lunar and planetary information bulletin

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NUMBER 16 JUNE 1978

NASA NEWS BRIEFS

GALILEO PROJECT

The Jupiter/Orbiter Probe scheduled to become the first planetary spacecraft to be carried aboard NASA's Space Shuttle, has been renamed THE GALILEO PROJECT. The science teams which were selected in the Fall of 1977 have been working on the design of the experiments to be carried aboard this probe which will conduct the most detailed scientific investigation yet of Jupiter, its environment and moons, including the first direct measurements of the planet's atmosphere. The Science Confirmation Procedure is set for October 1978. NASA Headquarters personnel for the Galileo project are Program Manager, Ron McCullar; Program Engineer, Mary Jo Smith; and Program Scientist, David Morrison. At the Jet Propulsion Laboratory, John Casani is Project Manager and Torrance Johnson is Project Scientist.

SOLAR-POLAR MISSION

The Solar-Polar mission, originally known as the Out-of-Ecliptic Mission, planned by NASA and the European Space Agency (ESA) is in the current budget with a new start planned for FY'79. A February 1983 shuttle launch is planned for the two unmanned spacecraft, one supplied by NASA and one by ESA. They would be launched simultaneously on looping trajectories that would bring them out to 748 million km from the Sun. The spacecraft would pass over both of the Sun's poles during its five-year mission. Instruments aboard the two spacecraft would investigate, as a function of solar structure of the Sun-wind interface, the solar magnetic field, solar and nonsolar cosmic rays, and the interstellar and interplanetary neutral gas and dust. The Jet Propulsion Laboratory is the lead center for this mission. The Project Manager is Henry Norris; the Project Scientist is Edward Smith. The Program Manager at NASA Headquarters is Mike McDonald.

PIONEER VENUS BEGINS PROBING VOYAGE

Pioneer Venus 1 blasted off from Cape Canaveral, Florida on Saturday May 20 and started its 300-million mile journey to Venus. Pioneer Venus 2 will be launched in August. Pioneer Venus 1, an orbiter, will reach Venus on December 4, 1978 and Pioneer Venus 2, a multiprobe spacecraft, will arrive five days later after splitting into a bus and four atmospheric entry probes.

The flights may shed new light on some of the most puzzling questions in planetary science:

> Why do two planets with about the same mass, probably formed out of similar materials and situated at comparable distances from the Sun, have atmospheres that have evolved so differently.
>
> Why is the surface of Venus baked by a searing heat, while Earth luxuriates in a climate friendly to life.

The answers to both of these questions depend on an understanding of the factors that govern the evolution of a planet's atmosphere.

Information gathered by the two instrument-laden Pioneers at Venus may also help us learn more about the forces that drive the weather on our own planet. The flights are the first ones devoted primarily to a study of the atmosphere and weather of another planet on a global scale. They will employ the largest number of vehicles ever used in such studies, and make measurements at the greatest number of locations. Circling the planet for at least eight months, the Pioneer Venus Orbiter will make the longest observations yet of Venus. It will be the first U.S. Spacecraft to orbit the planet.

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THE lunar and planetary information bulletin, formerly the Lunar Science Information Bulletin (no. 1 1974 to No. 14 1977) 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, and students and their institutions.

Editor: Frances B. Waranius
Lunar and Planetary Institute
3303 NASA Road One
Houston, TX 77058 U.S.A.
Telephone: 713/488-5200, ext. 35
FTS: 525-3436

SPACE PROGRAM PLANNING ACTIVE AMONG SCIENCE WORKING GROUPS

Two missions are currently enjoying high priority in advanced planning at NASA. One is a rendezvous with Halley's Comet in 1985 and the other is a sample return mission to Mars.

NASA and the ESA (European Space Agency) are both very interested in launching a space probe which could intercept Halley's Comet as it passes near the Earth in 1985. The mission which NASA is now studying would send a spacecraft to fly by the Comet and send a probe into it when the Comet is some 93 million miles from Earth. The spacecraft then would move on to meet up with a second comet, Tempel-2 and stay with it for several months. It probably would dock with the comet and sample it directly.

The work of the Comet Science Working Group headed by Dr. Michael Belton of Kitt Peak National Observatory will be considered by the National Research Council, Committee on Planetary and Lunar Exploration (COMPLEX) when it meets this summer. Since COMPLEX in 1975 recommended the study of comets, it is conjectured that this project will be recommended to the agency in the fall with a possible new start in 1982.

Although the mission now proposed would be a Halley fly-by with a Tempel-2 probe, the rationales published in a report in July 1977 are still valid. This report "A First Comet Mission; Report of the Comet Halley Science Working Group" was published as NASA TM-78420. An 11-page executive summary of the report was also published. The two documents are available from the National Technical Information Service as N77-29043 ($6.00) and N77-29044 ($4.00)

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Renewed interest in a Mars sampling mission also is encouraging to planetary scientists. Several scientists have been participating in a study to define the post-Viking Mars exploration program. A variety of vehicle options including geochemical orbiters, penetrators, hard landers, a Mars airplane, rolling balls, and mini-rovers, have been included in the study going on at Jet Propulsion Laboratory. In addition, a major engineering and mission analysis effort has gone into designing and costing a minimum Mars sample return mission. Cost estimates indicate that sample return missions are comparable in cost to in situ laboratory missions.

