments were designed to study the solar wind, Saturn's ring structure, temperature, density, magnetic field, and satellites. Information acquired during preliminary investigation of the data included the detection of Saturn's magnetic field which in contrast to Jupiter's magnetic field is not tilted with respect to its spin axis. Data from the analysis of the other experiments is just beginning.



more → see page 3

EXHIBITS OF GEOLOGIC INTEREST IN THE D.C. AREA

Visitors to the Washington, D.C. area this fall can attend two major exhibits of geologic interest. An exhibit reflecting the history of exploration and mapping of the United States from the early surveys of the western frontier to examples of modern space-age mapping will be on public display from June 20 to October 15, in the National Archives building, Pennsylvania Avenue and 8th Street NW, Washington, D.C.

The exhibit, consisting of panels, photos, original documents, paintings, and maps, is a cooperative effort by the National Archives and the U.S. Geological Survey. Titled "National Treasures: Land, Water, Minerals," the exhibit documents the origin of the USGS and its mission to collect and disseminate earth science information for the wise use of the land and its resources.

In another display at Smithsonian's National Museum of Natural History, from September 15 to November 11, more than 40 original works of geologic art by William Henry Holmes (1846-1933), considered the finest scientific landscapes of the American West drawn during the 19th century, will be on public display. Holmes' wash drawings, water colors, and pencil sketches, many published as woodcuts or lithographs, were important supplements to photographs by William Henry Jackson and other photographers of the territorial surveys of about 100 years ago in increasing the nation's awareness of the nature and beauty of the vast American West.

The display of geological panoramas, to occupy about 100 feet of discontinuous wall space in the second floor balcony of the Museum's Rotunda, is a cooperative effort by Smithsonian and the U.S. Geological Survey.

The two exhibits are in recognition of the centennial year of the U.S. Geological Survey which was founded March 3, 1879.

PIONEER SATURN ENCOUNTER (continued)

The only major disappointment of the mission so far has been the loss of data from the Infrared Radiometer during its scan of Titan. Valuable information regarding Titan's possible life supporting environment will have to wait the Voyager encounters.

Pioneer has extended our knowledge of that point of light in the sky we call Saturn. It will continue reporting to us through the late 1980's on its way out of our solar system. Although a point will come when we will not be able to receive its signals, the thoughts and hopes of thousands of space pioneers will be with Pioneer 11 as it travels through our solar system and perhaps....beyond.

by...Ron Weber, LPI Photo/Carto Data Manager who was on the scene at Ames for the Pioneer 11 encounter-

LPI TOPICAL CONFERENCES AND WORKSHOPS

The Institute facilitates communication within the scientific community by organizing meetings and publications in response to requests from that community. These meetings are intended to assist in the exchange of information and ideas among investigators with problems in common and to promote imaginative interactions resulting in new collaborative and interdisciplinary approaches to lunar, planetary and comparative planetological research problems.

Topical Conferences and Workshops generally are held at the Institute, although they may be held elsewhere in special circumstances. Attendance at informal Workshops is limited to about 30 people, which is the maximum number that can be expected to work together and to produce results in real time. The Institute can accommodate some 100 participants in Topical Conferences, which usually are structured around a core of invited participants who are chosen to provide a proper balance of the disciplines which should be involved in the subject under discussion. Each meeting is expected to provide conclusions concerning current state-of-the-art in the topical area, identification of fruitful new avenues of approach, and recommendations for future efforts or courses of action. Proceedings of Workshops usually are released informally, while those of Topical Conferences are published in appropriate journals or as books.

Members of the community who would like to convene a Workshop or Topical Conference should send a brief written proposal to the Symposia Office. Proposals should include the scientific rationale behind the meeting as well as a tentative list of organizers and attendees. When the topic is appropriate, the Institute welcomes co-sponsorship of its meetings by other organizations. Informal inquiries should be addressed to Dr. Russell Merrill at the LPI, (713/486-2166).

MUTCH NAMED NEW NASA SCIENCE CHIEF

On July 1, Dr. Thomas A. Mutch of Brown University in Providence, RI, became the new NASA Associate Administrator for Space Science, replacing Noel W. Hinners, who resigned March 31 after holding the post for five years. Mutch has been a major contributor to NASA science programs since 1969, when he became a member of the Lunar Science Review Board. He was also leader of the Viking Mars project's lander imaging team. Mutch's new job will involve coordinating the planning of future planetary missions and other space-science activities such as ground-based research.

GALILEO PROJECT UP-DATE

Plans for the Galileo Project are proceeding on schedule even though some problems in scheduling may result from the problems occuring with the Space Shuttle. Delays in the Shuttle may cause the Galileo mission to be set back to 1984 and it may be necessary to split the launch into two parts, one to orbit Jupiter and the second to drop a probe into the giant planet's turbulent atmosphere.

The original plan of using Space Shuttle as a launch platform for Galileo, placing the spacecraft in earth orbit where it would blast off to Jupiter using a solid-fuel rocket engine called the Inertial Upper Stage (IUS) which Boeing Co. is developing, is still the baseline plan for the mission but other launch options have been studied. Another option under study would use the liquid-fueled Centaur in place of the IUS.

In April, Galileo managers and scientists reviewed the Voyager 1 spacecraft hardware to assess whether any changes to the Galileo design should be made based on the experience gained on the Voyager mission. It was decided that no changes in the hardware designs for the Galileo systems were needed. In September, the Voyager science instrument packages and results will be reviewed by Galileo team members to determine if any changes are needed in the science plan.

Nearly all the subsystem contracts have been let and the Project is nearing its peak period of employment and expenditures.

LUNAR HIGHLANDS PROJECT

The Lunar and Planetary Sample Team (LAPST) has initiated a project to synthesize and expand what has been learned about the Lunar Highlands. Although a large amount of data have been collected on samples of the Lunar Highlands, much of this information has been gathered and reported in a piecemeal manner. The purpose of this highlands initiative will be to summarize the existing data, to fill gaps in the data base, and to open new avenues of study. New consortium efforts by Lunar Investigators are also encouraged.

In support of this project the Curator's Office at NASA/Johnson Space Center (JSC) is publishing a "Lunar Highlands Newsletter". Three issues of the Newsletter have been distributed and many scientists have returned the questionnaire which was attached to the first issue. Scientists who have not received this Newsletter and who would be interested in participating in the project should contact the Lunar Sample Curator, Mail Code SN2, NASA/Johnson Space Center, Houston, TX 77058 or Dr. Charles F. Meyer, Jr. , Mail Code SN7, at NASA/JSC.

A Topical Conference to promote interaction between the scientists involved in this project is to be held at the Lunar and Planetary Institute, November 14-16. (See p.7 this Bulletin for information about this Conference.

TEACHING SPACE WITH HISTORY

A method of bringing the lessons of space exploration into the American History classroom has been devised by Dr. Lawrence C. Wolken, Texas A&M University. In our schools today, a great deal of time is spent studying the period of exploration and colonization of the New World. Many parallels may be drawn between this early exploration and the exploration of space. The early explorers were financed by government funds. Colonization of the New World was begun by private companies hoping to make a profit. Today, many companies have purchased cargo space in the first twenty-two flights of the Space Shuttle. They hope today's research and development will lead to profitable products and manufacturing techniques in the future. Early explorers and colonists searched for riches such as spices, gold, and silver. Will the search for cheap energy lead the way to colonization of space? These are just a few of the more obvious similarities between the past and the present.

Dr. Wolken has developed some curriculum materials suggesting ways to transfer a student's interest in space to the history classroom. A number of workshops introducing this concept have also been held. Anyone interested in obtaining a copy of the materials available for using this classroom approach should write to Dr. Wolken at: Center for Education and Research in Free Enterprise, Texas A&M University, College Station, TX 77843.

NASA SELECTS TRW FOR SOLAR POLAR MISSION CONTRACT NEGOTIATIONS

NASA'S Jet Propulsion Laboratory, Pasadena, California, has selected TRW Space Systems Division of Redondo Beach, California, for negotiation of a contract to design, build and test one of two spacecraft to explore the Sun's polar regions during the 1980s.

Sponsored jointly by NASA and the European Space Agency (ESA), the International Solar Polar Mission seeks new information on the Sun, cosmic rays and magnetic fields in uncharted regions of the solar system. JPL manages the NASA portion of the project for the agency's Office of Space Science. The second spacecraft will be developed by ESA, an 11-nation consortium headquartered in Paris.

The TRW award calls for development of the American spacecraft system and ground support equipment, integration of the science payload with the spacecraft, testing and launch preparation and spacecraft system operations support during the mission.

The four-year mission begins in 1983 with the launch of both spacecraft with the Space Shuttle; gravity assist flyby of Jupiter in 1984 and arrival above and below the Sun's poles in 1986 and again in 1987. The mission will be the first in which spacecraft depart significantly from the plane in which the Earth and other planets orbit the Sun.

LPI TOPICAL CONFERENCE SERIES

Conference on the Ancient Sun: Fossil Record in the Earth, Moon, and Meteorites

A four-day LPI Topical Conference on the Ancient Sun will be held at the National Center for Atmospheric Research, Boulder, Colorado, October 16-19, 1979. The meeting is aimed at bringing together scientists from solar physics and from the lunar and planetary geoscience community to consider the challenge of recovering the long-term history of solar behavior from natural records. For epochs of solar history from the near-present to approximately 4.6 billion years ago, papers and discussion will focus on three broad topical areas:

Theories of solar variability and their consequences for changes in luminosity, particle emission, and magnetic fields; Records of particle emission in lunar and meteoritic materials; and Records of past solar behavior recoverable from terrestrial materials.

Conference abstracts will be published in late September, and may be ordered from the LPI Administrative Office, Attn: Ancient Sun Abstracts. U.S. requesters should include $2.00 to cover mailing costs. Foreign requesters should specify whether they wish their copy sent air mail printed matter (maximum cost $4.25) or surface mail ($1.05). A bill for the actual postage costs will be sent with the publication. A proceedings volume will be published sometime in late 1980 by Pergamon Press, New York. For further information about this meeting contact the LPI Symposia Office, 713/486-2150.

Conference on the Lunar Highlands Crust

In an effort to stimulate communications among scientists studying ancient planetary crusts, a three-day "Conference on the Lunar Highlands Crust" will be held at the Lunar and Planetary Institute, November 14-16, 1979. Because evidence of the earlist history of the Earth has been erased, and the ancient cratered terrains of Mercury and Mars have not yet been sampled, the samples of the Lunar Highlands are our best source of data to lead to an understanding of early planetary crustal formation. Although an intense period of bombardment of the lunar crust has scrambled the record of the first 600 million years, some pristine-ancient crustal rocks have been identified and have preserved a record of the approximately 4.6 billion year melting events associated with crustal formation. It is the aim of the conference to continue to synthesize what is known about the Lunar Highlands by integrating the sample and remote sensing data. This organized data base can then be used in modelling crustal formation processes. Abstracts will be published in mid-October. U.S. requesters may obtain a copy by sending $2.00 to the LPI Administrative Office, Attn: Lunar Highlands Abstracts. Foreign requesters should specific air mail printed matter or surface mail. They will be billed for actual mailing costs. A post-conference proceedings publication is also planned. For further information on this conference contact the LPI Symposia Office, 713/486-2150.

COLLOQUIUM: THE SATELLITES OF JUPITER

An international meeting on the satellites of Jupiter will be held in Kailua-Kona, Hawaii, May 13-16, 1980. The objectives are to bring together astronomers, geoscientists, and space scientists for a comprehensive discussion of the Jovian satellites as individual worlds and as a system, including their geology, geochemistry, interactions with the Jovian magnetosphere, and origins and evolution. Included as topics are the rings of Jupiter and the Io gas clouds. A book will be published based on papers presented.

The meeting will be four days, with both invited and shorter contributed papers. An attendance of about 200 is anticipated. It is expected that participants will furnish their own travel funds, although limited financial help for non-US attendees may be available later. Participation by all interested scientists without regard to nationality or country of residence is encouraged. There will be a registration fee of not more than $50. Rooms at the Kona Lagoon Hotel are guaranteed to participants at $29 per day.

If you are interested in being placed on the mailing list for further information, you must write to the Chairman of the Organizing Committee. It would also assist planning to know if you might submit a contributed paper. CHAIRMAN: Prof. David Morrison, Institute for Astronomy, 2680 Woodlawn Drive, Honolulu, Hawaii 96822 USA (tel: 808/948-8531)

OPTICAL AND INFRARED TELESCOPES FOR THE 1990'S

A workshop will be held in Tucson, Arizona January 7-12, 1980 to bring together experts in many fields and especially in telescope design and construction, to discuss various innovative approaches to the construction of the next generation of optical and infrared telescopes. Sessions will be devoted not only to telescopes, but to detectors, auxiliary instrumentation, and the ways of carrying out astronomical research in the 1990's. For more information about this workshop contact: Dr. G. Burbidge, Director, Kitt Peak National Observatory, P.O. Box 26732, Tucson, AZ 85726 USA.

+ +

IN MEMORY

Carlyle S. Beals
1899 - 1979

Dr. Beals, who in the early years of his career made prominent contributions in the field of stellar spectroscopy, is probably better known to the planetary community for his work on terrestrial and lunar craters, a work he continued even after his retirement from the position of Dominion Astronomer. Action is being taken to have a lunar crater named in his honor.

+ +

LPI SUMMER INTERN PROGRAM June 11-August 10, 1979

After ten weeks of active research with LPI and Johnson Space Center scientists, the majority of the thirteen 1979 LPI Summer Interns have returned home to classes or to begin careers in lunar and planetary research. The Interns were selected from a field of 98 highly qualified under-graduate or newly graduated students. In addition to individual research projects, the Interns participated in weekly seminars at the LPI where they had the opportunity to present a profile of their own research to colleagues and advisors, as well as to hear lectures on the current research being conducted in a variety of fields presented by LPI and JSC scientists. The Interns, advisors and projects are listed below.

INTERN	ADVISOR	PROJECT
Mr. John Brand Univ. Pennsylvania	Dr. Gary Lofgren NASA-JSC	Work on study of basalt crystallization kinetics
Ms. Mischelle Dalbey Univ. Nevada, Reno	Dr. Fred Hörz Dr. Mike Duke NASA-JSC	Work on analysis of high-speed films in support of the NASA-Ames "Penetrator Feasibility Study"
Ms. Barbara Eckstein Indiana Univ. of Penn.	Dr. Larry Nyquist NASA-JSC	Work on improving Ion Optics of the Mass Spectrometer Source
Ms. Susan Flamm Wellesley College	Dr. Carle Pieters NASA-JSC	Work on directional spectral reflectance of samples
Ms. Karen Fryer Wellesley College	Dr. Fred Hörz NASA-JSC	Work on petrography and microprobe analysis of glass-draped lunar rocks
Mr. Aaaron Goldberg Yale University	Dr. David Criswell LPI	Work on space processing techniques
Mr. Mark Grieshaber Washington University	Dr. Wendell Mendell NASA-JSC	Work on documenting and improving data-processing code for I. R. Interferometry experiments
Ms. Vicki Horner Univ. Arizona	Dr. Norman Hubbard NASA-JSC	Work on interpreting chemical data obtained in Apollo orbital x-ray and gamma-ray spectrometers in terms of stratigraphy and regional variations in chemical composition
Mr. Jonathan Lunine Univ. Rochester	Dr. Mike Duke, JSC Dr. Stan Zisk, MIT	Work on microwave imaging of volcanoes
Mr. Simon Prentice Univ. British Columbia	Dr. John Minear NASA-JSC	Work on melt migration in fractured porous media
Ms. Leonore Rubin Michigan State Univ.	Dr. Douglas Blanchard NASA-JSC	Work on neutron activation - improvement and documentation of microanalytical techniques
Mr. Richard Schultz Rutgers University	Dr. Herb Zook Dr. Uel Clanton NASA-JSC	Work on analysis of meteoroid impact pits on skylab windows
Ms. Jill Singer State Univ. New York, Buffalo	Dr. Peter Schultz LPI	Work on study of martian impact craters

A similar program is planned for 1980. Students in their sophomore-junior-senior years should contact the LPI, Summer Intern Program, during early February 1980 for further information.

