16. PHYSICAL STUDY OF PLANETS AND SATELLITES (ETUDE PHYSIQUE DE PLANETES ET SATELLITES)

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ORGANIZING COMMITTEE: M. J. S. Belton, D. Gautier, J. E. Guest, C. H. Mayer, S. Miyamoto, D. Morrison, C. Sagan.

1. Introduction

The explosive increase in the number of published papers on planetary and satellite research in recent years has made it impossible to provide an adequate summary of progress in the field over a given three year period in the space allotted for this purpose. The problem is particularly acute for the current epoch - 1 January 1976 to 31 December 1978 - because it encompasses major missions to Mars and Venus by the United States and the Soviet Union, as well as a large number of exciting discoveries made from the ground.

Instead of attempting the customary abbreviated summary, it seemed more appropriate simply to review some of the highlights of the past three years and to provide a short list of comprehensive references that have appeared during this time. The journal ICARUS has been adopted by the Division of Planetary Sciences of the American Astronomical Society and now contains most of the papers that are published in this field in English. It is an excellent source of information for anyone wishing to determine what the current state of the art is in planetary astronomy, containing more papers than we could adequately summarize here.

But this journal doesn't include all papers published in the field; a comprehensive review of the current literature requires the study of a large number of journals in several languages. As a partial gesture in this direction, reviews by Drs. Morozhenko and Teifel' of planetary research carried out in the Soviet Union are included in the present report, since much of this material may be unfamiliar to many Western scientists. Finally, reviews of activities at the IAU Planetary Data and Research Centers are given by Drs. Baum and Dollfus, and the structure of a new joint working group on cartography is described.

2. Solar System Research

Any attempt to select the most important discoveries in a given three-year period will necessarily reflect the biases of the selector. With that caveat in mind, the following events, discoveries, and references are offered as an indication of what we have learned in the last three years:

A. MERCURY

A comprehensive review of the results of the Mariner 10 mission to Mercury (multiple encounters in 1974 and 1975) was published by D. E. Gault, J. A. Burns, P. Cassen, and R. G. Strom in Ann. Rev. Astron. Astrophys., 15, 97-126 (1977).

B. VENUS

A summary of the results from the Venera 9 and 10 missions to Venus in October 1975 was published by M. V. Keldysh in Icarus, 30, 605-625 (1977). C. P. Florensky, L. B. Ronca, and A. T. Basilevsky discussed the appearance of the surface of Venus near the landing sites (Science, 196, 869 (1977)), and a series of papers by various authors also appeared in Kosmicheskie Issledovania, 14, Nos.

5 and 6 (1976) (in Russian), and in Proc. Lunar Sci. Conf. 8th (1977). An extensive review of the literature (including all spacecraft results to date) by M. Ya. Marov is currently in press in Ann. Rev. Astron. Astrophys., 16 (1978). As this is being written, the first results are being announced from the new series of U.S. and U.S.S.R. Venus probes that have reached the planet in December 1978. The most publicized finding is the discovery of unexpectedly large amounts of non-radiogenic noble gases in the atmosphere of Venus.

C. MARS

The major investigation of Mars during the period under review was carried out by the two successful orbiters and landers of the U.S. Viking Mission that reached the planet during the summer of 1976. Preliminary results from these missions were described in three issues of Science (193 No. 4255, 194, Nos. 4260 and 4271) in 1976, while more complete versions of the scientific findings were presented in a special issue of the Journal of Geophysical Research: 82, No. 28, pp 3951-4684 (1977). A large number of papers and reviews describing the results of this mission have appeared in other places; a new collection for the J. Geophys. Res. is being planned for 1979.

D. THE OUTER PLANETS

An excellent summary of current knowledge about the largest planet is available in the book Jupiter, Studies of the interior, atmosphere, magnetosphere and satellites edited by T. Gehrels (Tucson: U. of Arizona Press) 1976. The papers in this volume include reviews of Pioneer 10 and 11 results as well as ground-based and theoretical studies. Once again we are on the verge of new discoveries, with the Voyager spacecraft due for encounters with the Jupiter system in March and July of 1979. Until these results have been analysed and published, the Gehrels book will remain the basic reference in the field. With 44 papers authored and reviewed by over 100 experts, it has set a high standard for any future publications of this type.