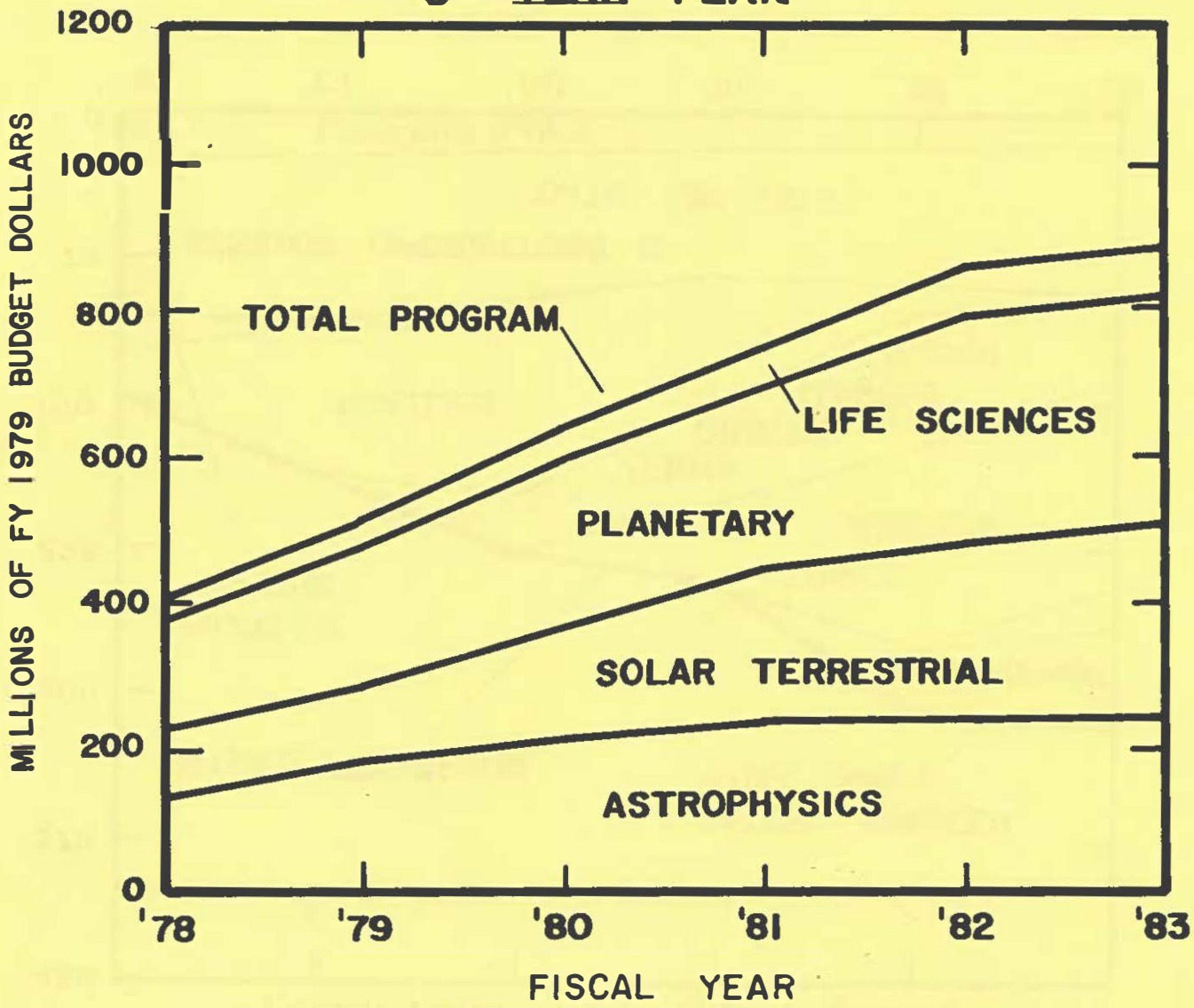
A small science steering group has also been meeting to translate the engineering options into a cohesive Mars exploration strategy. It has been recognized that to address the major questions about Mars will require a major program. The 1984 Mars Science Working Group has agreed that sample return should be the focus of such a program.

A decision will be made this summer by the Office of Space Science as to what the Mars exploration strategy should be. If a program that focuses on sample return is accepted, a new start could be sought in 1982 for a 1988 launch of sample return vehicles.