LUNAR MAP DISTRIBUTION AT NSSDC

In addition to being the prime distribution center for the data and photography resulting from the various space missions, the National Space Science Data Center (NSSDC) will now supply single copies of lunar maps to qualified requesters. Requests should include the map name, number, scale, and a brief description of the project or research for which the map is needed. A map user's guide complete with full ordering information is being prepared and should be ready for distribution in early 1980. In the meantime, letter requests may be sent to NSSDC, Code 601.4, Goddard Space Flight Center, Greenbelt, MD 20771. Assistance in identifying the proper map name and number can be obtained from the Photo/Map Library at the Lunar and Planetary Institute. (713/486-2172 or 486-2136)

VOYAGER 2 SLIDES AVAILABLE

In addition to the Voyager 1 slides, the Photo/Map Library at the Lunar and Planetary Institute now has a Voyager 2 slide set available for review and loan. The set contains about 40 slides including the satellites of Jupiter, in particular Europa, the cloud features in the equatorial bands of Jupiter, the ring feature of Jupiter and the volcanic plumes of Io. To borrow or review these slides, please contact the Photo/Map Library at the LPI (713/486-2172 or 486-2136).

NEW PUBLICATIONS

"A New Sun: the Solar Results from Skylab" is a new NASA publication containing an outstanding collection of color photography of the Sun's ever-changing features. The photography was obtained from the Earth-orbiting Skylab space station. Skylab provided a platform above the obscuring Earth's atmosphere for viewing the dynamic Sun through an array of eight specialized solar telescopes. Both images and spectra of the Sun in wavelengths spanning the soft x-ray, ultraviolet and visible light were returned by the Skylab instruments, the most advanced flown in space. The accompanying text explains the importance of Skylab photographs in advancing our understanding of solar astrophysics. The 198-page hard-cover book is for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, for $10.50. The document number is NASA SP-402.

"Comparing the Planets" is a new NASA Facts wall chart, NF-58. This 46" x 32" chart graphically depicts facts on the atmospheres, the geology, and geophysics of the Earth and planets using results from the recent space exploration missions. A diagram of the planets in the solar system shows their distance from the sun and their relative densities. The chart is available from the Education Office, NASA Headquarters, Code LFG-9, Washington, DC 20546, or from the Education Offices at the various NASA centers.

LUNAR AND PLANETARY BIBLIOGRAPHY

RECEIVED LPI Library May-August 1979. Address of first author is given. Contact author or your library for copy.

MOON. MOTION, DYNAMICS, GRAVITY FIELD

GUTZWILLER,M.C. (IBM THOMAS J. WATSON RESEARCH CENTER, YORKTOWN HEIGHTS, NY 10598): THE NUMERICAL EVALUATION OF ECKERT'S LUNAR EPHEMERIS
THE ASTRONOMICAL JOURNAL VOL. 84, 889-899 (1979)

RUNCORN,S.K. + HUGHES,W.W. + JONES,D.S. + THOMPSON,I. + KAHN, P.G. + POMPEA,S.M. (INST. OF LUNAR AND PLANETARY SCIENCES, SCHOOL OF PHYSICS, UNIV. OF NEWCASTLE-UPON-TYNE, UK): MAUTILOID GROWTH RHYTHMS AND LUNAR DYNAMICS (MATTERS ARISING AND REPLIES
NATURE VOL. 279, 452-455 (1979)

SCHMIDT,D.S. (UNIV. OF CINCINNATI, DEPT. OF MATHEMATICAL SCIENCES, CINCINNATI, OH 45221): LITERAL SOLUTION FOR HILL'S LUNAR PROBLEM
CELESTIAL MECHANICS VOL. 19, 279-289 (1979)

MOON. PHYSICAL STRUCTURE; THERMAL STRESS HISTORY

GALKIN,I.N. SEISMOTECTONICS OF THE MOON
GEOTECTONICS VOL. 12, 273-281 (1979)

GOULTY,N.R. (DEPT. OF GEOPHYSICS AND PLANETARY PHYSICS, SCHOOL OF PHYSICS, UNIV. OF NEWCASTLE UPON TYNE, NEWCASTLE UPON TYNE NE1 7RU (GREAT BRITAIN)): TIDAL TRIGGERING OF DEEP MOONQUAKES
PHYSICS OF THE EARTH AND PLANETARY INTERIORS VOL. 19, 52-58 (1979)

SOLOMON,S.C. + HEAD,J.W. (DEPT. OF EARTH AND PLANETARY SCIENCES, MASSACHUSETTS INST. OF TECHNOLOGY, CAMBRIDGE, MA 02139): VERTICAL MOVEMENT IN MARE BASINS: RELATION TO MARE EMPLACEMENT, BASIN TECTONICS, AND LUNAR THERMAL HISTORY
JOURNAL OF GEOPHYSICAL RESEARCH VOL. 84, 1667-1682 (1979)

MOON. MORPHOLOGY, STRATIGRAPHY, MAPPING

BURNHAM,R. THE MOON: THE SOUTHERN HIGHLANDS
ASTRONOMY VOL. 7, 36-40 (1979)

DENCE, M.R. (EARTH PHYSICS BRANCH, DEPT. OF ENERGY, MINES RESOURCES, OTTAWA, K1A 0Y3): IMPACT PROCESSES
GEOTIMES VOL 24(6), 24-26 (1979)

MOHAN,S.N. (JET PROPULSION LABORATORY, CALIFORNIA INST. OF TECHNOLOGY, 4800 OAK DRIVE, PASADENA, CA 91103): NEW DETERMINATIONS OF FAR-SIDE LUNAR RADII FROM APOLLO PHOTOGRAPHY
ICARUS VOL. 38, 317-330 (1979)

SETTLE,M. + HEAD,J.W., III (DEPT. OF GEOLOGICAL SCIENCES, BROWN UNIV., PROVIDENCE, RI 02912): THE ROLE OF RIM SLUMPING IN THE MODIFICATION OF LUNAR IMPACT CRATERS
JOURNAL OF GEOPHYSICAL RESEARCH VOL. 84, 3081-3096 (1979)

MOON. CHEMICAL COMPOSITION, PETROLOGY

ANDRAWES,F.F. + GIBSON,E.K., JR. (LOCKHEED ELECTRONICS COMPANY, INC., 1830 NASA ROAD 1, HOUSTON, TX 77058): RELEASE AND ANALYSIS OF GASES FROM GEOLOGICAL SAMPLES
AMERICAN MINERALOGIST VOL. 64, 453-463 (1979)

LABOTKA,T.C. + VANIMAN,D.T. + PAPIKE,J.J. (DEPT. OF EARTH AND SPACE SCIENCES, STATE UNIV. OF NEW YORK, STONY BROOK, NY 11794): THE APOLLO 17 DRILL CORE: COMPARATIVE MODAL PETROLOGY AND PHASE CHEMISTRY OF THE GREATER THAN 20 MICROMETER AND LESS THAN 20 MICROMETER SOIL FRACTIONS
GEOPHYSICAL RESEARCH LETTERS VOL. 6, 503-506 (1979)

MOON. RADIATION; OPTICAL, THERMAL PROPERTIES

CHUCHKOV,E.A. + TULOPOV, V.I. CORPUSCULAR ALBEDO OF THE MOON BASED ON THE DATA OF THE LUNA 22 ARTIFICIAL LUNAR SATELLITE
COSMIC RESEARCH VOL. 16, 612-620 (1979)

MOON. GENERAL REVIEWS

HERBERT,R. THE MOON COMES DOWN TO EARTH
NEW SCIENTIST VOL. 83, 181-183 (1979)

MEADOWS,A.J. (DEPT. OF ASTRONOMY, UNIVERSITY OF LEICESTER, ENGLAND): APOLLO'S SCIENTIFIC LEGACY
NEW SCIENTIST VOL. 83, 299-301 (1979)

OBERG,J.E. (NASA/JOHNSON SPACE CENTER, HOUSTON, TX 77058): THE MOON RACE COVER-UP
NEW SCIENTIST VOL. 83, 296-299 (1979)

O'LEARY,B. (DEPT. OF PHYSICS, PRINCETON UNIV., PRINCETON, NJ): IN THE FOOTPRINTS OF APOLLO
NEW SCIENTIST VOL. 83, 178-180 (1979)

PLANETS (REFERS TO MORE THAN ONE PLANET)

BRACEWELL,R.N. + MACPHIE,R.H. (ELECTRICAL ENGINEERING DEPT., STANFORD UNIV., CA 94305): SEARCHING FOR NONSOLAR PLANETS
ICARUS VOL. 38, 136-147 (1979)

CONSOLMAGNO,G.J. (DEPT. OF PLANETARY SCIENCES, UNIV. OF ARIZONA, TUCSON, AZ 85721): LORENTZ SCATTERING OF INTERPLANETARY DUST
ICARUS VOL. 38, 398-410 (1979)

COOK,A.H. (CAVENDISH LABORATORY, MADINGLEY ROAD, CAMBRIDGE, ENGLAND): A NOTE ON THE FLATTENING OF URANUS AND NEPTUNE
ROYAL ASTRONOMICAL SOCIETY, MONTHLY NOTICES VOL. 187, 39P-43P (1979)

DECAMPLI,W.M. + CAMERON,A.G.W. (HARVARD-SMITHSONIAN CENTER FOR ASTROPHYSICS, CAMBRIDGE, MA 02138): STRUCTURE AND EVOLUTION OF ISOLATED GIANT GASEOUS PROTOPLANETS
ICARUS VOL. 38, 367-391 (1979)

PLANETS (CONTINUED)

COURTIN,R. + LENA,P. + DE MUIZON,M. + ROUAN,D. + NICOLLIER,C. + WIJNBERGEN,J. (LABORATOIRE DE PHYSIQUE STELLAIRE ET PLANETAIRE, 91370 VERRIERES LE BUISSON, FRANCE): FAR-INFRARED PHOTOMETRY OF PLANETS: SATURN AND VENUS
ICARUS VOL. 38, 411-419 (1979)

DRAKE,M.J. (DEPT. OF PLANETARY SCIENCES, UNIV. OF ARIZONA, TUCSON, AZ 85721): PLANETARY CRUSTS
GEOTIMES VOL. 24(6), 22-24 (1978)

ESHLEMAN,V.R. + TYLER,G.L. + FREEMAN,W.T. (CENTER FOR RADAR ASTRONOMY, STANFORD UNIV., STANFORD, CA 94305): DEEP RADIO OCCULTATIONS AND 'EVOLUTE FLASHES'; THEIR CHARACTERISTICS AND UTILITY FOR PLANETARY STUDIES
ICARUS VOL. 37, 612-626 (1979)

GOLDEN,L.M. (RADIO ASTRONOMY LABORATORY AND ASTRONOMY DEPT., UNIV. OF CALIFORNIA, BERKELEY, CA 94720): THE EFFECT OF SURFACE ROUGHNESS ON THE TRANSMISSION OF MICROWAVE RADIATION THROUGH A PLANETARY SURFACE
ICARUS VOL. 38, 451-455 (1979)

GOLITSYN,G.S. (INST. OF ATMOSPHERIC PHYSICS, ACADEMY OF SCIENCES OF USSR, MOSCOW 109017, USSR): ATMOSPHERIC DYNAMICS ON THE OUTER PLANETS AND SOME OF THEIR SATELLITES
ICARUS VOL. 38, 333-341 (1979)

GRIEVE,R.A.F. + ROBERTSON,P.B. (EARTH PHYSICS BRANCH, DEPT. OF ENERGY, MINES AND RESOURCES, OTTAWA K1A 0Y3): THE TERRESTRIAL CRATERING RECORD. I. CURRENT STATUS OF OBSERVATIONS
ICARUS VOL. 38, 212-229 (1979)

GRIEVE,R.A.F. + DENCE,M.R. (EARTH PHYSICS BRANCH, DEPT. OF ENERGY, MINES AND RESOURCES, OTTAWA K1A 0Y3 CANADA): THE TERRESTRIAL CRATERING RECORD. II. THE CRATER PRODUCTION RATE
ICARUS VOL. 38, 230-242 (1979)

HEIKEN, G. (MAIL STOP 978, LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NM 87545): PLANETARY REGOLITHS
GEOTIMES VOL. 24(6), 26-28 (1979)

HISCOCK,W.A. + LINDBLOM,L. (DEPT. OF PHYSICS AND ASTRONOMY, UNIV. OF MARYLAND, COLLEGE PARK, MD 20742): POST-NEWTONIAN EFFECTS ON SATELLITE ORBITS NEAR JUPITER AND SATURN
THE ASTROPHYSICAL JOURNAL VOL. 231, 224-228 (1979)

PHILLIPS,R.J. (JET PROPULSION LABORATORY, CALIFORNIA INST. OF TECHNOLOGY, PASADENA, CA, 91103): PLANETARY INTERIORS
GEOTIMES VOL. 24(6), 20-22 (1979)

PODOSEK,F.A. (DEPT. OF EARTH AND PLANETARY SCIENCES AND MCDONNELL CENTER FOR THE SPACE SCIENCE, WASHINGTON UNIV., ST. LOUIS, MO 63130): SOLAR SYSTEM
GEOTIMES VOL. 24(6), 18-19 (1979)

POLLACK,J.B. (SPACE SCIENCE DIVISION, NASA-AMES RESEARCH CENTER, MOFFETT FIELD, CA, 94035): CLIMATIC CHANGE ON THE TERRESTRIAL PLANETS
ICARUS VOL. 37, 479-553 (1979)

POLLACK,J.B. + BURNS,J.A. + TAUBER,M.E. (THEORETICAL AND PLANETARY STUDIES BRANCH, AMES RESEARCH CENTER, NASA, MOFFETT FIELD, CA 94035): GAS DRAG IN PRIMORDIAL CIRCUMPLANETARY ENVELOPES: A MECHANISM FOR SATELLITE CAPTURE
ICARUS VOL. 37, 587-611 (1979)

RANCITELLI,L.A. (BATTELLE PACIFIC NORTHWEST LABORATORIES, BOX 999, RICHLAND, WA 99352): EXTRATERRESTRIAL MATERIALS
GEOTIMES VOL. 24(6), 30-31 (1979)

RAULIN,F. + BOSSARD,A. + TOUPANCE,G. (LABORATOIRE DE PHYSICO-CHIMIE DE L'ENVIRONNEMENT, UNIV. PARIS-VAL DE MARNE, AVENUE DU GENERAL DE GAULLE, 94010 CRETEIL CEDEX, FRANCE): ABUNDANCE OF ORGANIC COMPOUNDS PHOTOCHEMICALLY PRODUCED IN THE ATMOSPHERES OF THE OUTER PLANETS
ICARUS VOL. 38, 358-366 (1979)