A workshop reviewing current knowledge about Saturn and Titan was held under the auspices of NASA Headquarters in Washington, D.C., in February of 1978. Proceedings of this conference are being edited by Drs. D. M. Hunten and D. Morrison and should be available shortly. The specific purpose of the conference was to provide a background for the design of a possible mission that might include a Saturn orbiter with probes to both Saturn and Titan.

The last three year period was marked by three exciting discoveries in the outer solar system:

(a) the asteroidal object Chiron, found by C. T. Kowal in an orbit lying mainly between Saturn and Uranus (I.A.U. Circ. No. 3129 (1977));
(b) the rings of Uranus discovered by J. L. Elliot, E. Dunham, and D. Mink (Nature, 267, 328 (1977)) and R. L. Millis, L. H. Wasserman, and P. V. Birch (Nature, 267, 330 (1977));
(c) a satellite of Pluto, discovered by J. W. Christy and R. S. Harrington (Astron. J., 83, 1005 (1978)).

Further observations of all of these objects have been made since their discovery and may be expected to be reviewed at future Symposia. The most recent comprehensive review of the various satellite systems is the book Planetary Satellites edited by J. A. Burns (Tucson: U. of Arizona Press) 1977. The book contains 27 papers by 34 authors based on presentations at IAU Colloquium No. 28 at Cornell University, on 18-21 August 1974.

3. Planetary Studies in the USSR

A. TERRESTRIAL PLANETS (A. V. Morozhenko)

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(a) Main Astronomical Observatory of the Ukrainian Academy of Sciences (Kiev)

1. The spectral dependence of particle albedo (ω) in the period of the strongest activity of the Martian dust storm of 1971 was determined ($0.8201 \leq \omega \leq 0.9901$ for $0.35 \leq \lambda \leq 0.70\mu$), the lower limit of the optical thickness value $\tau_0 \geq 20$, as well as the value of volume scattering coefficient σ_0 at the level of formation of CO_2 absorption bands at λ 1.05 and 1,6μ ($\sigma_0 \approx 2.10^{-5}$ cm^{-1}) were also derived (Dlugach, Morozhenko).

2. A rigorous method was developed for numerical calculation of the luminous intensity in a multi-layer optically thick atmosphere. This allowed an analysis of the results of radiation field measurements of the Venus atmosphere. In particular, the upper limit of clouds was found to be at a height of about 70 km, and the optical thickness of the cloud layer was found equal to about 50 (Dlugach, Yanovitskii).

3. Investigations were carried out on the possibility of using the photometric method for determining the slope of the walls of Martian relief. The slopes of the walls of some craters were determined from photos made with "Mars-5". The mean slopes of the external walls appeared to be about 3°, and the inner ones -6° and +7° (Botvinova).

(b) Astronomical Observatory of the Kharkov University

Using the data of photographic and photoelectric observations of Mars in 1971, the values of the mean radius of the dust particles (about 10μ) as well as a value for the upper limit of the dust layer optical thickness ($\lesssim$ 40) were estimated. A method for the control of the state of the Martian atmosphere was usggested from the observation of brightness in various regions of the spectrum (Aleksandrov, D. Lupishko, T. Lupishko).

(c) Crimean Astrophysical Observatory

Television observations of Mars were carried out in ten regions of the spectral interval 0.377 - 0.760 in the period from 25 October 1975 to 13 February 1976. The images showed that the "blue clearings" occurred in both the light and the dark regions on Mars which speaks in favour of the hypothesis of their origin from atmospheric dust. The dust activity was registered in November - December, 1975, and the global dust storm was observed in the period from 17 January to 13 February 1976 (Abramenko, Prokofjeva).

(d) The Shternberg State Astronomical Institute

An analysis of the IR-observations of Venus obtained in 1970-1976 was carried out (Taranova). The temporal (about a day) variations of the continuous spectral intensity and equivalent widths of carbon dioxide bands were discovered.

(e) Institute of Applied Mathematics of the Academy of Sciences of U.S.S.R.

1. The vertical structure of the Venus atmosphere was studied for heights less than 65 km with the help of nephelometer placed on the spacecrafts "Venera -9 and -10". A cloudy layer was proved to have a layered structure and its lower limit was found at the height of 49 km. Below this layer the atmosphere also includes some quantity of aerosol, but its origin is different. The optical thickness of the cloudy layer is 20 - 25 and 50 - 55 corresponding to the altitude interval of 49-62 km for the landing places of "Venera -8 and -10". The volume scattering coefficient varies in the range of (1 - 5).10^{-5} cm^{-1} (Marov et al.).