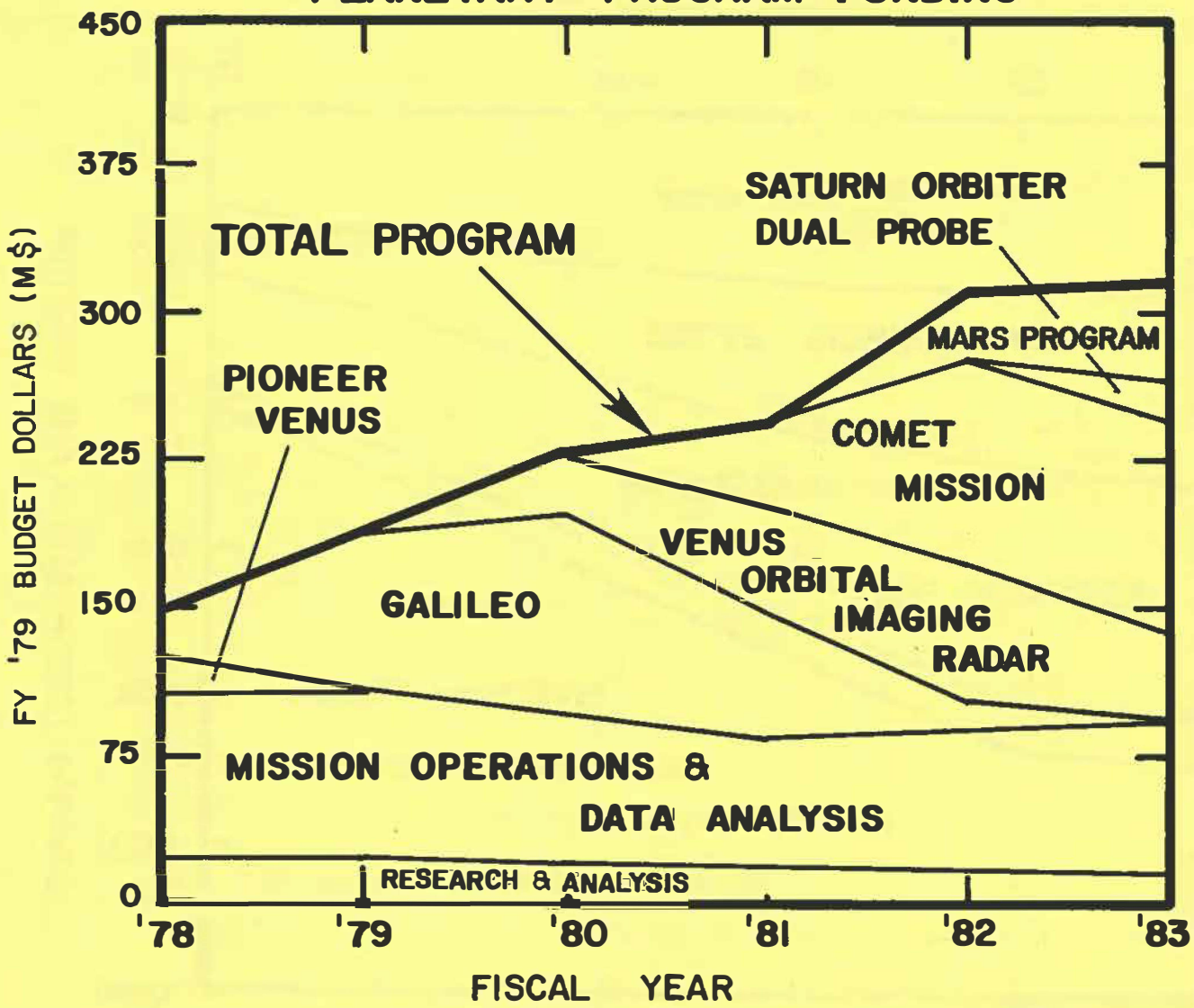
NASA PLANETARY EXPLORATION PLANS
SIGNIFICANT EVENTS

MISSION	EVENTS
PIONEER VENUS ORBITER	ORBIT INSERTION, DECEMBER 1978
PIONEER VENUS MULTIPROBE	VENUS ENCOUNTER/ENTRY, DECEMBER 1978
PIONEER 11	SATURN ENCOUNTER, SEPTEMBER 1979
VOYAGER 1	JUPITER ENCOUNTER, MARCH 1979
	SATURN ENCOUNTER, NOVEMBER 1980
VOYAGER 2	JUPITER ENCOUNTER, JULY 1979
	SATURN ENCOUNTER, AUGUST 1981
	URANUS ENCOUNTER, JANUARY 1986
SOLAR MAXIMUM MISSION	LAUNCH, OCTOBER 1979
VENUS ORBITAL IMAGING RADAR	VENUS ENCOUNTER, 1983
SOLAR POLAR MISSION	JUPITER ENCOUNTER, 1984
	SOLAR POLES PASSAGE, 1986
GALILEO MISSION	MARS FLYBY, APRIL 1982
	JUPITER ENCOUNTER (ORBIT INSERTION/ PROBE ENTRY), 1985
COMET HALLEY/TEMPEL 2 MISSION	HALLEY ENCOUNTER, NOVEMBER 1985
	TEMPEL 2 ENCOUNTER, JULY 1988
or	
COMET ENCKE RENDEZVOUS	ENCKE ENCOUNTER, 1987
MARS GEOCHEMICAL ORBITER	MARS ENCOUNTER, 1987
MARS SAMPLE RETURN	MARS ENCOUNTER, 1989
	EARTH RETURN, 1991
SATURN ORBITER DUAL PROBE	SATURN ENCOUNTER, 1992