SAUNDERS,R.S. (JET PROPULSION LABORATORY, CALIFORNIA INST. OF TECHNOLOGY, PASADENA, CA 91103): VOLCANIC LANDFORMS
GEOTIMES VOL. 24(6), 28-30 (1979)

SCHUBERT,G. + CASSEN,P. + YOUNG,R.E. (DEPT. OF EARTH AND SPACE SCIENCES, UNIV. OF CALIFORNIA, LOS ANGELES, CA 90024): SUBSOLIDUS CONVECTIVE COOLING HISTORIES OF TERRESTRIAL PLANETS
ICARUS VOL. 38, 192-211 (1979)

WHITCOMB,S.E. + HILDEBRAND,R.H. + KEENE,J. + STIENING,R.F. + HARPER,D.A. (ENRICO FERMI INST., THE UNIV. OF CHICAGO, CHICAGO, IL 60637): SUBMILLIMETER BRIGHTNESS TEMPERATURES OF VENUS, JUPITER, URANUS, AND NEPTUNE
ICARUS VOL. 38, 75-80 (1979)

JUPITER

ATREYA,S.K. + DONAHUE,T.M. (DEPT. OF ATMOSPHERIC AND OCEANIC SCIENCE, SPACE PHYSICS RESEARCH LABORATORY, UNIV. OF MICHIGAN, ANN ARBOR, MI 48109): MODELS OF THE JOVIAN UPPER ATMOSPHERE
REVIEWS OF GEOPHYSICS AND SPACE PHYSICS VOL. 17, 388-396 (1979)

BAKER,D.N. + HIGBIE,P.R. + BELIAN,R.D. + HONES,E.W. (UNIV. OF CALIFORNIA, LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NM 87545): DO JOVIAN ELECTRONS INFLUENCE THE TERRESTRIAL OUTER RADIATION ZONE?
GEOPHYSICAL RESEARCH LETTERS VOL. 6, 531-534 (1979)

BAR-NUN,A. (DEPT. OF GEOPHYSICS AND PLANETARY SCIENCES, TEL AVIV UNIV., TEL AVIV, ISRAEL): ACETYLENE FORMATION ON JUPITER: PHOTOLYSIS OF THUNDERSTORMS?
ICARUS VOL. 38, 180-191 (1979)

BEATTY,J.K. THE FAR-OUT WORLDS OF VOYAGER 1-I
SKY AND TELESCOPE VOL. 57, 423-427 (1979)

BEATTY,J.K. THE FAR-OUT WORLDS OF VOYAGER 1-II
SKY AND TELESCOPE VOL. 57, 516-520 (1979)

BECKLIN,E.E. + WYNN-WILLIAMS,C.G. (INST. FOR ASTRONOMY, UNIV. OF HAWAII, 2680 WOODLAWN DR., HONOLULU, HI 96822): DETECTION OF JUPITER'S RING AT 2.2 MICROMETER
NATURE VOL. 279, 400-401 (1979)

JUPITER (CONTINUED)

BRIDGE,H.S. + BELCHER,J.W. + LAZARUS,A.J. + SULLIVAN,J.D. + MCNUTT,R.L. + BAGENAL,F. + SCUDDER,J.D. + SITTLER,E.C. + SISCOE,G.L. + VASYLIUNAS,V.M. + (CENTER FOR SPACE RESEARCH AND DEPT. OF PHYSICS, MASSACHUSETTS INST. OF TECHNOLOGY, CAMBRIDGE, MA 02139): PLASMA OBSERVATIONS NEAR JUPITER: INITIAL RESULTS FROM VOYAGER 1
SCIENCE VOL. 204, 987-991 (1979)

BROADFOOT,A.L. + BELTON,M.J. + TAKACS,P.Z. + SANDEL,B.R. + SHEMANSKY,D.E. + HOLBERG,J.B. + AJELLO,J.M. + MOOS,H.W. + ATREYA,S.K. + DONAHUE,T.M. + BERTAUX,J.L. + BLAMONT,J.E. + STROBEL,D.F. + MCCONNELL,J.C. + GUDDY,R. + DALGARNO,A. + MCELROY,M.B. (KITT PEAK NATIONAL OBSERVATORY, TUCSON, AZ 85726): EXTREME ULTRAVIOLET OBSERVATIONS FROM VOYAGER 1 ENCOUNTER WITH JUPITER SCIENCE VOL. 204, 979-982 (1979)

CONSOLMAGNO,G.J. (HARVARD-SMITHSONIAN CENTER FOR ASTROPHYSICS, CAMBRIDGE, MA 02138): SULFUR VOLCANOES ON IO
SCIENCE VOL. 205, 397-398 (1979)

EBERHART,J. JOVIAN MOON MAPS
SCIENCE NEWS VOL. 115, 396-397 (1979)

EDELSON,R.E. + MADSEN,B.D. + DAVIS,E.K. + GARRISON,G.W. (JET PROPULSION LABORATORY, CALIFORNIA INST. OF TECHNOLOGY, PASADENA, CA 91103): VOYAGER TELECOMMUNICATIONS: THE BROADCAST FROM JUPITER
SCIENCE VOL. 204, 913-921 (1979)

ESHLEMAN,V.R. + TYLER,G.L. + WOOD,G.E. + LINDAL,G.F. + ANDERSON,J.D. + LEVY,G.S. + CROFT,T.A. (CENTER FOR RADAR ASTRONOMY, STANFORD UNIV., STANFORD, CA 94305): RADIO SCIENCE WITH VOYAGER 1 AT JUPITER: PRELIMINARY PROFILES OF THE ATMOSPHERE AND IONOSPHERE
SCIENCE VOL. 204, 976-978 (1979)

FEGLEY,B., JR. + LEWIS,J.S. (DEPT. OF EARTH AND PLANETARY SCIENCES, MASSACHUSETTS INST. OF TECHNOLOGY, CAMBRIDGE, MA 02139): THERMODYNAMICS OF SELECTED TRACE ELEMENTS IN THE JOVIAN ATMOSPHERE
ICARUS VOL. 38, 166-179 (1979)

GOERTZ,C.K. (DEPT. OF PHYSICS AND ASTRONOMY, THE UNIV. OF IOWA, IOWA CITY, IA 52242): THE JOVIAN MAGNETODISK
SPACE SCIENCE REVIEWS VOL. 23, 319-343 (1979)

GOERTZ,C.K. + SCHARDT,A.W. + VAN ALLEN,J.A. + PARISH,J.L. (DEPT. OF PHYSICS AND ASTRONOMY, UNIV. OF IOWA, IOWA CITY, IA 52242): PLASMA IN THE JOVIAN CURRENT SHEET
GEOPHYSICAL RESEARCH LETTERS VOL. 6, 495-498 (1979)

GOLDSTEIN,M. + EVIATAR,A. + THIEMAN,J.R. (LABORATORY FOR EXTRATERRESTRIAL PHYSICS, NASA GODDARD SPACE FLIGHT CENTER GREENBELT, MD): A BEAMING MODEL OF THE IO-INDEPENDENT JOVIAN DECAMETER RADIATION BASED ON MULTIPOLE MODELS OF THE JOVIAN MAGNETIC FIELD
THE ASTROPHYSICAL JOURNAL VOL. 229, 1186-1197 (1979)

GOLDSTEIN,M.L. + EVIATAR,A. (NASA/GODDARD SPACE FLIGHT CENTER, LABORATORY FOR EXTRATERRESTRIAL PHYSICS, GREENBELT, MD 20771): AN EMISSION MECHANISM FOR THE IO-INDEPENDENT JOVIAN DECAMETER RADIATION
THE ASTROPHYSICAL JOURNAL VOL. 230, 261-273 (1979)

GOLITSYN,G.S. + STEKLOV,A.F. ATMOSPHERES OF PLANETARY SATELLITES. III. THE DYNAMICS OF THE RAREFIED ATMOSPHERES OF THE GALILEAN SATELLITES OF JUPITER
SOLAR SYSTEM RESEARCH VOL. 12, 163-167 (1979)

GURNETT,D.A. + SHAW,R.R. + ANDERSON,R.R. + KURTH,W.S. + SCARF,F.L. (DEPT. OF PHYSICS AND ASTRONOMY, THE UNIV. OF IOWA, IOWA CITY, IA 52242): WHISTLERS OBSERVED BY VOYAGER 1: DETECTION OF LIGHTNING ON JUPITER
GEOPHYSICAL RESEARCH LETTERS VOL. 6, 511-514 (1979)

HANEL,R. + CONRATH,B. + FLASAR,M. + KUNDE,V. + LOWMAN,P. + MAGUIRE,W. + PEARL,J. + PIRRAGLIA,J. + SAMUELSON,R. + GAUTIER,D. + GIERASCH,P. + KUMAR,S. + PONNAMPERUMA,C. (GODDARD SPACE FLIGHT CENTER, GREENBELT, MD 20771): INFRARED OBSERVATIONS OF THE JOVIAN SYSTEM FROM VOYAGER 1
SCIENCE VOL. 204, 972-976 (1979)

HIDE,R. + MALIN,S.R.C. (GEOPHYSICAL FLUID DYNAMICS LABORATORY, METEOROLOGICAL OFFICE (MET. O.21), BRACKNELL, BERKSHIRE, UK): THE SIZE OF JUPITER'S ELECTRICALLY CONDUCTING FLUID CORE
NATURE VOL. 280, 42-43 (1979)

HILL,T.W. + DESSLER,A.J. + FANALE,F.P. (SPACE PHYSICS AND ASTRONOMY DEPT., RICE UNIV., HOUSTON TX 77001): LOCALIZED DEPOSITION AND SPUTTERING OF JOVIAN IONOSPHERIC SODIUM ON IO
PLANETARY AND SPACE SCIENCE VOL. 27, 419-424 (1979)

KAISER,M.L. + DESCH,M.D. + RIDDLE,A.C. + LECACHEUX,A. + PEARCE,J.B. + ALEXANDER,J.K. + WARWICK,J.W. + THIEMAN,J.R. (NASA/GODDARD SPACE FLIGHT CENTER, GREENBELT, MD 20771): VOYAGER SPACECRAFT RADIO OBSERVATIONS OF JUPITER: INITIAL CRUISE RESULTS
GEOPHYSICAL RESEARCH LETTERS VOL. 6, 507-510 (1979)

KRIMIGIS,S.M. + ARMSTRONG,T.P. + AXFORD,W.I. + BOSTROM,C.O. + FAN,C.Y. + GLOECKLER,G. + LANZEROTTI,L.J. + KEATH,E.P. + ZWICKL,R.D. + CARBARY,J.F. + HAMILTON,D.C. (APPLIED PHYSICS LABORATORY, JOHNS HOPKINS UNIVERSITY, LAUREL, MD 20810): LOW-ENERGY CHARGED PARTICLE ENVIRONMENT AT JUPITER: A FIRST LOOK
SCIENCE VOL. 204, 998-1003 (1979)

LENORUVITZ,J.M. VOYAGER 2 EXPANDS JUPITER DATA
AVIATION WEEK SPACE TECHNOLOGY VOL. 111(3), 16-21 (1979)

MCDONALD,F.B. + SCHARDT,A.W. + TRAINOR,J.H. (LABORATORY FOR HIGH ENERGY ASTROPHYSICS, NASA/GODDARD SPACE FLIGHT CENTER, GREENBELT, MD 20771): ENERGETIC PROTONS IN THE JOVIAN MAGNETOSPHERE
JOURNAL OF GEOPHYSICAL RESEARCH VOL. 84, 2579-2596 (1979)

JUPITER (CONTINUED)

MULHOLLAND,J.D. + SHEARS,P.J. + BENEDICT,G.F. (MCDONALD OBSERVATORY AND DEPT. OF ASTRONOMY, UNIV. OF TEXAS AT AUSTIN, AUSTIN, TX 78712): ASTROMETRIC OBSERVATIONS OF THE FAINT SATELLITES OF JUPITER DURING THE 1975-1976 OPPOSITION
THE ASTRONOMICAL JOURNAL VOL. 84, 883-884 (1979)

NASH,D.B. + JOHNSON,T.V. (JET PROPULSION LABORATORY, CALIFORNIA INST. TECHNOLOGY, PASADENA, CA 91103): ALBEDO DISTRIBUTION ON IO'S SURFACE
ICARUS VOL. 38, 69-74 (1979)

NESS,N.F. + ACUNA,M.H. + LEPPING,R.P. + BURLAGA,L.F. + BEHANNON,K.W. + NEUBAUER,F.M. (NASA/GODDARD SPACE FLIGHT CENTER, GREENBELT, MD 20771):
MAGNETIC FIELD STUDIES AT JUPITER BY VOYAGER 1: PRELIMINARY RESULTS
SCIENCE VOL. 204, 982-987 (1979)

NISHIDA,A. + MAEZAWA,K. + TERASAWA,T. (INST. OF SPACE AND AERONAUTICAL SCIENCE, UNIV. OF TOKYO, KOMABA, MEGURA-KU, TOKYO 153, JAPAN): ENERGETICS OF TERRESTRIAL AND JOVIAN MAGNETOSPHERES
SPACE SCIENCE REVIEWS VOL. 23, 345-356 (1979)

PILCHER,C.B. (INST. FOR ASTRONOMY, UNIV. OF HAWAII, HONOLULU, HI 96822): THE STABILITY OF WATER ON IO
ICARUS VOL. 37, 559-574 (1979)

PILCHER, C.B. + SCHEMPP,W.V. (INST. FOR ASTRONOMY, UNIV. OF HAWAII, HONOLULU, HI 96822): JOVIAN SODIUM EMISSION FROM REGION C2
ICARUS VOL. 38, 1-11 (1979)

SCARF,F.L. + GURNETT,D.A. + KURTH,W.S. (SPACE SCIENCES DEPT., TRW DEFENSE AND SPACE SYSTEMS GROUP, REDONDO BEACH, CA 90278): JUPITER PLASMA WAVE OBSERVATIONS: AN INITIAL VOYAGER 1 OVERVIEW
SCIENCE VOL. 204, 991-995 (1979)

SCHULZ,M. (SPACE SCIENCES LABORATORY, IVAN A. GETTING LABORATORIES, THE AEROSPACE CORPORATION, EL SEGUNDO, CA 90245): JUPITER'S RADIATION BELTS
SPACE SCIENCE REVIEWS VOL. 23, 277-318 (1979)

SMITH,H.A. + SODERBLOM,L.A. + JOHNSON,T.V. + INGERSOLL,A.P. + COLLINS,S.A. + SHOEMAKER,E.M. + HUNT,G.E. + MASURSKY,H. + CARR,M.H. + DAVIES,M.E. + COOK,A.F. + BOYCE,J.M. + OWEN,T. + DANIELSON,G.E. + SAGAN,C. + BEEBE,R.F. + VEVERKA,J. + MCCAULEY,J.F. + STROM,R.G. + MORRISON,D. + BRIGGS,G.A. + SUOMI,V.E. (DEPT. OF PLANETARY SCIENCES, UNIV. OF ARIZONA, TUCSON, AZ 85721): THE JUPITER SYSTEM THROUGH THE EYES OF VOYAGER 1 SCIENCE
VOL. 204, 951-972 (1979)

STONE,E.C. + LANE,A.L. (JET PROPULSION LABORATORY, CALIFORNIA INST. OF TECHNOLOGY, PASADENA, CA 91103): VOYAGER 1 ENCOUNTER WITH JOVIAN SYSTEM
SCIENCE VOL. 204, 945-948 (1979)