2. The light intensity in the Venus atmosphere and on the planet's surface was

studied in five wavelengths in the spectral region 0.52-0.96μ. These measurements may be well represented by the two-layer atmosphere model according to which the cloudy layer has an optical thickness of about 30, and its lower layer includes a small quantity of fine aerosol (Avduevskii).

3. The wind velocity near the Venus surface was measured (0.5 - 1 m/sec) (Avduevskii).

(f) The Institute for Space Research of Academy of Sciences of U.S.S.R.

1. With the help of "Venera -9 and -10" it was estimated that the content of H_2O in the Venus atmosphere was $3 \cdot 10^{-2}$ volume % at the heights 20-40 km, with a possible uncertainty on the oder of 2 (from the measurements of the intensity of absorption bands at 8200 Å) (Moroz et al.).

2. The changes of the solar radiation intensity during a few minutes after the landing indicated the presence of a dust layer on the planetary surface (Ekonomov, Moshkin, Golovin).

3. The luminosity of the Venus night sky was investigated in the visible region of the spectrum. The bands of molecular hydrogen are dominant, with an excitational mechanism that is only effective in an atmosphere where CO_2 predominates (Krasnopol'skii, Krys'ko).

4. The characteristics of the emergent thermal radiation of Venus were studied in detail. An essential distinction between the emergent thermal radiation from night to day was discovered (Ksanfomality).

5. The hydrogen corona of Venus was shown to contain the gas with two different temperatures (at a height larger than 300 km the temperature is higher); the relative content of deuterium in the Venus atmosphere is less than 1% (Kurt, USSR; Blamont, France).

6. The magnetic plasma tail of Venus was detected, in which the plasma flux differs from that encountering the planet (Vajsberg).

(g) Institute of the Earth Magnetism (Moscow)

1. Evidence was obtained for the presence of a Martian magnetic field with dipole moment $M = (2.2 \pm 0.3).10^{22}$ G/cm^3. The polarity is reverse to that of the Earth's dipole. The magnetic tail on the dark side of Mars extends to 9000 km.

2. It was found that the space on the dark side of Venus is the magnetosphere with the density of magnetic energy exceeding that of radiation energy. Not far from the surface of the planet the field was observed to be of external origin. The field topology at these distances may be explained by the interaction of the field of the transition zone of solar or induced origin with a weak proper magnetic field of the planet. Its polarity is opposite to that of the Earth's dipole, and its magnetic moment is not more than $3 \cdot 10^{22}$ G/cm^3.

(h) Research Radiophysical Institute of the Gorky University

1. The radio-frequency radiation of Venus, Mars, Mercury, Saturn and Uranus measured at 1.35 cm corresponds to the brightness temperatures 457±26°K, 186±20°K, 406±28°K, 124±8°K and 147±13°K, respectively. The measured values of the brightness temperature of Venus speak in favour of the presence of some water vapor in its undercloudy layer. Its relative content is 0.3 - 0.5% (Baranov et al.).

2. A theoretical investigation of the thermal regime of the upper surface material

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of Mercury was carried out. From a comparison of the night temperature obtained by the experimental method with the data obtained by calculations, the thermal parameters were estimated. The derived value $\gamma = (\kappa\rho c)^{-1/2} = 600\pm100$ shows the structure of the upper surface of Mercury to be similar to that of lunar soil (Krotikov, Shchuko).

The effect of temperature and atmospheric pressure on the thermal properties of the Martian soil was considered theoretically. It was shown that the variations of the atmospheric pressure in various regions of Mars as well as the temperature variations on the planet's surface in the nighttime cause variations of the thermal parameter γ on the order of 15 - 20% (Krotikov, Shchuko).

(i) Physical Institute of the Academy of Sciences

The long period variations of Mars' radio-frequency radiation at the wavelength of 8mm were analysed (Kuz'min). The preliminary conclusions were that the observed variations of brightness temperature of the planet follow in the first approximation the calculated variations caused by the ellipticity of the orbit, the inclination of the axis of rotation to the orbital plane and the geometry of the visibility of the planet from the Earth.