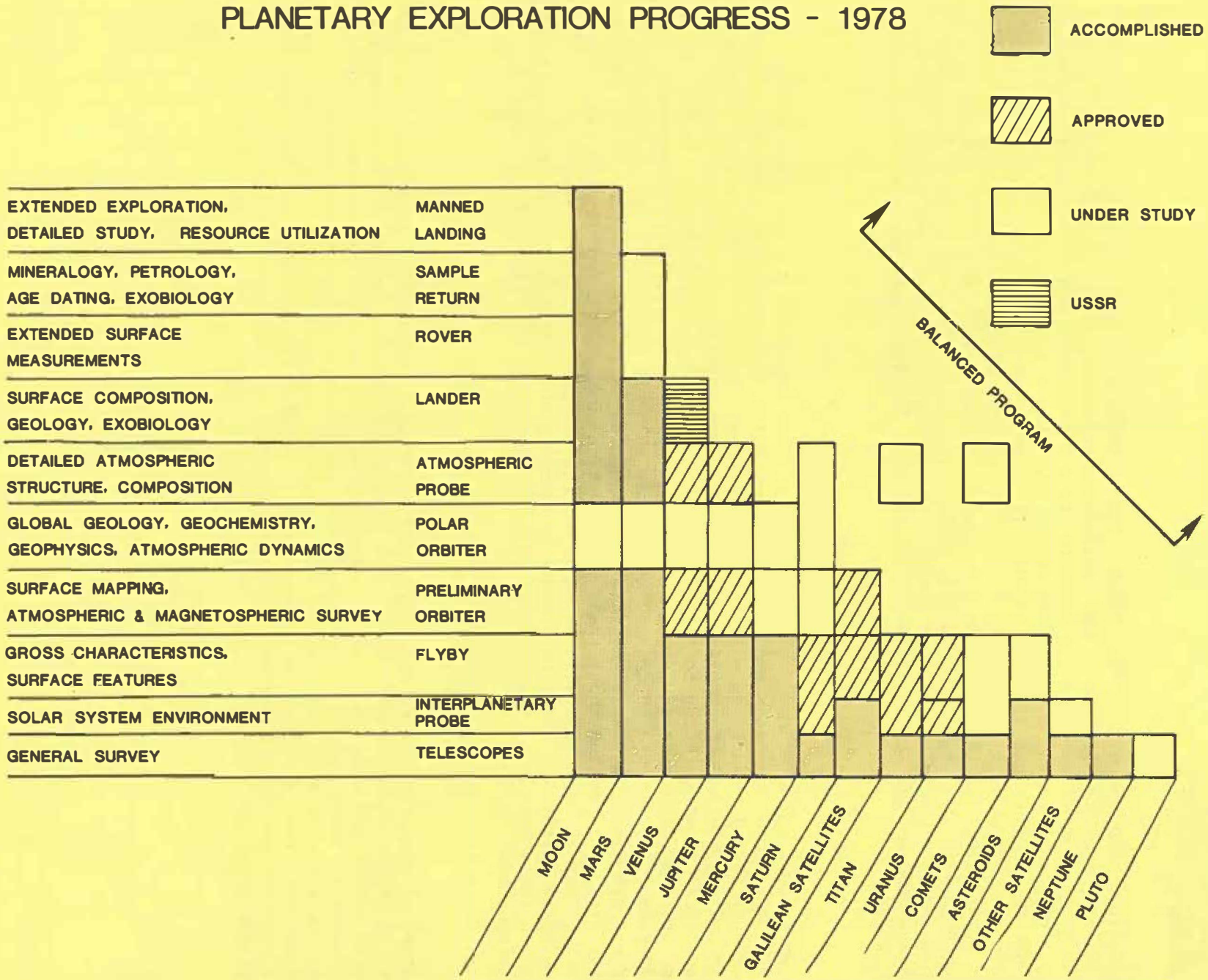
NASA SPACE SCIENCE PROGRAM FUNDING
5 - YEAR PLAN



NASA OSS 5-YR PLAN
PLANETARY PROGRAM FUNDING



PLANETARY EXPLORATION PROGRESS - 1978



CONFERENCES SCHEDULED - LPI

A topical conference *"Plateau Uplift: Mode & Mechanism"* will be held August 14-16, 1978 in Flagstaff, Arizona. This conference co-sponsored by Working Group 7 of the International Committee on Geodynamics and the Lunar and Planetary Institute, will be hosted by the U.S. Geological Survey. Deadline for abstracts for this conference is 30 June 1978. A field trip is being organized in conjunction with this conference to view tertiary structure, geomorphology, volcanics and sequence of events from the Lake Mead area southward to the "transition zone" along the southwestern edge of the Colorado Plateau. If you are interested in this conference and field trip and did not receive the announcement which was mailed in May, please contact Pam Jones, Symposia Office, LPI, 713-488-5202, ext. 50 (FTS direct 525-3436)