SUTTON,C. VOYAGE TO THE GIANT PLANET
NEW SCIENTIST VOL. 83, 217-220 (1979)

SWARTZ,W.E. + WILLIAMS,G.O. + MCDONOUGH,T. (SCHOOL OF ELECTRICAL ENGINEERING, CORNELL UNIV., ITHACA, NY 14853): THE ROLE OF ENERGETIC PARTICLE PRECIPITATION IN JOVIAN MAGNETOSPHERICS: 1. SECONDARY ELECTRONS FROM THE IONOSPHERE OF JUPITER
GEOPHYSICAL RESEARCH LETTERS VOL. 6, 389-392 (1979)

TERRILE,R.J. + BEEBE,R.F. (JET PROPULSION LABORATORY, CALIFORNIA INST. OF TECHNOLOGY, PASADENA, CA 91103): SUMMARY OF HISTORICAL DATA: INTERPRETATION OF THE PIONEER AND VOYAGER CLOUD CONFIGURATIONS IN A TIME-DEPENDENT FRAMEWORK
SCIENCE VOL. 204, 948-951 (1979)

TERRILE,R.J. + CAPPS,R.W. + BACKMAN,D.F. + BERLIN,E.E. + BROWN,R.H. + CRUIKSHANK,D.P. + BEICHMAN,C.A. + WESTPHAL,J.A. (JET PROPULSION LABORATORY, CALIFORNIA INST. OF TECHNOLOGY, PASADENA, CA 91103): INFRARED IMAGES OF JUPITER AT 5-MICROMETER WAVELENGTH DURING THE VOYAGER 1 ENCOUNTER
SCIENCE VOL. 204, 1007-1008 (1979)

THIEMAN,J.R. + SMITH,A.G. (LABORATORY FOR EXTRATERRESTRIAL PHYSICS, GODDARD SPACE FLIGHT CENTER, GREENBELT, MD 20771): DETAILED GEOMETRICAL MODELING OF JUPITER'S IO-RELATED DECAMETRIC RADIATION
JOURNAL OF GEOPHYSICAL RESEARCH VOL. 84, 2666-2674 (1979)

THOMSEN,M.F. (DEPT. OF PHYSICS AND ASTRONOMY UNIV. OF IOWA, IOWA CITY, IA 52242): JOVIAN MAGNETOSPHERE-SATELLITE INTERACTIONS: ASPECTS OF ENERGETIC CHARGED PARTICLE LOSS
REVIEWS OF GEOPHYSICS AND SPACE PHYSICS VOL. 17, 369-387 (1979)

VAN ALLEN,J.A. (DEPT. OF PHYSICS AND ASTRONOMY, UNIV. OF IOWA, IOWA CITY, IA 52242): ENERGETIC ELECTRONS IN JUPITER'S DAWN MAGNETODISC
GEOPHYSICAL RESEARCH LETTERS VOL. 6, 309-312 (1979)

VOGT,R.E. + COOK,W.R. + CUMMINGS,A.C. + GARRARD,T.L. + GEHRELS,N. + STONE,E.C. + TRAINOR,J.H. + SCHARDT,A.W. + CONLON,T. + LAL,N. + MCDONALD,F.B. (CALIFORNIA INST. OF TECHNOLOGY, PASADENA, CA 91125): STONE,E.C. + TRAINOR,J.H. + SCHARDT,A.W. + CONLON,T. + LAL,N. + MCDONALD,F.B. VOYAGER 1: ENERGETIC IONS AND ELECTRONS IN THE JOVIAN MAGNETOSPHERE
SCIENCE VOL. 204, 1003-1007 (1979)

WALLACE,L. + SMITH,G.R. (KITT PEAK NATL. OBS., TUCSON, AZ 85726): THE JOVIAN TEMPERATURE STRUCTURE OBTAINED BY INVERSION OF INFRARED SPECTRAL MEASUREMENTS
ICARUS VOL. 38, 342-348 (1979)

WARWICK,J.W. + PEARCE,J.B. + RIDDLE,A.C. + ALEXANDER,J.K. + DESCH,M.D. + KAISER,M.L. + THIEMAN,J.R. + CARR,T.D. + GULKIS,S. + BOISCHOT,A. + HARVEY,C.C. + PEDERSEN,B.M. (LABORATORY FOR APPLIED PLASMA STUDIES, SCIENCE APPLICATIONS, INC., BOULDER, CO 80302): VOYAGER 1 PLANETARY RADIO ASTRONOMY OBSERVATIONS NEAR JUPITER
SCIENCE VOL. 204, 995-998 (1979)

WEST,R.A. SPATIALLY RESOLVED METHANE BAND PHOTOMETRY OF JUPITER. 1. ABSOLUTE REFLECTIVITY AND CENTER-TO-LIMB VARIATIONS IN THE 6190-, 7250-, AND 8900-A BANDS
ICARUS VOL. 38, 12-33 (1979)

JUPITER (CONTINUED)

WEST, R.A. (DEPT. OF PLANETARY SCIENCES, THE UNIV. OF ARIZONA, TUCSON, AZ 85721): SPATIALLY RESOLVED METHANE BAND PHOTOMETRY OF JUPITER. II. ANALYSIS OF THE SOUTHERN EQUATORIAL BELT AND SOUTH TROPICAL ZONE REFLECTIVITY
ICARUS VOL. 38, 34-53 (1979)

WOLSTENCROFT,R.D. + SMITH,R.J. (ROYAL OBSERVATORY, EDINBURGH, SCOTLAND): SPECTROPOLARIMETRY OF THE METHANE AND AMMONIA BANDS OF JUPITER BETWEEN 6800 AND 8200 A
ICARUS VOL. 38, 155-165 (1979)

MARS

BOGDANOV,A.V. A MECHANISM FOR DEIMOS TO INFLUENCE THE CHARACTERISTICS OF THE MARTIAN MAGNETOSPHERE
COSMIC RESEARCH VOL. 16, 590-602 (1979)

BRIGGS,G.A. + BAUM,W.A. + BARNES,J. (JET PROPULSION LABORATORY, CALIFORNIA INST. OF TECHNOLOGY, PASADENA, CA 91103): VIKING ORBITER IMAGING OBSERVATIONS OF DUST IN THE MARTIAN ATMOSPHERE.
JOURNAL OF GEOPHYSICAL RESEARCH VOL. 84, 2795-2820 (1979)

CARR,M.H. (U.S. GEOLOGICAL SURVEY, MENLO PARK, CA 94025): FORMATION OF MARTIAN FLOOD FEATURES BY RELEASE OF WATER FROM CONFINED AQUIFERS
JOURNAL OF GEOPHYSICAL RESEARCH VOL. 84, 2995-3007 (1979)

CUTTS,J.A. + BLASIUS,K.R. + ROBERTS,W.J. (PLANETARY SCIENCE INST., SCIENCE APPLICATIONS, INC., PASADENA, CA 91101): EVOLUTION OF MARTIAN POLAR LANDSCAPES: INTERPLAY OF LONG-TERM VARIATIONS IN PERENNIAL ICE COVER AND DUST STORM INTENSITY
JOURNAL OF GEOPHYSICAL RESEARCH VOL. 84, 2975-2995 (1979)

DAVIES,D.W. (JET PROPULSION LABORATORY, CALIFORNIA INST. OF TECHNOLOGY, PASADENA, CA 91103): THE VERTICAL DISTRIBUTION OF MARS WATER VAPOR
JOURNAL OF GEOPHYSICAL RESEARCH VOL. 84, 2875-2879 (1979)

DEBARBAT,S. (OBSERVATOIRE DE PARIS, FRANCE): (FR) CORRECTIONS TO THE PAPER "OBSERVATIONS OF MARS POSITION WITH THE PARIS ASTROLABE (1975-1976)
ASTRONOMY AND ASTROPHYSICS SUPPLEMENT SERIES VOL. 36, 9-10 (1979)

FARMER,C.B. + DOMS,P.E. (DIVISION OF GEOLOGICAL AND PLANETARY SCIENCES, CALIFORNIA INST. OF TECHNOLOGY, PASADENA, CA 91125): GLOBAL SEASONAL VARIATION OF WATER VAPOR ON MARS AND THE
IMPLICATIONS FOR PERMAFROST
JOURNAL OF GEOPHYSICAL RESEARCH VOL. 84, 2881-2888 (1979)

GIERASCH,P.J. + THOMAS,P. + FRENCH,R.G. + VEVERKA,J. (CENTER FOR RADIOPHYSICS AND SPACE RESEARCH, CORNELL UNIV., ITHACA, NY 14853): SPIRAL CLOUDS ON MARS: A NEW ATMOSPHERIC PHENOMENON
GEOPHYSICAL RESEARCH LETTERS VOL. 6, 405-408 (1979)

GOINS,N.R. + LAZAREWICZ,A.R. (DEPT. OF EARTH AND PLANETARY SCIENCES, MASSACHUSETTS INST. OF TECHNOLOGY, CAMBRIDGE, MA 02139): MARTIAN SEISMICITY
GEOPHYSICAL RESEARCH LETTERS VOL. 6, 368-370 (1979)

HARTMANN,W. THE WATERY PAST OF MARS
NEW SCIENTIST VOL. 82, 1083-1085 (1979)

HESS,S.L. + HENRY,R.M + TILLMAN,J.E. (DEPT. OF METEOROLOGY, FLORIDA STATE UNIV., TALLAHASSEE, FL 32306): THE SEASONAL VARIATION OF ATMOSPHERIC PRESSURE ON MARS AS AFFECTED BY THE SOUTH POLAR CAP
JOURNAL OF GEOPHYSICAL RESEARCH VOL. 84, 2923-2927 (1979)

HESS,S.L. (DEPT. OF METEOROLOGY, FLORIDA STATE UNIV., TALLAHASSEE, FL 32306): STATIC STABILITY AND THERMAL WIND IN AN ATMOSPHERE OF VARIABLE COMPOSITION: APPLICATIONS TO MARS
JOURNAL OF GEOPHYSICAL RESEARCH VOL. 84, 2969-2973 (1979)

HUNT,G.E. (LABORATORY FOR PLANETARY ATMOSPHERES, DEPT. OF PHYSICS AND ASTRONOMY, UNIV. COLLEGE LONDON, LONDON WC1E 6BT, ENGLAND): THERMAL INFRARED PROPERTIES OF THE MARTIAN ATMOSPHERE. 4. PREDICTIONS OF THE PRESENCE OF DUST AND ICE CLOUDS FROM VIKING IRTM SPECTRAL MEASUREMENTS
JOURNAL OF GEOPHYSICAL RESEARCH VOL. 84, 2865-2874 (1979)

JAMES,P.B. + BRIGGS,G. + BARNES,J. + SPRUCK,A. (JET PROPULSION LABORATORY, CALIFORNIA INST. OF TECHNOLOGY, PASADENA, CA 91103): SEASONAL RECESSION OF MARS' SOUTH POLAR CAP AS SEEN BY VIKING
JOURNAL OF GEOPHYSICAL RESEARCH VOL. 84, 2889-2922 (1979)

JONES,K.L. + ARVIDSON,R.E. + GUINNESS,E.A. + BRAGG,S.L. + WALL,S.D. + CARLSTON,C.E. + PIDEK,D.G. (PLANETARY RESEARCH INC., PASADENA, CA 91106):
ONE MARS YEAR: VIKING LANDER IMAGING OBSERVATIONS
SCIENCE VOL. 204, 799-806 (1979)

KIEFFER,H.H. MARS VOLATILES (AND METEOROLOGY AND DUST)
JOURNAL OF GEOPHYSICAL RESEARCH VOL. 84, 2793 (1979)

LEOVY,C.B. + ZUREK,R.W. (DEPT. OF ATMOSPHERIC SCIENCES, UNIV. OF WASHINGTON, SEATTLE, WA 98195): THERMAL TIDES AND MARTIAN DUST STORMS: DIRECT EVIDENCE FOR COUPLING
JOURNAL OF GEOPHYSICAL RESEARCH VOL. 84, 2956-2968 (1979)

MARTIN,T.Z. + PETERFREUND,A.R. + MINER,E.D. + KIEFFER,H.H. + HUNT,G.E. (DEPT. OF EARTH AND SPACE SCIENCES, UNIV. OF CALIFORNIA, LOS ANGELES, CA 90024):
THERMAL INFRARED PROPERTIES OF THE MARTIAN ATMOSPHERE. 1. GLOBAL BEHAVIOR AT 7, 9, 11, AND 20 MICROMETER
JOURNAL OF GEOPHYSICAL RESEARCH VOL. 84, 2830-2842 (1979)

MARTIN,T.Z. + KIEFFER,H.H. (DEPT. OF EARTH AND SPACE SCIENCES, UNIV. OF CALIFORNIA, LOS ANGELES, CA 90024): THERMAL INFRARED PROPERTIES OF THE MARTIAN ATMOSPHERE. 2. THE 15 MICROMETER BAND MEASUREMENTS
JOURNAL OF GEOPHYSICAL RESEARCH VOL. 84, 2843-2852 (1979)

MARS (CONTINUED)

NAKAMURA,Y. + ANDERSON,D.L. (GEOPHYSICS LABORATORY, MARINE SCIENCE INST., THE UNIV. OF TEXAS, GALVESTON, TX 77550): MARTIAN WIND ACTIVITY DETECTED BY A SEISMOMETER AT VIKING LANDER 2 SITE
GEOPHYSICAL RESEARCH LETTERS VOL. 6, 499-502 (1979)

PETERFREUND,A.R. + KIEFFER,H.H. (DEPT. OF EARTH AND SPACE SCIENCES, UNIV. OF CALIFORNIA AT LOS ANGELES, LOS ANGELES, CA 90024): THERMAL INFRARED PROPERTIES OF THE MARTIAN ATMOSPHERE. 3. LOCAL DUST CLOUDS
JOURNAL OF GEOPHYSICAL RESEARCH VOL. 84, 2853-2863 (1979)

POLLACK,J.B. + COLBURN,D.S. + FLASAR,F.M. + KAHN,R. + CARLSTON,C.E. + PIDEK,D.G. (SPACE SCIENCE DIVISION, NASA AMES RESEARCH CENTER, MOFFETT FIELD, CA 94035): PROPERTIES AND EFFECTS OF DUST PARTICLES SUSPENDED IN THE MARTIAN ATMOSPHERE
JOURNAL OF GEOPHYSICAL RESEARCH VOL. 84, 2929-2945 (1979)

RYAN,J.A. + HENRY,R.M. (EARTH SCIENCE DEPT., CALIFORNIA STATE UNIV. AT FULLERTON, FULLERTON, CA 92634): MARS ATMOSPHERIC PHENOMENA DURING MAJOR DUST STORMS AS MEASURED AT SURFACE
JOURNAL OF GEOPHYSICAL RESEARCH VOL. 84, 2821-2829 (1979)

SHIMAZAKI,T. + SHIMIZU,M. (NASA AMES RESEARCH CENTER, MOFFETT FIELD, CA 94035): THE SEASONAL VARIATION OF OZONE DENSITY IN THE MARTIAN ATMOSPHERE
JOURNAL OF GEOPHYSICAL RESEARCH VOL. 84, 1269-1276 (1979)

SMIRNOV,V.N. + OMEL'CHENKO,A.N. + VAISBERG,O.L. POSSIBLE DISCOVERY OF CUSPS NEAR MARS
COSMIC RESEARCH VOL. 16, 688-693 (1979)

