about the same as a year ago, and 12% greater than the average for the period of record from 1930.

In Arizona the combined contents of lakes Mead and Mohave was 8,242 billion gallons, 36% above the 34-year average, 3% less than a year ago, and 9% below capacity.

Contents of 10 index reservoirs in northern and central California decreased during March to just 1% above long-term averages. The contents were 18% greater than at this time last year.

Average flows of each of the nation's "Big Five" rivers increased from February to March. Individual flows for March: the Mississippi River at Vicksburg, Miss., 650 bgd, 52% greater than the average flow in February, and 23% above average for March; the St. Lawrence River near Massena, N.Y., 181 bgd, an increase of 6% from February, 12% above the March monthly average; the Ohio River at Louisville, Ky., 143 bgd, up 27% over February, but 10% below the long-term March average; the Columbia River at The Dalles, Ore., 120 bgd, up 48% from February, and 52% more than the long-term March average; and the Missouri at Hermann, Mo., 110 bgd, up 84% from February flow, and 130% above the average March readings.

In cooperation with nearly 800 federal, state, and local agencies, the USGS routinely gathers data on the quantity and quality of the nation's surface water and groundwater resources at more than 45,000 stations across the country.

GRL New Editor

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William Lowrie of the Institut fur Geophysik in Zurich has been appointed as a coeditor of *Geophysical Research Letters*. He replaces K. J. Hsü on the editorial board.

Papers intended for publication in GRL may be submitted to any of the coeditors, whose names and addresses appear below. In most cases, the coeditor who receives a submission will arrange for review of the paper and will notify the author of revisions that may be needed. A submission should include four copies of the paper and the names, addresses, and telephone numbers of five suggested referees. A copy of the paper should also be sent to the Editorial Office in Ann Arbor, Mich., and another copy sent to the Publications Division of the American Geophysical Union in Washington, D. C.

Authors may save time in the review process by submitting their papers to an editor in the same geographic region.

James C. G. Walker, Editor-in-Chief, *Geophysical Research Letters*, 2455 Hayward, Ann Arbor, MI 48109–2143, (telephone: (313) 763-9940, telex: 466042 SPRL CI, telemail: JCGWALKER).

Gaston J. Kockarts, Institut d'Aeronomie Spatiale, 3 Avenue Circulaire, B-1180 Bruxelles, Belgium, (telephone: 2/3742728 or 2/3748121, telex: 21563 ESPACE B, telemail: GKOCKARTS).

Kurt Lambeck, Research School of Earth Sciences, Australian National University, POB 4, Camberra, ACT, Australia 2600, (telephone: 61–62–49–3406, telex: 62693, telemail: KLAMBECK).

William Lowrie, Institut fur Geophysik, ETH-Honggerberg, CH-8093 Zurich, Switzerland, (telephone: 377-2607, telemail: WLOWRIE).

Tetsuya Sato, Institute for Fusion Theory, Hiroshima University, Hiroshima, 730, Japan, (telephone: 082-247-0195, telex: 652712 HUHEPL, telemail: TSATO).

Rob Van der Voo, *Geophysical Research Letters*, 2455 Hayward, Ann Arbor, MI 48109–2143, (telephone: (313) 764-1435, telex: 466042 SPRL CI, telemail: JCGWALKER).

National Technology Medal Nominations

PAGE 362

Nominations opened this month for the second round of the National Technology Medals, which are awarded periodically by the president of the United States to recognize individuals and companies for "outstanding contributions to improving the well being of the United States through the promotion of technology or technological manpower."

Any U.S. citizen or U.S.-owned company is eligible. Persons connected with the administration or selection procedures for the medal are not eligible during the period of their service or for 5 years thereafter. It is anticipated that no more than 12 medals will be awarded on any one occasion.

Instructions and nomination forms are available from Philip Goodman, Executive Director, National Technology Medal Nomination Evaluation Committee, Room 4824, U.S. Department of Commerce, Washington, DC 20230. The deadline for submission of nominations is July 31, 1984.—*BTR*

Giacobini-Zinner Re-sighted

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Comet Giacobini-Zinner, which will be the target of close-up investigation by a NASA spacecraft next year, has been sighted for the first time since 1979 by a team of astronomers at Kitt Peak National Observatory in Arizona. The comet was photographed with the 395 cm Mayall Telescope on April 3 by George Will and Michael Belton of Kitt Peak and Stanislaus Djorgovski and Hyron Spinrad of the University of California at Berkeley. The earlier than usual sighting and the closeness of the comet to its predicted location (within 4 arc seconds) will help in planning the September 1985 rendezvous by the International Cometary Explorer (ICE) spacecraft.