B. OUTER PLANETS RESEARCH (V. G. Teifel')

(a) Jupiter

It was shown in a number of papers of the Alma-Ata and Kiev planetary research groups that the two-layer model (a gas-aerosol semi-infinite cloud layer below a pure gas atmosphere) satisfactorily describes the observed properties of most regions on Jupiter in the shortwave continuum as well as in the visible and near infrared molecular absorption bands. In terms of this model Teifel' (Alma-Ata) has estimated the methane, ammonia and hydrogen abundances in the atmosphere of Jupiter above the clouds and within the cloud layer per mean free scattering path. There were no contradictions between the estimates derived from weak and moderately strong absorption bands of CH_4 and from the line intensities in the strong absorption band near 1.1μm.

The H_2 abundance in the atmosphere above the clouds is about 5-10 km-amagat both from the ultraviolet spectrophotometery and from the intensity of the quadrupole lines. According to Morozhenko and Yanovitskii (Kiev) the relative abundance of CH_4 is about $(2.3\pm0.7)10^{-3}$ and the relative abundance of NH_3 within the cloud layer is about $(1.0\pm0.5)10^{-4}$.

Vdovichenko and Gaisin (Alma-Ata) have studied an absolute spectral reflectivity of Jupiter's cloud cover in the spectral range from 0.32 to 1.1μm using the scanning spectrometer. From two-years spectrophotometric observations Teifel and Kharitonova have shown that the limb-darkening of the Jovian polar regions is almost independent of wavelength in contrast to the equatorial and temperate belts and zones of Jupiter. This peculiarity may be explained by the presence of some quantity of absorbing aerosol particles in the atmosphere over the polar regions. Photometery of polar regions and analysis of latitudinal variations of the methane absorption both lead to the conclusion that the optical depth of the pure gas atmosphere is greatest at temperate latitudes and decreases toward the Jovian poles.

Some parameters of the two-layer model were determined by Vdovichenko from observations with the image-tube spectrograph and the scanning spectrometer at 0.6-1.1μm. The latitudinal varations of the altitude of the upper cloud boundary were estimated to be about ±6 km compared with the cloud boundary at the equator. Photometric parameters of the Jovian cloud layer were determined also by Kartashov

(Alma-Ata).

Aksenov, Atai and Ibragimov (Alma-Ata, Shemakha) have studied the intensity variations of the ammonia and hydrogen absorption lines on the disk of Jupiter. A review of morphological peculiarities in the molecular absorption distribution on the Jovian disk and related problems has been prepared by Teifel' and published in "Jupiter' (ed. T. Gehrels, U. of Arizona Press).

A new approach to the problem of cloud formation in the Jovian atmosphere was developed in the series of papers by Buikov, Ibragimov, Pirnach and Sorokina (Alma-Ata, Kiev). They have modelled theoretically the formation of the ammonia clouds taking into account some dynamical characteristics of the atmosphere of Jupiter (e.g., turbulent transfer, velocities of the vertical motions) and considering the role of condensation nuclei. The vertical profiles of density and microphysical structure of the cloud were derived from these calculations for some different and varied values of atmospheric parameters. In most cases the optical depth of the ammonia clouds was found to be significantly greater than unity.

The problem of the equatorial jet on Jupiter was considered by Keller, Yavorskaya and Simuni (Moscow), and Iroshnikov (Moscow). Shuleikin has proposed a dynamical analogy between the Great Red Spot on Jupiter and cyclic Atlantic ocean currents to explain the elliptic form of the Red Spot. A comprehensive review of theoretical studies of Jovian interiors was published by Zharkov and Trubitsyn in "Jupiter". A hot model of the internal structure of Jupiter was suggested by Kozyrev (Leningrad). He assumed the thermal conductivity of an electronic gas as a main mechanism of the heat transfer within the Jovian interiors.

(b) Saturn

From a special series of continuous 5-6 hours spectrometric observations of Saturn Kharitonova (Alma-Ata) has studied the probable longitudinal variations of the methane 6190 and 7250 Å absorption band intensities. She has shown by a statistical analysis that these variations are practically absent. The temporary variations from the analysis of 1972-1974 data cannot be more than 5 per cent. The detailed consideration of the methane absorption measurements in the equatorial and south temperate belts of Saturn (Teifel') leads to the conclusion that the vertical distribution of the aerosol concentration in these belts is not the same and the vertical gradient of the volume density within the temperate belt cloud layer is more than in equatorial clouds.