TILLMAN,J.E. + HENRY,R.M. + HESS,S.L. (DEPT. OF ATMOSPHERIC SCIENCE, UNIV. OF WASHINGTON, SEATTLE, WA 98195): FRONTAL SYSTEMS DURING PASSAGE OF THE MARTIAN NORTH POLAR HOOD OVER THE VIKING LANDER 2 SITE PRIOR TO THE FIRST 1977 DUST STORMS
JOURNAL OF GEOPHYSICAL RESEARCH VOL. 84, 2947-2955 (1979)

WEHRBEIN, W.M. + HORD, C.W. + BARTH,C.A. (DEPT. OF ASTRO-GEOPHYSICS, AND LABORATORY FOR ATMOSPHERIC AND SPACE PHYSICS, UNIV. OF COLORADO, BOULDER, CO 80309): MARINER 9 ULTRAVIOLET SPECTROMETER EXPERIMENT: VERTICAL DISTRIBUTION OF OZONE ON MARS
ICARUS VOL. 38, 288-299 (1979)

WISE,D.U. + GOLOMBEK,M.P. + MCGILL,G.E (DEPT. OF GEOLOGY AND GEOGRAPHY, UNIV. OF MASSACHUSETTS, AMHERST, MA 01003): THARSIS PROVINCE OF MARS: GEOLOGIC SEQUENCE, GEOMETRY, AND A DEFORMATION MECHANISM
ICARUS VOL. 38, 456-472 (1979)

MERCURY

HOOD,L. + SCHUBERT,G. (DEPT. OF EARTH AND SPACE SCIENCES, UNIV. OF CALIFORNIA, LOS ANGELES, CA 90024): INHIBITION OF SOLAR WIND IMPINGEMENT ON MERCURY BY PLANETARY INDUCTION CURRENTS
JOURNAL OF GEOPHYSICAL RESEARCH VOL. 84, 2641-2647 (1979)

NG,K.H. + BEARD,D.B. (UNIV. OF KANSAS, LAWRENCE, KS 66045): POSSIBLE DISPLACEMENT OF MERCURY'S DIPOLE
JOURNAL OF GEOPHYSICAL RESEARCH VOL. 84, 2115-2117 (1979)

PECHMANN,J.B. + MELOSH, H.J. (CALIFORNIA INST. OF TECHNOLOGY, PASADENA, CA 91125): GLOBAL FRACTURE PATTERNS OF A DESPUN PLANET: APPLICATION TO MERCURY
ICARUS VOL. 38, 243-250 (1979)

SLAVIN,J.A. + HOLZER,R.E. (DEPT. OF EARTH AND SPACE SCIENCES AND THE INST. OF GEOPHYSICS AND PLANETARY PHYSICS, UNIV. OF CALIFORNIA, LOS ANGELES, CA 90024): THE EFFECT OF EROSION ON THE SOLAR WIND STAND-OFF DISTANCE AT MERCURY
JOURNAL OF GEOPHYSICAL RESEARCH VOL. 84, 2076-2082 (1979)

PLUTO

LEBOFSKY, L.A. + RIEKE,G.H. + LEBOFSKY,M.J. (LUNAR AND PLANETARY LABORATORY, UNIV. OF ARIZONA, TUCSON, AZ 85721): SURFACE COMPOSITION OF PLUTO
ICARUS VOL. 37, 554-558 (1979)

SATURN

BAR-NUN,A. + POLLACK,M. (DEPT. OF GEOPHYSICS AND PLANETARY SCIENCES, TEL AVIV UNIV., RAMAT AVIV, ISRAEL): THE PHOTOCHEMISTRY OF HYDROCARBONS IN TITAN'S ATMOSPHERE
ICARUS VOL. 38, 115-122 (1979)

BRINKMAN,A.W. + MCGREGOR,J. (DEPT. OF PHYSICS, AHMADU BELLO UNIV., ZARIA, NIGERIA): THE EFFECT OF THE RING SYSTEM ON THE SOLAR RADIATION REACHING THE TOP OF SATURN'S ATMOSPHERE: DIRECT RADIATION
ICARUS VOL. 38, 479-482 (1979)

CESS,R.D. + CALDWELL,J. A SATURNIAN STRATOSPHERIC SEASONAL CLIMATE MODEL
ICARUS VOL. 38, 349-357 (1979)

CUZZI,J.N. + DONHISEN,R.H. + BURNS,J.A. + HAMILL,P. (NASA AMES RESEARCH CENTER, MOFFETT FIELD, CA 94035): THE VERTICAL STRUCTURE AND THICKNESS OF SATURN'S RINGS
ICARUS VOL. 38, 54-68 (1979)

DOLLFUS,A. (OBSERVATOIRE DE PARIS, F-92190 MEUDON, FRANCE): PHOTOMETRIC DETERMINATION OF THE SATURN RINGS' THICKNESS
ASTRONOMY AND ASTROPHYSICS VOL. 75, 204-206 (1979)

LUMME,K. + IRVINE,W.M. (DEPT.OF PHYSICS AND ASTRONOMY, UNIV. OF MASSACHUSETTS-AMHERST, MA): AZIMUTHAL BRIGHTNESS VARIATIONS OF SATURN'S RINGS. III. OBSERVATIONS AT TILT ANGLE B 11.5 DEGREE
THE ASTROPHYSICAL JOURNAL VOL. 229, 1109-1111 (1979)

SATURN (CONTINUED)

MOUS,H.W. + CLARKE,J.T. (DEPT. OF PHYSICS, JOHNS HOPKINS UNIV., BALTIMORE, MD 21218): DETECTION OF ACETYLENE IN THE SATURNIAN ATMOSPHERE, USING THE IUE SATELLITE
THE ASTROPHYSICAL JOURNAL VOL. 229, L107-L108 (1979)

SEITZER,P. + IANNA,P.A. + LEVINSON,F. (LEANDER MCCORMICK OBS. UNIV. VIRGINIA, CHARLOTTESVILLE, VA 22903): ASTROMETRIC OBSERVATIONS OF SATELLITES OF THE OUTER PLANETS. II. THE SATURNIAN SYSTEM DURING 1978
ASTRONOMICAL JOURNAL VOL. 84, 877-882 (1979)

TRUBITSYN,V.N. + BUBROV,A.M. + VASIL'EV,P.P. (DEPT. OF THEORETICAL PHYSICS, INST. OF EARTH PHYSICS, 10, B. GRUZINSKAYA, MOSCOW, D-242, USSR): GRAVITATIONAL POTENTIAL OF THE SATURNIAN SYSTEM
ICARUS VOL. 38, 473-478 (1979)

URANUS

NOEL,F. + CONTRERAS,K. + REPETUR,H. (DEPT. DE ASTRONOMIA, UNIV. DE CHILE, SANTIAGO, CHILE): OBSERVATIONS OF URANUS MADE WITH THE DANJON ASTROLABE OF SANTIAGO, CHILE, DURING 1977
ASTRONOMY ASTROPHYSICS SUPPLEMENT SERIES VOL. 36, 307-308 (1979)

PRICE,M.J. + FRANZ,O.G. (SCIENCE APPLICATIONS, INC., 5055 EAST BROADWAY, SUITE A-214, TUCSON, AZ 85711): URANUS: NARROW-WAVEBAND DISK PROFILES IN THE SPECTRAL REGION 6000 TO 8500 ANGSTROMS
ICARUS VOL. 38, 267-287 (1979)

VAN FLANDERN,T.C. (U.S. NAVAL OBSERVATORY, WASHINGTON, DC 20390): RINGS OF URANUS: INVISIBLE AND IMPOSSIBLE?
SCIENCE VOL. 204, 1076-1077 (1979)

VENUS

APT,J. + GOODY,R. (CENTER FOR EARTH AND PLANETARY PHYSICS, HARVARD UNIV., CAMBRIDGE, MA 02138): ANOMALOUS FEATURES IN THERMAL RADIANCE MAPS OF VENUS
JOURNAL OF GEOPHYSICAL RESEARCH VOL. 84, 2529-2538 (1979)

AUMANN,H.H. + ORTON,G.S. (EARTH AND SPACE SCIENCES DIVISION, JET PROPULSION LABORATORY, CALIFORNIA INST. OF TECHNOLOGY, 4800 OAK GROVE DRIVE, PASADENA, CA 91103): THE 12- TO 20-MICRON SPECTRUM OF VENUS: IMPLICATIONS FOR TEMPERATURE AND CLOUD STRUCTURE
ICARUS VOL. 38, 251-266 (1979)

BLAMONT,J. + RAGENT,B. (SERVICE D'AERONOMIE DU CENTRE, NATIONAL DE LA RECHERCHE SCIENTIFIQUE, 91 VERRIERES, FRANCE): FURTHER RESULTS OF THE PIONEER VENUS NEPHELOMETER EXPERIMENT
SCIENCE VOL. 205, 67-70 (1979)

BAUER, S.J. + DONAHUE,T.M. + HARTLE,R.E. + TAYLOR,H.A., JR. (NASA/GODDARD SPACE FLIGHT CENTER, GREENBELT, MD 20771): VENUS IONOSPHERE: PHOTOCHEMICAL AND THERMAL DIFFUSION CONTROL OF ION COMPOSITION
SCIENCE VOL. 205, 109-112 (1979)

BRACE,L.H. + TAYLOR,H.A., JR. + CLOUTIER,P.A. + NAGY,A.F. + DANIEL,R.E. (NASA GODDARD SPACE FLIGHT CENTER, LABORATORY FOR PLANETARY ATMOSPHERES, GREENBELT, MD 20771): ON THE CONFIGURATION OF THE NIGHTSIDE VENUS IONOPAUSE
GEOPHYSICAL RESEARCH LETTERS VOL. 6, 345-348 (1979)

BRACE,L.H. + THEIS,R.F. + NIEMANN,H.B. + MAYR,H.G. + HOEGY,W.R. + NAGY,A.F. (LABORATORY FOR PLANETARY ATMOSPHERES, NASA/GODDARD SPACE FLIGHT CENTER, GREENBELT, MD 20771): EMPIRICAL MODELS OF THE ELECTRON TEMPERATURE AND DENSITY IN THE NIGHTSIDE VENUS IONOSPHERE
SCIENCE VOL. 205, 102-104 (1979)

BREUS,T.K. (SPACE RESEARCH INST., ACADEMY OF SCIENCES, MOSCOW, U.S.S.R.): VENUS: REVIEW OF PRESENT UNDERSTANDING OF SOLAR WIND INTERACTION
SPACE SCIENCE REVIEWS VOL. 23, 253-275 (1979)

COLIN,L. (NASA/AMES RESEARCH CENTER, MOFFETT FIELD, CA 94035): ENCOUNTER WITH VENUS: AN UPDATE
SCIENCE VOL. 205, 44-46 (1979)

COUNSELMAN,C.C., III + GOUREVITCH,S.A. + KING,R.W. + LOHIOT,G.B. + PRINN,R.G. (DEPT. OF EARTH AND PLANETARY SCIENCES, MASSACHUSETTS INST. OF TECHNOLOGY, CAMBRIDGE, MA 02139): VENUS WINDS ARE ZONAL AND RETROGRADE BELOW THE CLOUDS
SCIENCE VOL. 205, 85-87 (1979)

CRAVENS,T.E. + NAGY,A.F. + BRACE,L.H. + CHEN,R.H. + KNUDSEN,W.C. (SPACE PHYSICS RESEARCH LABORATORY, DEPT. OF ATMOSPHERIC AND OCEANIC SCIENCE, UNIV. OF MICHIGAN, ANN ARBOR, MI 48109): THE ENERGETICS OF THE IONOSPHERE OF VENUS: A PRELIMINARY MODEL BASED ON PIONEER VENUS OBSERVATIONS
GEOPHYSICAL RESEARCH LETTERS VOL. 6, 341-344 (1979)

DINER,D.J. + WESTPHAL,J.A. (DIVISION OF GEOLOGICAL AND PLANETARY SCIENCES, CALIFORNIA INST. OF TECHNOLOGY, PASADENA, CA 91125): CORRELATION OF SIMULTANEOUS ULTRAVIOLET (0.36 MICROMETER) AND INFRARED (8 TO 14 MICROMETER) IMAGES OF VENUS
ICARUS VOL. 38, 81-89 (1979)

DOLGINOV,S.S. + ZHUZGOV,L.N. + SHAROVA,V.A. + BUZIN,V.B. MAGNETIC FIELD AND MAGNETOSPHERE OF THE PLANET VENUS
COSMIC RESEARCH VOL. 16, 657-687 (1979)

DONAHUE,T.M. (UNIVERSITY OF MICHIGAN, ANN ARBOR, MI 48109): PIONEER VENUS RESULTS: AN OVERVIEW
SCIENCE VOL. 205, 41-44 (1979)

DUBININ,E.M. + POUGORNYI,I.M. + PUTANIN,YU.N. + SHKOL'NIKOVA,S.I.
DETERMINING THE MAGNETIC MOMENT OF VENUS BY MAGNETIC MEASUREMENTS IN THE TAIL
COSMIC RESEARCH VOL. 16, 693-697 (1979)

EKONOMOV,A.P. + GOLOVIN,YU.M. + MOSHKIN,B.E. CLOUD OPTICAL PROPERTIES AND THE ATMOSPHERE BELOW THE CLOUDS FROM VENERA 9 AND 10 PHOTOMETRIC MEASUREMENTS
COSMIC RESEARCH VOL. 16, 719-732 (1979)

EVANS,W.D. + GLORE,J.P. + KLEBESADEL,R.W. + LAROS,J.G. + TECH,E.R. + SPALDING,R.E. (UNIV. OF CALIFORNIA, LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NM 87545): GAMMA-RAY BURST OBSERVATIONS BY PIONEER VENUS ORBITER
SCIENCE VOL. 205, 119-121 (1979)

VENUS (CONTINUED)

FELDMAN,P.D. + MOOS,H.W. + CLARKE,J.T. + LANE,A.L. (PHYSICS DEPT., JOHNS HOPKINS UNIV., BALTIMORE, MD 21218): IDENTIFICATION OF THE UV NIGHTGLOW FROM VENUS
NATURE VOL. 279, 221-222 (1979)

GEHRELS,T. + GRADIE,J.C. + HOWES,M.L. + VRBA,F.J. (LUNAR AND PLANETARY LABORATORY, THE UNIV. OF ARIZONA, TUCSON, AZ 85721): WAVELENGTH DEPENDENCE OF POLARIZATION. XXXIV. OBSERVATIONS OF VENUS
THE ASTRONOMICAL JOURNAL VOL. 84, 671-682 (1979)

GOMHOSI,T. + CRAVENS,T.E. + NAGY,A.F. + BRACE,L.H. + OWENS,A.J. (SPACE PHYSICS RESEARCH LAB., UNIV. OF MICHIGAN, ANN ARBOR, MI 48109): PLASMA DIFFUSION INTO THE WAKE OF VENUS
GEOPHYSICAL RESEARCH LETTERS VOL. 6, 349-352 (1979)

GRINGAUZ,K.I. + VERIGIN,M.I. + BREUS,T.K. + GOMBOSI,T. (SPACE RESEARCH INST., USSR ACADEMY OF SCIENCES, MOSCOW, USSR): THE INTERACTION OF ELECTRONS IN THE OPTICAL UMBRA OF VENUS WITH THE PLANETARY ATMOSPHERE-THE ORIGIN OF THE NIGHTTIME IONOSPHERE
JOURNAL OF GEOPHYSICAL RESEARCH VOL. 84, 2123-2127 (1979)