Giacobini-Zinner is a well-known comet with an orbital period of 6.5 years, but its motion can be erratic due to outgassing of material from the nucleus. For that reason, John Brandt of the NASA Goddard Space Flight Center, comet scientist for the ICE mission, was "ecstatic" that the comet was resighted so close to its expected position. Mission planners now can proceed with the knowledge that they have a wide margin of propellant for adjusting the spacecraft trajectory prior to the comet encounter. The International Halley Watch, a coordinaed observing network of ground-based telescopes, will devote time to tracking the comet's path around the time of closest spacecraft approach.

The International Cometary Explorer formerly was named the International Sun-Earth Explorer (ISEE). Launched in 1978 to monitor the solar wind upstream of earth, the spacecraft was swung around the moon last December and redirected to a rendezvous course with Giacobini-Zinner. It will pass through the comet's tail on September 11, 1985, to measure charged particles and fields at a distance of approximately 10,000–20,000 km from the nucleus.

Books

Pioneer Venus

PAGE 362

Richard O. Fimmel, Lawrence Colin, and Eric Burgess (Eds.), NASA, Washington, DC, 1983, xi + 253 pp.

Reviewed by Janet Luhmann

In the tradition of the NASA special publications on planetary missions, the book, *Pioneer Venus*, offers a piece of history for a small investment. After a brief historical introduction, this book provides an informal but thorough documentation of a successful planetary mission with the human element very much at the forefront. Even the politics of funding are given acknowledgment. The amount of thought and planning that went into the design of the Pioneer Venus mission, from the feasibility studies and the announcement of opportunity in 1971 to the arrival of the orbiter and multiprobe spacecraft at Venus in late 1978, is given testimonial by the first half of the book, which is replete with tables and figures. It is evident from the vitality with which the two chapters on such mundane but crucial matters as mission operations, parachute development, tracking, data systems, and spacecraft engineering are written that the authors were intensely and actively involved in all aspects of the project. A separate chapter on scientific investigations gives brief descriptions of the experiments, highlighted with photographs of the instruments and principal investigators. The selection of experiments is especially noteworthy because the Pioneer Venus spacecraft was carefully outfitted to return complementary measurements, a trend that today's mission planners also adhere to.

Another chapter describes the mission from the cruise phase toward the planet to the present time, almost five years after the first encounter. It also successfully conveys some of the excitement of the arrival at Venus, the orbit insertion maneuvers, and the

probe releases as it must have been experienced by the crowds of engineers, investigators, and project managers at Ames Research Center in December 1978. After these rather inspiring descriptions of the human and technological sides of the mission, the remainder of the book is dedicated to the science returns. Although hardly anticlimatic, the ~60 pages of scientific results are documented in a somewhat more reserved style. Nevertheless, the subject matter does not lack excitement, and there are many enlightening illustrations (many in color) describing up to date results from the surface (radar), atmospheric, ionospheric, and solar wind interaction investigations. One might wish for more depth in the science discussion, but perhaps this book is not the place for it. Last, there is a bonus chapter by Sagdeev, Moroz, and Breus, which describes the Soviet missions to Venus up to Venera 12, and their interpretation of Venus observations in general. This chapter was not forced to blend with the rest of the book and so stands with an interesting independence and hints at the friendly competition that exists between the U.S. and Soviet space programs. Finally, there are several useful appendices and a bibliography which neatly conclude this colorful and informative record of a mission to Venus which is not likely to be bettered in the foreseeable future.

Janet Luhmann is with the Institute of Geophysics and Planetary Physics, University of California at Los Angeles, Los Angeles, CA 90024.

The Planet Venus

PAGES 362–363

Garry E. Hunt and Patrick Moore, (Eds.), Faber and Faber, Boston, Mass., 1982, 207 pp., $22.00.