The atmospheric pressure at the upper boundary of the equatorial cloud layer on Saturn is about 0.2±0.1 atm as derived from spectrophotometric and photometric studies (Morozhenko, Yanovitskii, Teifel'). This value is smaller than for Jupiter where it is about 0.3±0.05 atm. On both planets the upper boundary of the aerosols lies higher than the upper boundary of the convective zone.

The hydrogen abundance derived from the interpretation of the quadrupole lines measurements in terms of the two-layer model was estimated by Teifel' to be about 20±7 km-amagat for the atmosphere above the clouds and about 11 km-amagat per mean free scattering path within the cloud layer in agreement with the ultraviolet observations (apart from noticeable latitudinal variations). The relative ammonia abundance near the upper boundary of the cloud layer was estimated to be about $3 \cdot 10^{-6}$ (Teifel') and less than $2 \cdot 10^{-5}$ for deeper atmospheric layers (Morozhenko). The methane abundance above the clouds is about 53±8 m-amagat at the equator and 76±20 m-amagat for the south temperate region.

A review of polarimetric studies of Saturn in Kiev has been published by Morozhenko in 1977 in an issue of Astronomy and Astrophysics. Sigua (Abastumani) has studied the variations of the polarization of some points on Saturn's disk with phase angle at various wavelengths of the visible spectrum.

Gruzdeva, Naumov and Timofeeva (Gorky) have considred theoretically the problem of Saturn radio emission and a possible role of the ammonia inversion absorption in this process. Soloviev (Moscow) has confirmed an occurrence of the depression at lower frequencies of decimetric radio emission of Saturn which may be connected with the reabsorption of synchrotron emission by "cold" plasma.

(c) Rings of Saturn

Photoelectric measurements of the phase variations of the brightness of Saturn's rings were carried out by Krugov (Kiev) and Kartashov and Egorov (Alma-Ata). Gretskii (Kharkov) has discovered the secondary maximum of the ring B brightness near a phase angle of about 4°. He concluded also that the value of the opposition maximum depends on wavelength from his spectrophotometric measurements. The opposition effect may be connected with the "glory" phenomenon on relatively transparent particles with refractive index about 1.8. The secondary maximum may be explained by a "rainbow" effect on the same particles.

New analysis of the data about the apparent and true thickness of Saturn's rings was presented by Bobrov (Moscow). He suggests that the true ring thickness is significantly more than the mean radius of the particles within the rings.

(d) Satellites

Atai (Shemakha) has analysed a series of Io's spectrograms. The emission lines of sodium, calcium, iron and magnesium were detected and some variations of their intensities with the orbital phase angle were studied. A post-eclipse brightening of Io of about $0^{m}.08$-$0^{m}.09$ was noted by Prokofieva (Krimea) in ultra-violet and green from the photometry of television pictures.

Steklov (Kiev) has calculated diurnal temperature variations for the Galilean satellites of Jupiter and for Triton and Pluto. The night temperatures as he has shown are practically not dependent on thermal inertia and albedo of the surface and are determined by the daytime values. The water and ammonia in the atmospheres of these bodies cannot be in a concentration greater than 10^{8} cm^{-3}. There may be methane atmospheres on Triton and Pluto with pressures about 10^{-10} - 10^{-7} bars if their surfaces are covered by methane ice. Atmospheric pressure must be strongly dependent on planetographic coordinates.

From the observed flux of the radio emission of Europa, Ganymede and Callisto at 2.08 and 3.95 cm on RATAN-600 (Berlin et al.) brightness temperatures of about 180°K were derived. These temperatures are significantly greater than radiative equilibrium temperatures calculated for the Galilean satellites.

4. Planetary Photographs Center of International Astronomical Union (IAUPPC) (A. Dollfus)

The Planetary Photographs Center of the International Astronomical Union at Meudon Observatory, France (IAUPPC), was organized in 1961 at the request of the IAU with the assignment:

" ... to facilitate research on collections of photographic plates previously scattered in several observatories". (Trans. IAU 1961).