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A workshop on *Thermodynamics and Kinetics of Dust Formation in the Space Medium* will be held at the Lunar and Planetary Institute, September 6-8, 1978. This informal workshop will be concerned with a state-of-the-art review and discussions of the thermal physics and thermochemistry of solid particles (dust) immersed in, and forming from/ evaporating to the space medium. It will be limited to, and focus on, the specific space environments that now provide observational information, the laboratory experiments shedding light on the relevant processes, and studies of extraterrestrial materials (meteorites, "Brownlee particles") to the extent that they yield information about their condensation environment and condensation process. Special attention will be given to the transition states between molecules and solid particles. For information concerning the workshop and for instructions concerning submission of abstracts, please contact Dr. Bibhas De at the LPI, 713/488-5200, ext. 59

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A topical conference entitled *Origins of Planetary Magnetism* is scheduled to be held at the LPI on 8-11 November 1978. The purpose of this conference is to promote the assimilation and comparison of the various data sets on planetary magnetic fields gathered in recent years by spacecraft and ground-based observations, and to examine these data in the light of our knowledge of Earth's field, recent advances in dynamo and other theories, and our knowledge of planetary interiors. For additional information about this conference, please contact Dr. Len Srnka at the LPI, 713/488-5200, ext. 59.

CONFERENCES SCHEDULED
OTHER ORGANIZATIONS

The *Commission on Cosmic Mineralogy* of the *International Mineralogical Association (IMA)* will hold two Symposia during its forthcoming meeting as part of the 11th General Meeting of the IMA at Novosibirsk, Siberia, USSR, September 4-10, 1978. These two half-day sessions are devoted to *"Experimental Petrology of Extraterrestrial Materials and Their Origin"* (Co-sponsored by the Commission on Experimental Petrology of the International Union of Geological Sciences) and to *"Lunar and Meteorite Mineralogy"*. Persons interested in giving talks should submit titles and brief abstracts as soon as possible to the Chairman of the Commission on Cosmic Mineralogy of the IMA, Professor Dimitry P. Grigoriev, Director, Institute of Mineralogy, Mining Institute, 199026 Leningrad, USSR with copies to the Secretary, K. Keil, Dept. of Geology and Institute of Meteoritics, University of New Mexico, Albuquerque, NM 87131 USA.

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The 22nd Liege International Astrophysical Symposium to be held in Liege, June 20-22, 1978 will address the topic *"Les Elements et leurs isotopes dans l'Universe"*. The aim of this symposium will be to discuss the chemical evolution of cosmic systems. The symposium is organized under the auspices of the International Association for Geochemistry and Cosmochemistry (IAGC). For more information concerning the symposium, contact a member of the organizing committee, A. Boury, N. Grevesse, L. Remy-Battiau, or Dr. George Wetherill, President of the IAGC, at the Department of Terrestrial Magnetism, Carnegie Institute of Washington, 5241 Broad Branch Road, N.W., Washington, DC 20015 USA.

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The American Geophysical Union and the Division for Planetary Science of the American Astronomical Society (AAS/DPS) will co-sponsor an interdisciplinary Chapman Conference on the various ways in which the magnetosphere and the satellites of Jupiter interact. The conference will be held June 27-29, 1978 on the campus of the University of California at Los Angeles.

Because its purpose is to bring together for the first time concerned researchers for cross-disciplinary exposure to the status of studies and activities in all related fields, the conference will be characterized to a high degree by inter-disciplinary work, involving planetologists, geochemists, magnetospheric physicists, radio and optical astronomers, and astrophysicists. The maturing analysis of Pioneer data, exciting new ground-based observations, the forthcoming Voyager encounters, the Jupiter orbiter mission and the emergence of important astrophysical applications give added impetus to this meeting. For more information concerning this Chapman conference contact American Geophysical Union, 1909 K Street N.W., Washington, DC 20036 or G.L. Siscoe, Dept. of Atmospheric Sciences, UCLA, Los Angeles, CA 90024

CONFERENCES - OTHER ORGANIZATIONS (continued)

The Fourth International Conference on Geochronology, Cosmochronology and Isotope Geology will be held at Snowmass (near Aspen, Colorado) August
by field trips from August 27 to September 2. One publication of short papers submitted by participants is planned to be distributed at the meeting instead of abstracts. For further information and to be placed on the mailing list write: Irving Friedman, FICGCIG, U.S. Geological Survey, Box 25046, Mail Stop 963, DFC, Denver, CO 80225

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The *Houston Chapter of the American Astronautical Society* will be hosts this year to the 25th Anniversary Conference "The Future of the United States Space Program" The conference to be held at the Stouffer's Greenway Plaza Hotel, Houston, Texas on October 30 to November 2, 1978, will provide a forum for industry, government and the technical and scientific communities to share advanced concepts, techniques, and applications using the Frontiers of Space for the Betterment of Mankind. For more information contact American Astronautical Society, 1830 NASA Road One, LEC Mail Code D-01, Houston, Texas 77058 or Ms. Carolyn Watkins at the LPI 713/488-5200, ext. 37

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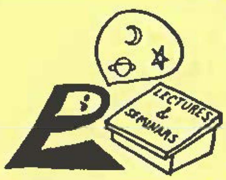

SPECIAL LECTURE SERIES ON FLUID DYNAMICS APPLIED TO LUNAR AND PLANETARY PROBLEMS

Dr. S. I. Pai, a key figure in the development of modern fluid dynamics, will give a series of lectures at the LPI from July 10 to July 14, 1978, on aspects of fluid dynamics and applications to the lunar and planetary sciences. Dr. Pai is a Research Professor in the Institute for Physical Science and Technology, and the Aerospace Engineering Department of the University of Maryland, College Park, MD. The approximate lecture schedule and program is as follows:

Monday, 7/10 A review of the development of modern fluid dynamics (I)

1. *Low speed aerodynamics - classical fluid dynamics*
2. *High speed aerodynamics - aerothermodynamics*
3. *Fluid dynamics in space age*
   - a. *Aerothermochemistry*
   - b. *Plasma dynamics and magnetofluid dynamics*
   - c. *Radiation gasdynamics*
   - d. *Rarefied gasdynamics*

Tuesday, 7/11 A review of the development of modern fluid dynamics (II)

4. *Modern fluid dynamics*
   - a. *Non-Newtonian Fluids*
   - b. *Two-Phase flows*
   - c. *Relativistic fluid dynamics*
   - d. *Superfluid - quantum fluid dynamics*
   - e. *Bio-fluid dynamics*

PAI LECTURE SERIES (continued)

Wed. 7/12 A detailed analysis of two-phase flows
- a. *Gas-solid flow*
- b. *Gas-liquid flow*
- c. *Liquid-solid flow*
- d. *Plasma-gas flow*
- e. *Plasma-solid flow - charged particles in gas*
- f. *Plasma-liquid flow - electrohydrodynamics*

Thurs. 7/13 Wave motions in a plasma under gravitational field
- a. *Fundamental modes of wave motion in a plasma under gravitational flow*
- b. *Magnetogasdynamic waves and shocks based on single fluid theory*
- c. *Magnetogasdynamic waves without gravitational field based on multifluid theory*
- d. *Magnetogasdynamic waves with gravitational field based on two-fluid theory.*

Fri. 7/14 Two-phase flow of a mixture of a gas and small solid particles with application to some lunar problems
- a. *Different phases of gas-solid flow*
- b. *Fundamental equations of a mixture of a gas and solid particles*
- c. *General discussions of important parameters in gas-solid two-phase flow*
- d. *Lunar and terrestrial ash flows*
- e. *Lunar and terrestrial volcanic flows*

The lectures will be given at 3:30 p.m. in the Berkner Room, Lunar and Planetary Institute. All those interested are urged to attend.

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CONCLUSION OF BIBLIOGRAPHY FROM PAGE 21

OTHER PLANETARY OBJECTS: ASTEROIDS, METEOROIDS, COMETS

Fujiwara, A. (Dept. of Physics, Kyoto Univ., Kyoto Japan) Kamimoto, G., Tsukamoto, A.: Expected shape distribution of asteroids obtained from laboratory impact experiments. NATURE 272, 602-603 (1978)

Hindley, K.: Chiron--the celestial centaur. NEW SCIENTIST 77 300-301 (1978)

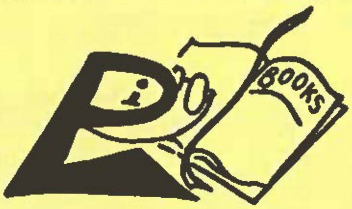
Smith, R.C. (Astronomy Centre, Univ. of Sussex, Falmer, Brighton, East Sussex, UK): Origin of slow moving object Kowal. NATURE 272, 229-230 (1978)

Taylor, R.C. (Lunar and Planetary Lab., The Univ. of Arizona, Tucson, AZ 85721): Minor planets and related objects. XXIV. Photometric observations for (5) Astraea. ASTRONOMICAL J. 83, 201-204 (1978)

Rickman, H. (Stockholm Observatorium, Sweden) Vaghi, S., : Distributions of Jovian perturbations on short-period comet orbits. ASTRONOMY & ASTROPHYSICS SUPPLEMENT SERIES 31, 389-400 (1978)

Sekanina, Z. (Center for Astrophysics, Harvard College Observatory, Cambridge, MA 02138): Relative motions of fragments of the split comets. II. Separation velocities and differential decelerations for extensively observed comets. ICARUS 33, 173-185 (1978)

NEW. . .
PUBLICATIONS. .
PICTURES. . .
POSTERS . .



NASA SP-370 The long-awaited Proceedings of the Soviet American Conference on Cosmochemistry of the Moon and Planets held in Moscow in June 1974 has now been published. This two-volume work containing 929 pages is available from the Superintendent of Documents as S/N 033-000-00633-1 for $18.00

APOLLO-SOYUZ
EXPERIMENTS IN SPACE This series of nine booklets discusses the Apollo Soyuz mission and describes the 34 experiments the crews performed in space. The booklets are designed to be used by high school and college teachers as curriculum supplements, but the descriptions of the experiments are clear and simple enough to be useful to lower grade levels and the general public. There are many diagrams and photographs (including color) in every booklet. All were provided by specialists at NASA and all are of excellent quality. The nine booklets (480 pages total) are sold as a set by the Superintendent of Documents as S/N 033-000-00688-8 for $10.00

VIKING PROJECT
DISPLAY Two new items also available from the Superintendent of Documents which are excellent for illustrations, exhibits and displays are:

VIKING PICTURES OF MARS. Set No. 1. This set consists of 9 of the very best Viking pictures of Mars (5 in black/white and 4 in color) presented in a large 11 x 24" format on heavy paper. Among the striking views are the first picture from the surface which portrays the foot of the Lander resting on Martian soil, a 100-degree panorama of a dune field (formed by joining two special side-by-side photos), an Orbiter photo of an enormous volcano crater, and a color, computer-enhanced landscape featuring a Martian sunset. A four-page illustrated booklet capsulizes the mission and explains the significance and prominent features of each photograph. The 9 lithos sold as a set only as S/N 033-000-00691-8 for $3.50

VIKING/MARS DISPLAY PACKAGE is a larger version of the above including many of the same pictures but as large poster sized photos. This packet includs a set of 50 information sheets which give suggested layouts, captions and descriptions of the design and function of each of the individual instruments, and title panels to help group the materials into specific topics. This set would create an ideal topical display in science classes, libraries, and science fairs. The set is sold as S/N 033-000-00711-6 for $5.00

NEW PUBLICATIONS (continued)

SEARCH FOR EXTRATERRESTRIAL INTELLIGENCE

A 276-page summary of the findings of a group of 16 U.S. Scientists on ways to detect possible radio signals from intelligent life in the universe has been published as NASA SP-419. Edited by Prof. Philip Morrison of MIT and Drs. John Billingham and John Wolfe of NASA/Ames, the volume is based on the results of a series of SETI (an acronym for Search for Extraterrestrial Intelligence) workshops held during 1975 and 1976. If NASA Funds were to be approved for the proposed SETI program at the Jet Propulsion Laboratory, they would provide for an all-sky, all-frequency search for radio signals from intelligent extraterrestrial life using existing antennas of the Deep Space Network at Goldstone, California, and some state-of-the-art hardware including a new very-wide-bandwidth supercooled preamplifier that will be developed specifically for the effort. The search would start in October 1978 and last for five years. Copies of this book can be obtained from the Superintendent of Documents as S/N 033-000-00696-0 for $4.50.

SHOCK METAMORPHISM OF NATURAL MATERIALS

Newcomers to lunar and planetary research may be interested to know that the book *Shock Metamorphism of Natural Materials*, a widely-referenced text on shock effects and meteorite craters is still available. The book, edited by Bevan M. French and Nicholas M. Short was originally published by Mono Books, Inc. in 1968. It is the proceedings volume for the Conference on Shock Metamorphism of Natural Materials, held in 1966, and it contains more than 30 well-illustrated articles on shock-wave mechanics, petrographic shock effects, and the identification of ancient terrestrial meteorite impact craters. The 644-page book priced at $25.00 is available from Mr. Ron Doohaluk, c/o Jewelcore, Inc., 116 South Main Street, Wilkes-Barre, PA 18701 (717/824-8764)

IMPACT AND EXPLOSION CRATERING

This book edited by D.J. Roddy, R.O. Pepin and R.B. Merrill, contains the proceedings of the Symposium on Planetary Cratering Mechanics which was held in Flagstaff, Arizona in September 1976. The conference sponsored by the Lunar Science Institute and hosted by the Astrogeology Branch of the U.S. Geological Survey was to provide an organized forum for communication among scientists engaged in planetary impact and explosion cratering research. Of the 78 papers presented at the meeting, nearly all are contained among the 64 contributions to this volume. The volume, published by Pergamon Press, 1977 is $137.50.

NEW PUBLICATIONS (continued)

COSMIC DUST edited by J.A.M. McDonnell and published by Wiley, reviews the current state of study and research on solid matter in the solar system and in the galaxy. Covering the source of dust, its detection, distribution and dynamics, and its interaction with the planets, the field is an extensive one affecting, in at least some small way, almost every branch of astronomy, physics, and environmental sciences. Some of the contributors to this text are F.L. Whipple, J.L. Weinberg, D.W. Hughes, J.M. Greenberg, D.E. Brownlee, D.G. Ashworth, D.S. Dohnanyi, and H. Fechtig. The 688-page book is available for $47.50.

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EDITOR'S NOTE: Please do not write the LPI to order any of the publications listed in this Bulletin. The following are the addresses of sources and publishers:

U.S. Government Printing Office
Superintendent of Documents
Washington, D.C. 20402

Pergamon Press
Maxwell House
Fairview Park
Elmsford, NY 10523

John Wiley & Sons
605 Third Avenue
New York, NY 10016

Any good book store should be able to get the books from Pergamon or Wiley for you. U.S. Government Printing Office requires that orders be prepaid.

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

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NINTH LUNAR AND PLANETARY SCIENCE CONFERENCE

The L&PSC held for the ninth consecutive year at the Johnson Space Center in March 1978 was attended by 710 participants from 11 countries. There were 303 presentations given which addressed the following seven topics:

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

The abstracts of the conference for those who were unable to attend are still available from Ms. C. Watkins at the LPI. Please send your prepaid order ($1.00 U.S. Mailing, $6.00 foreign mailing) requesting a copy of Lunar and Planetary Science IX .