HOFFMAN,J.H. + HODGES,R.R., JR. + MCELROY,M.H. + DONAHUE,T.M. + KOLPIN,M. (CENTER FOR SPACE SCIENCES, UNIV. OF TEXAS AT DALLAS, RICHARDSON, TX 75080): COMPOSITION AND STRUCTURE OF THE VENUS ATMOSPHERE: RESULTS FROM PIONEER VENUS
SCIENCE VOL. 205, 49-52 (1979)

HUNT,G.E. (DEPT. OF PHYSICS AND ASTRONOMY, UNIV. COLLEGE, LONDON, ENGLAND): A PIONEER'S VIEW OF VENUS
NATURE VOL. 278, 777-778 (1979)

INTRILIGATOR,D.S. + COLLARD,H.R. + MIHALOV,J.D. + WHITTEN,R.C. + WOLFE,J.H. (PHYSICS DEPT., UNIV. OF SOUTHERN CALIFORNIA, LOS ANGELES, CA 90007): ELECTRON OBSERVATIONS AND ION FLOWS FROM THE PIONEER VENUS ORBITER PLASMA ANALYZER EXPERIMENT
SCIENCE VOL. 205, 116-119 (1979)

KEATING,G.M. + TAYLOR,F.W. + NICHOLSON,J.Y., III + HINSON,E.W. (NASA LANGLEY RESEARCH CENTER, HAMPTON, VA 23665): SHORT-TERM CYCLIC VARIATIONS AND DIURNAL VARIATIONS OF THE VENUS UPPER ATMOSPHERE
SCIENCE VOL. 205, 62-64 (1979)

KLIORE,A.J. + PATEL,I.R. + NAGY,A.F. + CRAVENS,T.E. + GOMBOSI,T.I. (JET PROPULSION LABORATORY, CALIFORNIA INST. OF TECHNOLOGY, PASADENA, CA 91103): INITIAL OBSERVATIONS OF THE NIGHTSIDE IONOSPHERE OF VENUS FROM PIONEER VENUS ORBITER RADIO OCCULTATIONS
SCIENCE VOL. 205, 99-102 (1979)

KNOLLENBERG,R.G. + HUNTEN,D.M. (PARTICLE MEASURING SYSTEMS, INC., BOULDER, CO 80301): CLOUDS OF VENUS: A PRELIMINARY ASSESSMENT OF MICROSTRUCTURE
SCIENCE VOL. 205, 70-74 (1979)

KNUDSEN,W.C. + SPENNER,K. + WHITTEN,R.C. + SPREITER,J.R. + MILLER,K.L. + NOVAK,V. (LOCKHEED PALO ALTO RESEARCH LABORATORY, PALO ALTO, CA 94304): THERMAL STRUCTURE AND ENERGY INFLUX TO THE DAY-AND NIGHTSIDE VENUS IONOSPHERE
SCIENCE VOL. 205, 105-107 (1979)

KRASNOPOL'SKIY,V.A.
THRESHOLD ESTIMATES OF THE CONTENT OF SOME SUBSTANCES IN THE ATMOSPHERES OF MARS AND VENUS FROM THE RESULTS OF SPECTROSCOPY OF THE TWILIGHT GLOW ON THE MARS 5, VENERA 9, AND VENERA 10 SATELLITES
COSMIC RESEARCH VOL. 16, 713-718 (1979)

KSANFOMALITI,L.V. + PETROVA,E.V. VENERA 9 AND VENERA 10 PHOTOMETRY IN THE 3500 ANGSTROM BAND. 1. EXPERIMENTAL RESULTS
COSMIC RESEARCH VOL. 16, 707-713 (1979)

LANE,W.A. (NASA GODDARD INST. FOR SPACE STUDIES, GODDARD SPACE FLIGHT CENTER, NEW YORK, NY 10025): WAVELENGTH DEPENDENCE OF POLARIZATION. XXXV. VERTICAL STRUCTURE OF SCATTERING LAYERS ABOVE THE VISIBLE VENUS CLOUDS
THE ASTRONOMICAL JOURNAL VOL. 84, 683-691 (1979)

MUKAI,S. + MUKAI,T. (KANAZAWA INST. OF TECHNOLOGY, KANAZAWA-SOUTH, ISHIKAWA, 921 JAPAN): INTERPRETATION OF THE INFRARED POLARIZATION OF VENUS
ICARUS VOL. 38, 90-99 (1979)

NAGY,A.F. + CRAVENS,T.E. + CHEN,R.H. + TAYLOR,H.A., JR. + BRACE,L.H. + BRINTON,H.C. (SPACE PHYSICS RESEARCH LABORATORY, DEPT. OF ATMOSPHERIC AND OCEANIC SCIENCE, UNIV. OF MICHIGAN, ANN ARBOR, MI 48109): COMPARISON OF CALCULATED AND MEASURED ION DENSITIES ON THE DAYSIDE OF VENUS
SCIENCE VOL. 205, 107-109 (1979)

NIEMANN,H.B. + HARTLE,R.E. + HEDIN,A.E. + KASPRZAK,W.T. + SPENCER,N.W. + HUNTEN,D.M. + CARIGNAN,G.R. (LABORATORY FOR PLANETARY ATMOSPHERES, NASA/GOODARD SPACE FLIGHT CENTER, GREENBELT, MD 20771): VENUS UPPER ATMOSPHERE NEUTRAL GAS COMPOSITION: FIRST OBSERVATIONS OF THE DIURNAL VARIATIONS
SCIENCE VOL. 205, 54-56 (1979)

OYAMA,V.I. + CARLE,G.C. + WOELLER,F. + POLLACK,J.B. (NASA AMES RESEARCH CENTER, MOFFETT FIELD, CA 94035): LABORATORY CORROBORATION OF THE PIONEER VENUS GAS CHROMATOGRAPH ANALYSES
SCIENCE VOL. 205, 52-53 (1979)

PECHMANN,J.B. + MUHLEMAN,D.O. + BERGE,G.L. (DIVISION OF GEOLOGICAL AND PLANETARY SCIENCES, CALIF. INST. OF TECH. PASADENA, CA 91125): POLAR HEATING AND THE SHAPE OF VENUS
NATURE VOL. 279, 618-620 (1979)

PETTENGILL,G.H. + FORD,P.G. + BROWN,W.E., JR. + KAULA,W.M. + MASURSKY,H. + ELIASON,E. + MCGILL,G.E. (DEPT. OF EARTH AND PLANETARY SCIENCES, MASSACHUSETTS INST. OF TECHNOLOGY, CAMBRIDGE, MA 02139): VENUS: PRELIMINARY TOPOGRAPHIC AND SURFACE IMAGING RESULTS FROM THE PIONEER ORBITER
SCIENCE VOL. 205, 91-93 (1979)

PHILLIPS,R.J. + SJOGREN,W.L. + ABBOTT,E.A. + SMITH,J.C. + WIMBERLY,R.N. + WAGNER,C.A. (JET PROPULSION LABORATORY, CALIFORNIA INST. OF TECHNOLOGY, PASADENA, CA 91103): GRAVITY FIELD OF VENUS: A PRELIMINARY ANALYSIS
SCIENCE VOL. 205, 93-96 (1979)

POLLACK,J.B. + BLACK,D.C. (NASA AMES RESEARCH CENTER, MOFFETT FIELD, CA 94035): IMPLICATIONS OF THE GAS COMPOSITIONAL MEASUREMENTS OF PIONEER VENUS FOR THE ORIGIN OF PLANETARY ATMOSPHERES
SCIENCE VOL. 205, 56-59 (1979)

VENUS (CONTINUED)

POLLACK,J.B. + RAGENT,B. + BUESE,R.W. + TOMASKO,M.G. + BLAMONT,J. + KNOLLENBERG,R.G. + ESPOSITO,L.W. + STEWART,A.I. + TRAVIS,L. (NASA AMES RESEARCH CENTER, MOFFETT FIELD, CA 94035): NATURE OF THE ULTRAVIOLET ABSORBER IN THE VENUS CLOUDS: INFERENCES BASED ON PIONEER VENUS DATA
SCIENCE VOL. 205, 76-79 (1979)

ROMANOV,S.A. + SMIRNOV,V.N. + VAISBERG,O.L. INTERACTION OF THE SOLAR WIND WITH VENUS
COSMIC RESEARCH VOL. 16, 603-611 (1979)

ROSSOW,W.B. + WILLIAMS,G.P. (GODDARD INST. FOR SPACE STUDIES, NEW YORK, NY 10023): LARGE-SCALE MOTION IN THE VENUS STRATOSPHERE
JOURNAL OF THE ATMOSPHERIC SCIENCES VOL. 36, 377-389 (1979)

RUSSELL,C.T. + ELPHIC,R.C. + SLAVIN,J.A. (INST. OF GEOPHYSICS AND PLANETARY PHYSICS, UNIV. OF CALIFORNIA, LOS ANGELES 90024): INITIAL PIONEER VENUS MAGNETIC FIELD RESULTS: NIGHTSIDE OBSERVATIONS
SCIENCE VOL. 205, 114-116 (1979)

RUSSELL,C.T. + ELPHIC,R.C. (INST. OF GEOPHYSICS AND PLANETARY PHYSICS, UNIV. OF CALIF., LOS ANGELES, CA 90024): OBSERVATION OF MAGNETIC FLUX ROPES IN THE VENUS IONOSPHERE
NATURE VOL. 279, 616-618 (1979)

SCHORN,R.A.J. + YOUNG,A.T + YOUNG,L.D.G. (DEPT. OF PHYSICS, TEXAS AM UNIV., COLLEGE STATION, TX 77848): HIGH-DISPERSION SPECTROSCOPIC OBSERVATIONS OF VENUS NEAR SUPERIOR CONJUNCTION. III. THE CARBON DIOXIDE BAND AT 8689 ANGSTROM
ICARUS VOL. 38, 420-434 (1979)

SEIFF,A. + KIRK,D.H. + YOUNG,R.E. + SUMMER,S.C. + BLANCHARD,R.C. + FINDLAY,J.T. + KELLY,G.M. (NASA AMES RESEARCH CENTER, MOFFETT FIELD, CA 94035): THERMAL CONTRAST IN THE ATMOSPHERE OF VENUS: INITIAL APPRAISAL FROM PIONEER VENUS PROBE DATA
SCIENCE VOL. 205, 46-48 (1979)

SELIVANOV,A.S. + GEKTIN,YU.M. + KERZHANOVICH,V.V. + NARAEVA,M.K. + PANFILOV,A.S. + CHEMODANOV,V.P. + CHUCHIA,P.A. SURVEY OF THE VENUS CLOUD LAYER FROM THE VENERA 9 ORBITER
COSMIC RESEARCH VOL. 16, 698-706 (1979)

SHAPIRO,I.I. + CAMPBELL,D.B + DE CAMPLI,W.M. (DEPT. OF EARTH AND PLANETARY SCIENCES, MIT, CAMBRIDGE, MA 02138): NONRESONANCE ROTATION OF VENUS?
ASTROPHYSICAL JOURNAL VOL. 230, L123-L126 (1979)

SHEFER,R.E. + LAZARUS,A.J. + BRIDGE,H.S. (CENTER FOR SPACE RESEARCH AND DEPARTMENT OF PHYSICS, MIT, CAMBRIDGE, MA 02139): A REEXAMINATION OF PLASMA MEASUREMENTS FROM THE MARINER 5 VENUS ENCOUNTER
JOURNAL OF GEOPHYSICAL RESEARCH VOL. 84, 2109-2114 (1979)

SUOMI,V.E. + SROMOVSKY,L.A. + REVERCOMB,H.E. (SPACE AND ENGINEERING CENTER, UNIV. OF WISCONSIN, MADISON, WI 53706): PRELIMINARY RESULTS OF THE PIONEER VENUS SMALL PROBE: NET FLUX RADIOMETER EXPERIMENT
SCIENCE VOL. 205, 82-85 (1979)

STEWART,A.I. + BARTH,C.A. (DEPT. OF ASTROGEOPHYSICS AND LABORATORY FOR ATMOSPHERIC AND SPACE PHYSICS, UNIV. OF COLORADO, BOULDER, CO 80309): ULTRAVIOLET NIGHT AIRGLOW OF VENUS
SCIENCE VOL. 205, 59-62 (1979)

TAYLOR,F.W. + MCCLEESE,D.J. + DINER,D.J (EARTH AND SPACE SCIENCES DIV., JET PROPULSION LAB., CALIF. INST. OF TECHNOLOGY, PASADENA, CA 91103): POLAR CLEARING IN THE VENUS CLOUDS OBSERVED FROM THE PIONEER ORBITER
NATURE VOL. 279, 613-614 (1979)

TAYLOR,F.W. + DINER,D.J. + ELSON,L.S. + MCCLEESE,D.J. + MARTONCHIK,J.V. + DEDDERFIELD,J. + BRADLEY,S.P. + SCHOFIELD,J.T. + GILLE,J.C. + COFFEY,M.T. (EARTH AND SPACE SCIENCES DIVISION, JET PROPULSION LABORATORY, CALIFORNIA INST. OF TECHNOLOGY, PASADENA, CA 91103): TEMPERATURE, CLOUD STRUCTURE, AND DYNAMICS OF VENUS MIDDLE ATMOSPHERE BY INFRARED REMOTE SENSING FROM PIONEER ORBITER
SCIENCE VOL. 205, 65-67 (1979)

TAYLOR,H.A., JR. + BRINTON,H.C. + BAUER,S.J. + HARTLE,R.E. + CLOUTIER,P.A. + DANIELL,R.E., JR. + DONAHUE,T.M. (NASA/GODDARD SPACE FLIGHT CENTER, GREENBELT, MD 20771): IONOSPHERE OF VENUS: FIRST OBSERVATIONS OF DAY-NIGHT VARIATIONS OF THE ION COMPOSITION
SCIENCE VOL. 205, 96-99 (1979)

TAYLOR,W.W.L. + SCARF,F.L. + RUSSELL,C.T. + BRACE,L.H. (SPACE SCIENCES DEPT., TRW DEFENSE AND SPACE SYSTEMS GROUP, REDONDO BEACH, CA 90278): ABSORPTION OF WHISTLER MODE WAVES IN THE IONOSPHERE OF VENUS
SCIENCE VOL. 205, 112-114 (1979)

TAYLOR,W.W.L. + SCARF,F.L. + RUSSELL,C.T. + BRACE,L.H. (SPACE SCIENCES DEPT., TRW DEFENSE AND SPACE SYSTEMS GROUP, ONE SPACE PARK, REDONDO BEACH, CA 90278): EVIDENCE FOR LIGHTNING ON VENUS
NATURE VOL. 279, 614-616 (1979)

TOMASKO,M.G. + DOUSE,L.R. + SMITH,P.H (LUNAR AND PLANETARY AND OPTICAL SCIENCES CENTER, LABORATORY AND OPTICAL SCIENCES CENTER, UNIV. OF ARIZONA, TUCSON, AZ 85721): ABSORPTION OF SUNLIGHT IN THE ATMOSPHERE OF VENUS
SCIENCE VOL. 205, 80-82 (1979)