IAUPPC is now gathering a large collection of planetary pictures taken with telescopes throughout the world since the beginning of astronomical photography. These documents are filed in a system which provides straightforward access for reproduction, measurements, and intercomparisons. The collections include 33,000

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distinct positive pictures for all the planets, 8,500 selected images of exceptional quality, 6,000 original negatives, etc. ... These documents come from 18 Observatories of different countries, plus some private temporary stations, with particularly large contributions from the Pic-du-Midi and Lowell Observatories, and the New-Mexico State University Station.

At its General Assembly of Sydney in 1973, the IAU decided to extend the scope of IAUPPC to imaging data on planets and Moon returned by the space missions. Thus the Center has available now copies of the films for the lunar missions RANGER, SURVEYOR, ORBITER, APOLLO and for the planetary missions MARINER 4 to 10, the lunar sample data, etc. ...

All these documents and the facilities needed for their analysis were housed in a special building of Observatoire de Paris, at Meudon, France connected with the Laboratory "Physique du Système Solaire" which was entrusted to foster the IAUPPC scientific activity by involving scientists from all countries. In 1977, all the collections were moved to another building.

During the first 16 years of operation of the Center, more than 50 papers in scientific journals which are based upon the documents of the Center were published. Among those 24 are from the past five years. In addition, 6 dissertations for doctoral degrees were largely based upon data from the IAUPPC facilities.

During the period 1975-1978 the Center was visited more than 100 times by 75 scientists or users originating from 12 countries, among those one third were from France. Users visit the Center either occasionally for a specific purpose, or frequently for more systematic needs, or else for longer periods lasting in some cases for several months. Mailing of documents to requestors was also a part of IAUPPC activities. Most of the time the scientists working at the Center borrow or order copies of documents, in addition to local consultations and analyses. Documents were loaned at an average yearly level of around 50 slides or films, 50 paper prints, 50 transparent copies from telescopic results and a large number of spacecraft planetary imaging data.

These past years, in addition to the files, the photographic darkrooms, image analsis and microphotometric facilities already available, the IAUPPC has developed contacts with the nearby computing center of INAG, CIRCE and CDCA for access to image digitalization and processing capabilities.

The IAU is also fostering systematic telescopic photography of planets by coordinating the contributions of amateur astronomers equipped with their own instruments, or by training them for work with the telescopes avialable in observatories.

In 1975 and again in 1977, photographic surveys of Venus in the ultraviolet were conducted in connection with polarimetric analysis of the light at the planetary surfaces. In 1977, for instance, the coverage included more than 200 pictures taken during 65 distinct dates, a fraction of them having been covered by several stations; during 11 of these data of photographic observations, simultaneous polarization mapping data were collected in orange, U.V. or both, with the Meudon Observatory telescopes.

For 1978-1979, IAUPPC is organizing with the "Laboratory of Planetary Atmospheres", London, U.K. an International Jupiter Voyager Telescope Observation Program (IJVTOP), to document the Jupiter atmospheric pictures in connection with the NASA Voyager spacecraft program. Amateur Astronomical Societies are again involved. In November and December 1978, more than 100 pictures were already collected.

5. Joint Working Group on Cartographic Coordinates and Rotational Elements of the Planets and Satellites

Recognizing that planetocentric coordinates are frequently used to correlate and collate data and are required for navigation, the IAU at the XVIth General Assembly in Grenoble, 1976 established the Working Group on Cartographic Coordinates and Rotational Elements of the Planets and Satellites to recommend specific cartographic coordinate systems and conventions for all users. This Working Group reports to Commissions 4 (Ephemerides) and 16. The current chairman is M. E. Davies; the membership is as follows:

C. A. Cross, R. L. Duncombe, H. Masursky, B. Morando, P. K. Seidelman, Y. S. Tjuflin, G. A. Wilkins. V. K. Abalakin and T. C. Owen are *ex officio* members as the current presidents of 4 and 16, respectively. The Working Group is presently drafting a report which will be presented to the Commissions at the 1979 General Assembly in Montreal.

T.C. OWEN
President of the Commission

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WORKING GROUP FOR PLANETARY SYSTEM NOMENCLATURE (NOMENCLATURE DU SYSTEME PLANÉTAIRE)

(Committee of the Executive Committee)

PRESIDENT: P.M. Millman.
Members: B.Yu. Levin, D. Morrison, T.C. Owen, G.H. Pettengill, V.V. Shevchenko, B.A. Smith, E.A. Whitaker.
CONSULTANTS: S.E. Dwornik, A.M. Komkov.