Reviewed by Janet Luhmann

This book is not so much for the space scientist looking for background material for research as it is for one interested in the history of planetary exploration. The first half (~100 pps) is devoted to studies of Venus before the space age, starting at several hundred years BC. It is obvious from the multitude of detailed descriptions of observers' accounts that considerable library research went into this section. While sometimes tedious, this chronology of Venus research is punctuated with amusing facts. While many may know about the Velikovsky theory of the cometary origin of the planet, few may know that Lowell drew pictures of Cytherian canals similar to the canals of Mars or that Frederick the Great of Prussia proposed to name the (once suspected) satellite of Venus D'Alembert, after the mathematician. An equally amusing appendix shows the ups and downs of the rotation period of this planet with the invisible surface. Much attention is focused on early telescope observations, the ashen light, and transits of Venus. At the end of this half, one appreciates that Venus has played a fairly important role in history in the areas of religion, science, and technology.

The second half of the book, in contrast, is straightforward scientific reporting about the spacecraft missions to Venus and modern ground-based studies. While this section does not go into much depth, it provides a compact overview of the Soviet and U.S. efforts from the 1960's to the 1980's, starting with the early Veneras and Mariners and ending with mention of the (then still hopeful) VOIR and pending Vega missions. There is brief mention of recent scientific results from the Pioneer Venus mission and Venera 13 and 14. Subjects such as the runaway greenhouse effect and atmospheric composition, the present lack of water and the deuterium clue to possible ancient oceans, the sulphuric acid clouds, super rotation of the upper atmosphere, lightning and its possible relationship to volcanic activity, the absence of plate tectonics and an intrinsic magnetic field, and the Venera pictures of the reddish rock surface and orange sky are introduced with some references. Essentially, nothing is said about the characteristics of the ionosphere and solar wind interaction both of which represent some of the most intriguing findings of the Pioneer Venus mission. The lack of an intrinsic magnetic field at Venus allows the solar wind to interct directly with the planetary ionosphere and atmosphere. Since the Venus data provides us with our first opportunity to learn about a comet-like object in the solar wind, neglect of this is a shortcoming of the authors' summary of the latest Venus research.

Together, the first and second parts of the book leave an appreciation of how far we have come in the last 20 years compared to the rest of human history. Whether intended or not, it is by nature a commentary on the coupling of scientific progress and technology as well as a review of Venus' place in history.

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AGU

Membership Applications Received

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Applications for membership have been received from the following individuals. The letter after the name denotes the proposed primary section affiliation.

Regular Members

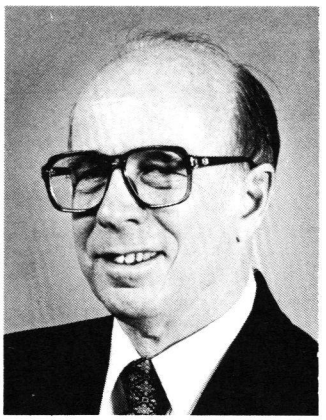
Renae R. Bayuk, Riva Y. Cheung (SS), Paul A. Head (GP), Heikki Korhonen (S), J. Paul Mutschlecner (A), Erik W. Pearson (A), C. P. Price (SM), Warren Slocum (GP), David K. Smith (V), Eric Swanson (V), Daniel C. Wilkinson (SS), John A. Wolff (V), L. William Youmans (P).

Student Status

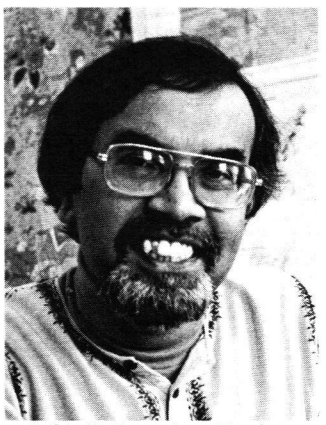
Philip Bogden (O), George J. Dillman (T), Steve Jones (T), Richard Kilbury (H), Michael D. Krantz (V), Warren G. Lee (O), Cheng-Leo Lin (S), Jeanie Mascarenas (S), Michael J. Pangia (SM), Joseph M. Parish (GP), Lisanne G. Pearcy (V), Steven Petrin (H), Jean-Jacques Ponthieu (SM).

Novin Rashedi (H), Javier Samper (H), Deborah Ann Schnell (V), Mary-Jo Shine (H), David A. Siegel (O), Robert L. Stovall (S), Bergthora S. Thorbjarnardottir (S), Gregory Tieman (T), Mark J. Warner (O).

1984 AGU Fellows



Samuel J. Bame—For continued excellence in space plasma physics research, particularly for his foresight and imagination in designing and implementing space plasma instrumentation.



Subir K. Banerjee—For important contributions to understanding the magnetization of rocks and minerals.

Charles A. Barth—For exceptional contributions to the scientific study of the atmospheres of the earth and planets.