TRAVIS,L.D. + COFFEEN,D.L. + DEL GENIO,A.D. + HANSEN,J.E. + KAWABATA,K. + LACIS,A.A. + LANE,W.A. + LIMAYE,S.S. + ROSSOW,W.B. + STONE,P.H. (NASA GODDARD INST. FOR SPACE STUDIES, GODDARD SPACE FLIGHT CENTER, NEW YORK, NY 10025): CLOUD IMAGES FROM THE PIONEER VENUS ORBITER
SCIENCE VOL. 205, 74-76 (1979)

VON ZAHN,U. + FRICKE,K.H. + HOFFMANN,H.-J. + PELKA,K. (PHYSIKALISCHES INST., UNIV. BONN, 5300 BONN 1, W. GERMANY): VENUS: EDDY COEFFICIENTS IN THE THERMOSPHERE AND THE INFRARED HELIUM CONTENT OF THE LOWER ATMOSPHERE
GEOPHYSICAL RESEARCH LETTERS VOL. 6, 337-340 (1979)

WARD, W.R. + DE CAMPLI,W.M. (JPL, CALIF. INST. OF TECH. PASADENA, CA 91103): COMMENTS ON THE VENUS ROTATION POLE
ASTROPHYSICAL JOURNAL VOL. 230, L117-L121 (1979)

VENUS (CONTINUED)

SWAMY,K.S. + DONN,B. (TATA INST. OF FUNDAMENTAL RESEARCH, BOMBAY 400 005, INDIA): AN ANALYSIS OF THE INFRARED CONTINUUM OF COMETS. II. COMET KOHOUTEK
THE ASTRONOMICAL JOURNAL VOL. 84, 692-697 (1979)

VAGHI,S. + ZAPPALA,V. + CURIR,A. + DE SANCTIS,G. + FERRERI,W. + BACCHELLI,L. (ASTRONOMICAL OBSERVATORY OF TORINO, PINO TORINESE, ITALY): POSITIONS OF SELECTED MINOR PLANETS
ASTRONOMY AND ASTROPHYSICS. SUPPLEMENT SERIES VOL. 36, 309-312 (1979)

COMETS

A'HEARN,M.F. + MILLIS,R.L. + BIRCH,P.V. (ASTRONOMY PROGRAM, UNIV. OF MARYLAND, COLLEGE PARK, MD 20742): GAS AND DUST IN SOME RECENT PERIODIC COMETS
THE ASTRONOMICAL JOURNAL VOL. 84, 570-579 (1979)

SCHLOERB,F.P. + IRVINE,W.M. + ROBINSON,S.E (DEPT. OF PHYSICS AND ASTRONOMY, UNIV. OF MASSACHUSETTS, AMHERST, MA 01003): A SEARCH FOR MILLIMETER-WAVE EMISSION FROM HCN, CO, AND CH3CN IN COMET BRADFIELD (1978C)
ICARUS VOL. 38, 392-397 (1979)

SEKANINA,Z. (HARVARD-SMITHSONIAN CENTER FOR ASTROPHYSICS, CAMBRIDGE, MA 02138): RELATIVE MOTIONS OF FRAGMENTS OF THE SPLIT COMETS. III. A TEST OF SPLITTING AND COMETS WITH SUSPECTED MULTIPLE NUCLEI
ICARUS VOL. 38, 300-316 (1979)

WEISSMAN,P.R. (PLANETARY ATMOSPHERES SECTION, JET PROPULSION LABORATORY, PASADENA, CA 91103): NONGRAVITATIONAL PERTURBATIONS OF LONG-PERIOD COMETS
THE ASTRONOMICAL JOURNAL
VOL. 84, 580-584 (1979)

WRIGHT,C.S. + NELSON,G.J. (IONOSPHERIC PREDICTION SERVICE, DEPT. OF SCIENCE, P.O. BOX 372, NARRABRI, N.S.W. 2390, AUSTRALIA): COMET PLASMA DENSITIES DEDUCED FROM REFRACTION OF OCCULTED RADIO SOURCES
ICARUS VOL. 38, 123-135 (1979)

YABUSHITA,S. (DEPT. OF APPLIED MATHEMATICS AND PHYSICS, KYOTO UNIV., KYOTO, JAPAN): A STATISTICAL STUDY OF THE EVOLUTION OF THE ORBITS OF LONG-PERIOD COMETS
ROYAL ASTRONOMICAL SOCIETY. MONTHLY NOTICES VOL. 187, 445-462 (1979)

METEORITES

ALAERTS,L. + ANDERS,E. (ENRICO FERMI INST. AND DEPT. OF CHEMISTRY, UNIV. OF CHICAGO, CHICAGO IL 60637): ON THE KINETICS OF VOLATILE LOSS FROM CHONDRITES
GEOCHIMICA ET COSMOCHIMICA ACTA VOL. 43, 547-553 (1979)

EASTON,A.J. + BUCKLEY,H.A. (DEPT. OF MINERALOGY, BRITISH MUSEUM (NATURAL HISTORY), LONDON SW7 5BD, ENGLAND): IRON METEORITES OF GROUP IA AND IIA: STUDY OF PHOSPHIDE MORPHOLOGY ENHANCED BY DRY C12 ETCHING
METEORITICS VOL. 14, 143-152 (1979)

FIREMAN,E.L. + STOENNER,R.W. (SMITHSONIAN ASTROPHYSICAL OBSERVATORY, CAMBRIDGE, MA 02138): ARGON-37 AND ARGON-39 RADIOACTIVITIES IN THE DHAJALA AND CANON CITY METEORITES
METEORITICS VOL. 14, 1-11 (1979)

WOLFF,R.S. + GOLDSTEIN,B.E. + KUMAR,S. (JET PROPULSION LABORATORY, CALIFORNIA INST. OF TECHNOLOGY, PASADENA, CA 91103): A MODEL OF THE VARIABILITY OF THE VENUS IONOPAUSE ALTITUDE
GEOPHYSICAL RESEARCH LETTERS VOL. 6, 353-356 (1979)

WOO,R. + ARMSTRONG,J.W. + KENDALL,W.B. (JET PROPULSION LABORATORY, CALIFORNIA INST. OF TECHNOLOGY, PASADENA, CA 91103): MEASUREMENTS OF TURBULENCE IN THE VENUS ATMOSPHERE DEDUCED FROM PIONEER VENUS MULTIPROBE RADIO SCINTILLATIONS
SCIENCE VOL. 205, 87-89 (1979)

YOUNG,A.T. + SCHORN,R.A. + YOUNG,L.D.G. + CRISP,D. (DEPT. OF PHYSICS, TEXAS AM UNIV., COLLEGE STATION, TX 77843): SPECTROSCOPIC OBSERVATIONS OF WINDS ON VENUS. I. TECHNIQUE AND DATA REDUCTION
ICARUS VOL. 38, 435-450 (1979)

ASTEROIDS

DEHEUGNE,H. + MACHADO,L.E. (OBSERVATOIRE ROYAL DE BELGIQUE, BRUSSELS, BELGIUM): (FR) POSITIONS OF ASTEROIDS AT ESO-LA SILLA BY MEANS OF THE GPO (F=400 CM, D=40 CM) IN APRIL 1978
ASTRONOMY AND ASTROPHYSICS SUPPLEMENT SERIES VOL. 36, 313-316 (1979)

DERMOTT, S.F. (CENTER FOR RADIOPHYSICS AND SPACE RESEARCH, CORNELL UNIV., ITHACA, NY 14853): SHAPES AND GRAVITATIONAL MOMENTS OF SATELLITES AND ASTEROIDS
ICARUS VOL. 37, 575-586 (1979)

HARRIS,A.W. + YOUNG,J. (JET PROPULSION LABORATORY, PASADENA, CA 91103): PHOTOELECTRIC LIGHTCURVES OF ASTEROIDS 42 ISIS, 45 EUGENIA, 56 MELETE, 103 HERA, 532 HERCULINA, AND 558 CARMEN
ICARUS VOL. 38, 100-105 (1979)

LAGERKVIST,C.I. (ASTRONOMISKA OBSERVATORIET, BOX 515, S-751 20 UPPSALA, SWEDEN): A LIGHTCURVE SURVEY OF ASTEROIDS WITH SCHMIDT TELESCOPES: OBSERVATIONS OF NINE ASTEROIDS DURING OPPOSITIONS IN 1977
ICARUS VOL. 38, 106-114 (1979)

LEBOFSKY,L.A. + LEBOFSKY,M.J. + RIEKE,G.H. (LUNAR AND PLANETARY LABORATORY, UNIV. OF ARIZONA, TUCSON, AZ 85721): RADIOMETRY AND SURFACE PROPERTIES OF APOLLO, AMOR, AND ATEN ASTEROIDS
THE ASTRONOMICAL JOURNAL VOL. 84, 885-888 (1979)

REITSEMA,H.J. (LUNAR AND PLANETARY LABORATORY, UNIV. OF ARIZONA, TUCSON AZ 85721): RELIABILITY OF MINOR PLANET SATELLITE OBSERVATIONS
SCIENCE VOL. 205, 185-186 (1979)

METEORITES (CONTINUED)

SCHUBER,H.J. + SCALTRITI,F. + ZAPPALA,V. (INST. FUR ASTRONOMIE, GRAZ, AUSTRIA): PHOTOELECTRIC PHOTOMETRY AND ROTATION PERIODS OF THREE LARGE AND DARK ASTEROIDS: 49 PALES, 88 THISBE AND 92 UNDINA
ASTRONOMY AND ASTROPHYSICS SUPPLEMENT SERIES VOL. 36, 1-8 (1979)

FITZGERALD,M.J. (CENTRE FOR PRECAMBRIAN RESEARCH, UNIV. OF ADELAIDE, ADELAIDE, SOUTH AUSTRALIA): THE CHEMICAL COMPOSITION AND CLASSIFICATION OF THE KAROUNDA METEORITE
METEORITICS VOL. 14, 109-115 (1979)

FRIEDEMANN,C. + GURTLER,J. + DORSCHNER,J. (UNIVERSITATS-STERNWARTE JENA, G.D.R.): THE 10- AND 20 MICROMETER INTERSTELLAR ABSORPTION BANDS: COMPARISON WITH THE INFRARED SPECTRUM OF THE NOGOYA METEORITE
ASTROPHYSICS AND SPACE SCIENCE VOL. 60, 297-304 (1979)

GLASS,B.P. + BARLOW,R.A. (GEOLOGY DEPT., UNIV. OF DELAWARE, NEWARK, DE 19711): MINERAL INCLUSIONS IN MUONG NONG-TYPE INDOCHINITES: IMPLICATIONS CONCERNING PARENT MATERIAL AND PROCESS OF FORMATION
METEORITICS VOL. 14, 55-67 (1979)

GLASS,B.P. + ZWART,P. (DEPT. OF GEOLOGY, UNIV. OF DELAWARE, NEWARK, DE 19711): THE IVORY COAST MICROTEKTITE STREWNFIELD: NEW DATA
EARTH AND PLANETARY SCIENCE LETTERS VOL. 43, 336-342 (1979)

GRIFFIN,W.L. + JORGENSEN,K.A. (MINERALOGISK-GEOLOGISK MUSEUM, OSLO, NORWAY): THE GREFSHEIM (NORWAY) METEORITE: A NEW L6 CHONDRITE
METEORITICS VOL. 14, 117-120 (1979)

HARLOW,G.E. + NEHRU,C.E. + PRINZ,M. + TAYLOR,G.J. + KEIL,K. (DEPT. OF MINERAL SCIENCES, AMERICAN MUSEUM OF NATURAL HISTORY, NEW YORK, NY 10024): PYROXENES IN SERRA DE MAGE: COOLING HISTORY IN COMPARISON WITH MOAMA AND MOORE COUNTY
EARTH AND PLANETARY SCIENCE LETTERS VOL. 43, 173-181 (1979)

HARTUNG,J.B. + RIVOLO,A.R. (DEPT. OF EARTH AND SPACE SCIENCES, STATE UNIV. OF NEW YORK AT STONY BROOK, STONY BROOK, NY 11794): A POSSIBLE SOURCE IN CAMBODIA FOR AUSTRALASIAN TEKTITES
METEORITICS VOL. 14, 153-160 (1979)

HEYDEGGER,H.R. + FOSTER,J.J. + COMPSTON,W. (RESEARCH SCHOOL OF EARTH SCIENCES, AUSTRALIAN NATIONAL UNIV., CANBERRA, ACT, AUSTRALIA 2600): EVIDENCE OF A NEW ISOTOPIC ANOMALY FROM TITANIUM ISOTOPIC RATIOS IN METEORIC MATERIALS
NATURE VOL. 278, 704-707 (1979)

HEYMANN,D. (THE LUNAR AND PLANETARY INST., 3303 NASA ROAD 1, HOUSTON, TX 77058): SODIUM-22, 26AL, AND 10BE IN 3HE-RICH FLAKES
METEORITICS VOL. 14, 43-50 (1979)

HONDA,M. + OZIMA,M. + NAKADA,Y. + ONAKA,T. (GEOPHYSICAL INST., UNIV. OF TOKYO, BUNKYO-KU, TOKYO 113, JAPAN): TRAPPING OF RARE GASES DURING THE CONDENSATION OF SOLIDS
EARTH AND PLANETARY SCIENCE LETTERS VOL. 43, 197-200 (1979)

IKRAMUDDIN,M. + LIPSCHUTZ,M.E. + GIBSON,E.K., JR. (DEPT. OF CHEMISTRY, PURDUE UNIV., W. LAFAYETTE, IN 47907): ON MOBILE ELEMENT TRANSPORT IN HEATED AREE
METEORITICS VOL. 14, 69-80 (1979)

JAGO,R.A. (DEPT. OF MATERIALS ENGINEERING, MONASH UNIV., CLAYTON, 3168 VICTORIA, AUSTRALIA): SANTA CATHARINA AND THE ORIGIN OF CLOUDY TAENITE IN METEORITES
NATURE VOL. 279, 413-415 (1979)

JOHNSON,A.A. + REMO,J.L. + DAVIS,R.B. (SPEED SCIENTIFIC SCHOOL, UNIV. OF LOUISVILLE, LOUISVILLE, KY 40208): THE LOW TEMPERATURE IMPACT PROPERTIES OF THE METEORITE HUBA
JOURNAL OF GEOPHYSICAL RESEARCH VOL. 84, 1683-1688 (1979)

KERRIDGE,J.F. + MACDOUGALL,J.D. + CARLSON,J. (INST. OF GEOPHYSICS, UNIV. OF CALIFORNIA, LOS ANGELES, CA 90024): IRON-NICKEL SULFIDES IN THE MURCHISON METEORITE AND THEIR RELATIONSHIP TO PHASE Q1
EARTH AND PLANETARY SCIENCE LETTERS VOL. 43, 1-4 (1979)

KERRIDGE,J.F. + MACKAY,A.L. + BOYNTON,W.V. (INST. OF GEOPHYS. AND PLANETARY PHYSICS, UNIV. OF CALIFORNIA, LOS ANGELES, CA 90024): MAGNETITE IN CI CARBONACEOUS METEORITES: ORIGIN BY AQUEOUS ACTIVITY ON A PLANETESIMAL SURFACE
SCIENCE VOL. 205, 395-397 (1979)

KERRIDGE,J.F. + MACDOUGALL,J.D. + MARTI,K. (INST. OF GEOPHYSICS, UNIV. OF CALIFORNIA, LOS ANGELES, CA 90024): CLUES OF THE ORIGIN OF SULFIDE MINERALS IN CI CHONDRITES
EARTH AND PLANETARY SCIENCE LETTERS VOL. 43, 359-367 (1979)