The Proceedings of the Conference are well underway. 250 manuscripts have been processed and are under review. The Proceedings will be published by Pergamon Press and are scheduled to appear in December.

CALENDAR

JUNE 20-22	22nd Liege INTERNATIONAL ASTROPHYSICAL SYMPOSIUM, Liege. See page 9 this Bulletin for details
JUNE 27-29	JOVIAN-MAGNETOSPHERE-SATELLITE INTERACTIONS CONFERENCE. (A Chapman Conference See page 9 this Bulletin for details.
JULY 16-22	HAWAII SYMPOSIUM ON VOLCANISM. For information contact: Hawaii Symposium, c/o Lois Elms, 745 Gilpin Drive, Boulder, CO 80303. (EOS 59, 146 (1978)
AUG. 14-16	PLATEAU UPLIFT: MODE AND MECHANISM. Flagstaff, AZ See page 8 this Bulletin for details
AUG. 14-17	METEORITICAL SOCIETY ANNUAL MEETING, Sudbury, Ont. For information contact: D.H. Rousell, Dept. of Geology, Laurentian University, Sudbury, Ont. P3E 2C6, Canada
AUG. 20-25	4th INTERNATIONAL CONFERENCE ON GEOCHRONOLOGY, COSMOCHRONOLOGY, AND ISOTOPE GEOLOGY, Aspen, CO. See page10 this Bulletin for details
AUG. 20-25	SILICEOUS DEPOSITS, A GSA Penrose Conference, University of British Columbia, Vancouver. For information contact: James R. Hein, U.S. Geological Survey, Menlo Park, CA 94025
AUG. 29-SEPT.1	EUROPEAN GEOPHYSICAL SOCIETY, Universite Louis Pasteur, Strasbourg, France. For information contact: EGS Secretary, C. Argent, Royal Society, 6 Carlton House Terrace, London SW1Y 5AG, England
AUG. 31-SEPT. 1	COLORADO PLATEAU, ANNUAL SYMPOSIUM, Flagstaff, AZ. For information contact: William J. Breed, Route 4, Box 720, Museum of Northern Arizona, Flagstaff, AZ 86001
SEPT. 4-10	INTERNATIONAL MINERALOGICAL ASSOCIATION, Novosibirsk, Siberia, USSR. See page 9 this Bulletin for details
SEPT. 6-8	THERMODYNAMICS AND KINETICS OF DUST FORMATION IN THE SPACE MEDIUM, Houston See page 8 this Bulletin for details
SETP. 10-16	ORIGIN AND EVOLUTION OF GRANITIC MAGMAS (Penrose Conference) For information contact: David R. Wones, 4404 Derring Hall, Virginia Polytechnic Institute and State University, Dept. of Geological Sciences, Blacksburg, VA 24061 (GEOLOGY 6, 158 (1978)
SEPT. 24-28	MAGNETIC STRUCTURE OF BASEMENT (Penrose Conference) University of Cambridge, U.K. For information contact: H.P. Johnson, Dept. of Oceanography, University of Washington, Seattle, WA 98195
OCT. 2-5	APPLICATIONS OF GEODESY TO GEODYNAMICS (GEOP Research Conference) Ohio State University, Columbus, Ohio. For information contact: Ivan I. Mueller, Dept. of Geodetic Sciences, Ohio State University, 1958 Neil Avenue, Columbus, OH 43210
OCT. 8-17	RIFT ZONES OF THE EARTH: TECTONICS AND MAGMATISM OF THE RIO GRANDE RIFT, Santa Fe, NM. For information contact: Cal Cuntz, Los Alamos Scientific Laboratory, ISD-2, MS355, Box 1663, Los Alamos, NM 87545
OCT. 16-20	EVOLUTION OF PLANETARY ATMOSPHERES AND CLIMATOLOGY OF THE EARTH, Nice, France. For information contact: Centre National d'Etudes Spatiales, Dept. des Affaires Universitaires, 18 Avenue Edouard-Belin, 31055 Toulouse CEDEX France.
OCT. 23-25	GEOLOGICAL SOCIETY OF AMERICA (and affiliated societies) annual meeting, Toronto, Canada. For information contact: Annual meeting secretary, GSA, 3300 Penrose Place, Boulder, CO 80301 (GEOLOGY 6 March and July issues)
OCT. 30-NOV. 3	AMERICAN ASTRONOMICAL SOCIETY/DIVISION FOR PLANETARY SCIENCE, Hilton Hotel, Pasadena, CA. For information contact: Torrance Johnson, Jet Propulsion Laboratory, 4800 Oak Grove Dr., Pasadena, CA 91103
OCT. 30-NOV. 2	AMERICAN ASTRONAUTICAL SOCIETY 25th ANNIVERSARY CONFERENCE, Houston, TX. See page 10 this Bulletin for details
NOV. 8-11	ORIGINS OF PLANETARY MAGNETISM, Houston, TX See page 8 this Bulletin for details
NOV. 13-17	HEAT TRANSPORT PROCESSES IN THE EARTH (Penrose Conference) Los Alamos, NM For information contact: James W. Mercer or Charles R. Faust, U.S. Geological Survey, National Center, Mail Stop 431, Reston, VA 22092 (EOS 59, 146)

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