Since the last General Assembly of the IAU in Grenoble, France, we have been saddened by the death of two of our valued colleagues:-

> Professor Donald H. Menzel, past chairman of the Lunar Nomenclature Task Group, passed away on December 14, 1976.
> Professor Yu.N. Lipskiy, member of the Lunar and Mercury Nomenclature Task Groups, died on January 24, 1978.

The activities of the IAU/WGPSN, up to and including the XVI General Assembly in Grenoble, have been detailed in Trans. Intern. Astron. Union 16B, pp. 321-369, 1977. The fourth meeting of the Working Group was held in Washington, D.C., USA, June 1-2, 1977, and the fifth meeting in Innsbruck, Austria, June 1, 1978. The sixth meeting is scheduled for August 13, 1979, in Montreal, Canada.

For the future assignment of original names in the Russian cyrillic alphabet the transliteration system currently used by the US Board on Geographic Names (BGN), and by the UK Permanent Committee on Geographic Names (PCGN), will be adopted by the IAU/WGPSN. This transliteration system is defined in the publication "Romanization Guide, 1972", published by the Geographer, US Department of State, April 1, 1972. The IAU/WGPSN will also use this publication as a general guide for transliteration from other alphabets.

For assigning names to small features near a landing site on any planet or satellite the following rule applies:-

> Representatives of the country achieving a landing on a planetary body shall have the prerogative of naming any features within a radius of approximately 100 km of the landing site. These names shall be chosen according to the accepted standards established by the IAU.

A name bank for future use on the moon has been maintained and name banks for use on Venus and on the planetary bodies in the outer solar system have been established. A comprehensive publication, including all official nomenclature assigned by the IAU to topographical features on the planetary bodies in the solar system, is being prepared by the WGPSN and will be published by the National Aeronautics and Space Administration (NASA) in Washington. It is planned that this publication will be available for general distribution during 1979.

Action taken by the nomenclature groups appointed by the IAU has been described in short notes by Millman (18.091.006), Owen (18.099.205), Morrison (18.092.019), and Dollfus et al. (1978); and individual personal opinions have been published by Arthur (17.015.009), Kowal (18.091.060), Krumenaker (1978), Pike (17.015.011), and Sagan (17.015.010). Jürgen Blunck has written a book on the nomenclature of Mars and its satellites (20.003.035). New names, assigned by the IAU in the 1976-1979 triennium, will be published in Trans. Intern. Astron. Union 17B, after approval by the General Assembly in Montreal, August 1979.

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The detailed material presented for the consideration of the IAU/WGPSN is prepared by five nomenclature task groups dealing with the Moon, Mercury, Venus, Mars, and the Outer Solar System, respectively. The current membership in these task groups is listed below:-

Task Group for
Lunar Nomenclature

V.V. Shevchenko (Chairman)
A. Dollfus
F. El-Baz
K.P. Florenskiy
H. Masursky
P.M. Millman
S.K. Runcorn
E.A. Whitaker

Task Group for
Mercury Nomenclature

D. Morrison (Chairman)
M.E. Davies
A. Dollfus
K.P. Florenskiy
O.J. Gingerich
J.E. Guest

Task Group for
Venus Nomenclature

G.H. Pettengill (Chairman)
R.M. Goldstein
M.Ya. Marov
H. Masursky

Task Group for
Mars Nomenclature

B.A. Smith (Chairman)
A. Dollfus
M.Ya. Marov
H. Masursky
S. Miyamoto
A.V. Morozhenko
C. Sagan

Task Group for
Outer Solar System Nomenclature

T.C. Owen (Chairman)
K. Aksnes
M.S. Bobrov
M.E. Davies
D. Gautier
H. Masursky
B.A. Smith
V.G. Tejfel'

References

Dollfus, A., Chapman, C.R., Davies, M.E., Gingerich, O.J., Goldstein, R.M., Guest, J.E., Morrison, D. and Smith, B.A.: 1978, Icarus 34, p. 210.
Krumenaker, L.E.: 1978, Icarus 34, p. 215.

P.M. MILLMAN
President of IAU/WGPSN

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