KING,T.V.V. + KING,E.A. (DEPT. OF GEOLOGY, UNIV. OF HOUSTON, HOUSTON, TX 77004): SIZE FREQUENCY DISTRIBUTIONS OF FLUID DROP CHONDRULES IN ORDINARY CHONDRITES
METEORITICS VOL. 14, 91-96 (1979)

LEWIS,R.S. + ALAERTS,L. + HERTOGEN,J. + JANSSENS,M.J. + PALME,H. + ANDERS,E. (ENRICO FERMI INST. AND DEPT. OF CHEMISTRY, UNIV OF CHICAGO, CHICAGO, IL 60637): A CARBONACEOUS INCLUSION FROM THE KRYMKA LL-CHONDRITE: NOBLE GASES AND TRACE ELEMENTS
GEOCHIMICA ET COSMOCHIMICA ACTA VOL. 43, 897-903 (1979)

LIN,L.S. + GOLDSTEIN,J.I. + WILLIAMS,D.B. (DEPT. OF METALLURGY AND MATERIALS ENGINEERING, LEHIGH UNIV., BETHLEHEM, PA 18015): ANALYTICAL ELECTRON MICROSCOPY STUDY OF THE PLESSITE STRUCTURE IN FOUR IIICD IRON METEORITES
GEOCHIMICA ET COSMOCHIMICA ACTA VOL. 43, 725-737 (1979)

MA,M.-S. + SCHMITT,R.A. (DEPT. OF CHEMISTRY AND THE RADIATION CENTER, OREGON STATE UNIV., CORVALLIS, OR 97331): GENESIS OF THE CUMULATE EUCRITES SERRA DE MAGE AND MOORE COUNTY: A GEOCHEMICAL STUDY
METEORITICS VOL. 14, 81-89 (1979)

METEORITES (CONTINUED)

MCKEEVER,S.W. + SEARS,D.W. (DEPT. OF PHYSICS, UNIV. OF BIRMINGHAM, BIRMINGHAM B15 2TT, ENGLAND): METEORITES AND THERMOLUMINESCENCE
METEORITICS VOL. 14, 29-41 (1979)

MCSWEEN,H.Y., JR. + TAYLOR,L.A. + STOLPER,E. (DEPT. OF GEOLOGICAL SCIENCES, UNIV. OF TENNESSEE, KNOXVILLE, TN 37916): ALLAN HILLS 77005: A NEW METEORITE TYPE FOUND IN ANTARCTICA
SCIENCE VOL. 204, 1201-1203 (1979)

MASUDA,A. + TANAKA,T. (DEPT. OF EARTH SCIENCES, KOBE UNIV., NADA, KOBE 657, JAPAN): EXPERIMENTAL STUDIES ON BEHAVIORS OF MAJOR AND MINOR LITHOSPHILE ELEMENTS IN VAPORIZATION UNDER EVACUATED CONDITION
METEORITICS VOL. 14, 13-28 (1979)

MERMELENGAS,N. + DE LAETER,J.R. + ROSMAN,K.J.R. (DEPT. OF PHYSICS, WESTERN AUSTRALIAN INST. OF TECHNOLOGY, SOUTH BENTLEY, WESTERN AUSTRALIA, 6102): NEW DATA ON THE ABUNDANCE OF PALLADIUM IN METEORITES
GEOCHIMICA ET COSMOCHIMICA ACTA VOL. 43, 747-753 (1979)

MILLER,D.S. + WAGNER,G.A. (DEPT. OF GEOLOGY, RENSSELAER POLYTECHNIC INST., TROY, NY 12181): AGE AND INTENSITY OF THERMAL EVENTS BY FISSION TRACK ANALYSIS: THE RIES IMPACT CRATER
EARTH AND PLANETARY SCIENCE LETTERS VOL. 43, 351-358 (1979)

MITTLEFEHLDT,D.W. + CHOU,C.-L. + WASSON,J.T. (INST. OF GEOPHYSICS AND PLANETARY PHYSICS, UNIV. OF CALIFORNIA, LOS ANGELES, CA 90024): MESOSIDERITES AND HOWARDITES: IGNEOUS FORMATION AND POSSIBLE GENETIC RELATIONSHIPS
GEOCHIMICA ET COSMOCHIMICA ACTA VOL. 43, 673-688 (1979)

MOREN,A.E. + GOLDSTEIN,J.I. (DEPT. OF METALLURGY AND MATERIALS ENGINEERING, LEHIGH UNIV. BETHLEHEM, PA 18015): COOLING RATES OF GROUP IVA IRON METEORITES DETERMINED FROM A TERNARY FE-NI-P MODEL
EARTH AND PLANETARY SCIENCE LETTERS VOL. 43, 182-196 (1979)

NEVSKIY,A.P. PHENOMENON OF POSITIVE STABILIZED ELECTRIC CHARGE AND THE EFFECT OF ELECTRIC DISCHARGE EXPLOSION OF LARGE METEORITES IN PLANETARY ATMOSPHERES
SOLAR SYSTEM RESEARCH VOL. 12, 173-181 (1979)

NEWSOM,H.E. + DRAKE,M.J. (LUNAR AND PLANETARY LABORATORY, UNIV. OF ARIZONA, TUCSON, AZ 85721): THE ORIGIN OF METAL CLASTS IN THE BENCUBBIN METEORITIC BRECCIA
GEOCHIMICA ET COSMOCHIMICA ACTA VOL. 43, 689-707 (1979)

OLSEN,E. + ZEITSCHEL,W. (DEPT. OF GEOLOGY, FIELD MUSEUM OF NATURAL HISTORY, CHICAGO, IL 60605): RICA AVENTURA: A NEW IRON METEORITE FROM CHILE
METEORITICS VOL. 14, 51-53 (1979)

OUSEPH,P.J. + GROSKREUTZ,H.E. + JOHNSON,A.A. (DEPT. OF PHYSICS, UNIV. OF LOUISVILLE, LOUISVILLE, KY 40208): MOSSBAUER SPECTRA FOR IRON BEARING PHASES IN THE METEORITE TOLUCA
METEORITICS VOL. 14, 97-108 (1979)

REED,S.J.B. + SCOTT,E.R.D. + LONG,J.V.P. (DEPT. OF MINERALOGY AND PETROLOGY, UNIV. OF CAMBRIDGE, CAMBRIDGE, ENGLAND): ION MICROPROBE ANALYSIS OF OLIVINE IN PALLASITE METEORITES FOR NICKEL
EARTH AND PLANETARY SCIENCE LETTERS VOL. 43, 5-12 (1979)

REEVES,H. (CENTRE D'ETUDES NUCLEAIRES DE SACLAY, PARIS, FRANCE): COSMOCHRONOLOGY AFTER ALLENDE
THE ASTROPHYSICAL JOURNAL VOL. 231, 229-235 (1979)

REVELLE,D.O. (PLANETARY SCIENCES SECTION, HERZBERG INST. OF ASTROPHYSICS, NATIONAL RESEARCH COUNCIL OF CANADA, OTTAWA, ONTARIO, K1A 0R6 CANADA): A QUASI-SIMPLE ABLATION MODEL FOR LARGE METEORITE ENTRY: THEORY VS OBSERVATIONS
JOURNAL OF ATMOSPHERIC AND TERRESTRIAL PHYSICS VOL. 41, 453-473 (1979)

SMITH,J.V. + HERVIG,R.L. (DEPT. OF THE GEOPHYSICAL SCIENCE, UNIV. OF CHICAGO, CHICAGO, IL 60637): MINERALOGY, PETROGRAPHY AND MINOR ELEMENTS
METEORITICS VOL. 14, 121-142 (1979)

STOLPER,E. + MCSWEEN,H.Y., JR. + HAYS,J.F. (DEPT. OF GEOLOGICAL SCIENCE, HARVARD UNIV., CAMBRIDGE, MA 02138): A PETROGENETIC MODEL OF THE RELATIONSHIPS AMONG ACHONDRITIC METEORITES
GEOCHIMICA ET COSMOCHIMICA ACTA VOL. 43, 589-602 (1979)

ZAIKOWSKI,A. (DEPT. OF PHYSICS, UNIV. OF CALIFORNIA, BERKELEY, CA 94720): INFRARED SPECTRA OF THE ORGUEIL (C-1) CHONDRITE AND SERPENTINE MINERALS
GEOCHIMICA ET COSMOCHIMICA ACTA VOL. 43, 943-945 (1979)

C A L E N D A R

June 20-October 15	National Treasures: Land, Water, Minerals Exhibit at National Archives Building (see page 3 this Bulletin
Sept 15-November 15	William Henry Holmes Exhibit National Museum of Natural History (see page 3 this Bulletin)
October 16-19	Conference on the Ancient Sun: Fossil Record in the Earth, Moon, and Meteorites, National Center for Atmospheric Research, Boulder, CO (see page 7 this Bulletin) Contact: Ms. Pamela P. Jones Lunar and Planetary Institute
October 23-26	AAS/Division for Planetary Science, 11th annual meeting, Holiday Inn, Clayton, MO Contact: Prof. Raymond E. Arvidson Dept. of Earth & Planetary Sciences Washington University St. Louis, MO 63160
November 5-8	Geological Society of America and Associated Societies, Annual Meeting, San Diego, CA Contact: Mr. Fred Handy GSA Headquarters 3300 Penrose Place Boulder, CO 80301
November 14-16	Conference on the Lunar Highlands Crust Houston, TX (see page 7 this Bulletin Contact: Ms. Pamela P. Jones Lunar and Planetary Institute
December 2-15	International Union of Geodesy and Geophysics XVII General Assembly, Canberra, Australia U.S. participants may Contact: A.F. Spilhaus, Jr. American Geophysical Union 2000 Florida Avenue NW Washington, DC 20009 Others to respective national committees OR Executive Director Organizing Committee, IUGG 1979 Australian Academy of Science P.O. Box 783 Canberra City ACT 2601 Australia

December 3-7	American Geophysical Union, Fall Meeting San Francisco, CA Contact: Meets AGU 2000 Florida Avenue NW Washington, DC 20009
January 14	DEADLINE - Abstracts due for XI Lunar and Planetary Science Conference. For forms and information contact: Publications Office Lunar and Planetary Institute
January 14-16	Planetary Geology Principal Investigators' Meeting, Arizona State University. Contact: Dr. Joseph Boyce NASA Headquarters Code: SL-4 Washington, DC 20546
February 27-29	3rd Annual Conference on the Physics of the Jovian Magnetosphere, Rice University, Houston, TX. Contact: T.W. Hill Dept. of Space Physics & Astronomy Rice University Houston, TX 77001
March 17-23	XI LUNAR & PLANETARY SCIENCE CONFERENCE Houston, TX Contact: Symposia Office Lunar and Planetary Institute

: :

The lunar and planetary information bulletin is published by the Lunar and Planetary Institute. There are usually four issues per year. It is distributed free on request to lunar and planetary scientists, educators, students, and their institutions.

The next issue will be in December. Copy deadline 3 December 1979. If you have any announcements which you would like to have printed in the bulletin, please send them to the Editor. We reserve the right to select and edit copy.

Editor: Frances B. Waranius, Lunar and Planetary Institute
3303 NASA Road One, Houston, TX 77058
Phone: 713/486-2135

: :

WHERE ARE THE LUNAR SAMPLES?

STATUS OF THE APOLLO LUNAR SAMPLE COLLECTION

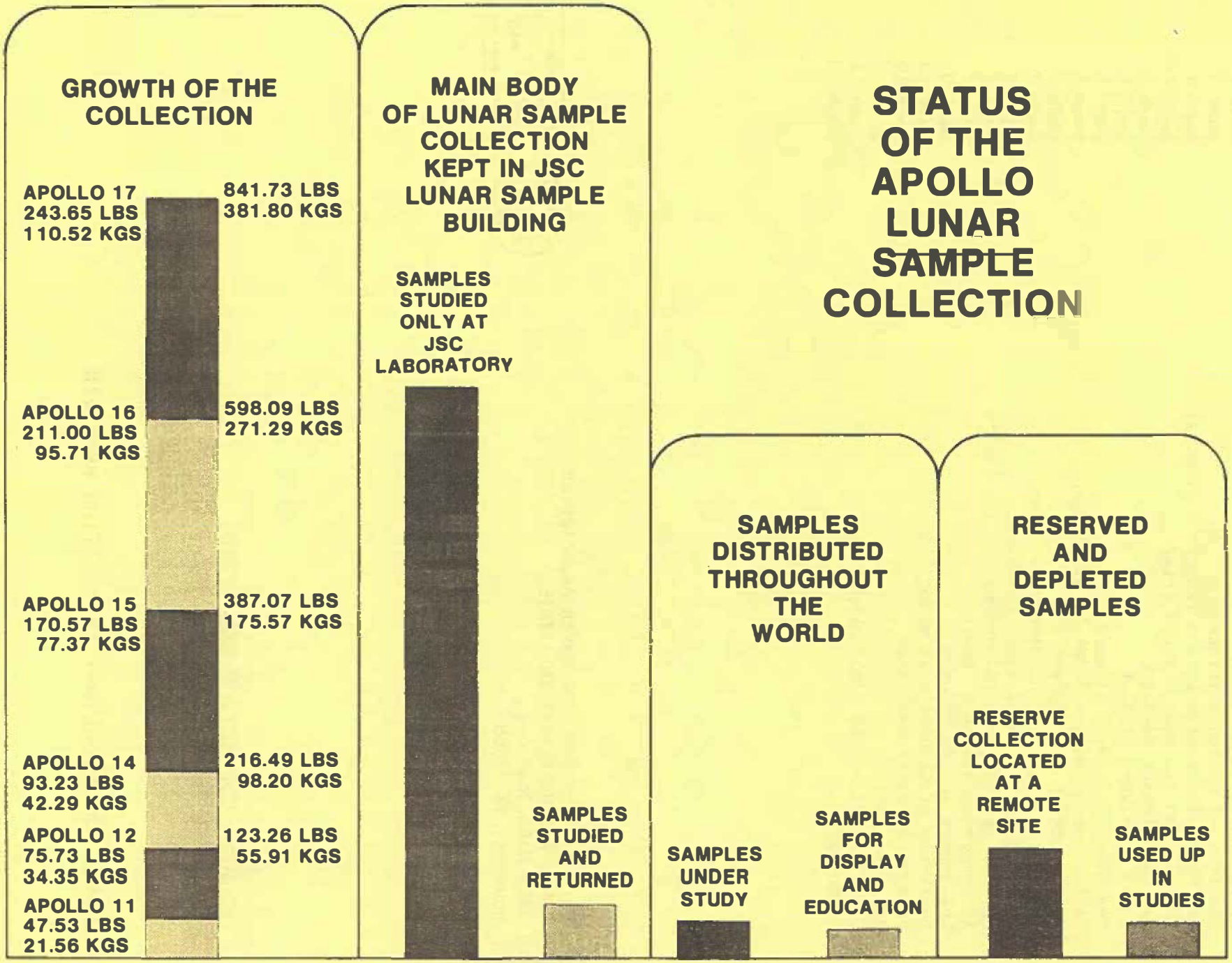


TABLE OF CONTENTS

Universities Space Research Association
LUNAR AND PLANETARY INSTITUTE
3303 NASA Road One
Houston, TX 77058

HOUSTON TEXAS

Nonprofit Org.
U.S. POSTAGE
PAID
Permit No. 662

ADDRESS CORRECTION REQUESTED

LUNAR AND PLANETARY INFORMATION BULLETIN