CIA/PB 131632-91

NOVEMBER 6 1959

UNCLASSIFIED - INFORMATION ON SOVIET BLOC INTERNATIONAL GEOPHYSICAL COOPERATION - 1959

(16)

INFORMATION ON SOVIET BLOC INTERNATIONAL GEOPHYSICAL COOPERATION - 1959

November 6, 1959

U. S. DEPARTMENT OF COMMERCE
Business and Defense Services Administration
Office of Technical Services
Washington 25, D. C.

Published Weekly
Subscription Price $12.00 for the Series

INTERNATIONAL GEOPHYSICAL COOPERATION PROGRAM -- SOVIET-BLOC ACTIVITIES

Table of Contents

I. GENERAL

Fedorov Charges Lack of Cooperation in Release of US Satellite Data

Responding to a question of an American journalist, on whether the Soviet Union's placing of a pennant on the Moon reflects the intention to put forward a claim to possession of the Moon, N. S. Khrushchev said that the notion "my" is obsolete for the Soviet people and that a new notion, "our," has taken root. "Therefore," Khrushchev said further, "we consider the sending of a rocket into space and the placing of our pennant on the Moon as our achievement. And in the word 'our' we imply the countries of the whole world, that is, we imply that this is our achievement and the achievement of all people living on the Earth."

The practical activities of Soviet scientists in the region of space research are in complete accordance with the position stated by the head of the Soviet government.

The mutual exchange of information, the application of uniform methods of research, and the extensive discussion of the results at international conferences are unquestionably useful in any region of study. However, this is of particular importance in geophysical research and in the investigation of interplanetary space.

Geophysical phenomena occur in the space of the entire globe. The organization of systematic observations at many points of the Earth's surface is necessary for their study. These observations must be made in a coordinated manner under a single program, with uniform instruments and at definite times. Only in this way will it be possible to compare results and will the conclusions be well founded.

Investigations of cosmic space are of an analogous character. The use of artificial Earth satellites for scientific purposes is more effective if observations on them are conducted in a coordinated manner at various points on the globe. Thus, the first artificial satellite, which was launched in the Soviet Union, has already permitted scientists in many countries to determine the density of the atmosphere by observing the constant slowing down of the satellite and to investigate the structure of the ionosphere by studying the propagation of the satellite's radio signals.

The launching of high altitude geophysical rockets and, in particular, artificial Earth satellites and cosmic rockets is a very complex and expensive business. Such experiments can be carried out only by countries

which are highly developed in the scientific and technical sense. It is obviously their duty to transmit to the scientific community of the world those new data on the nature of our planet and other celestial bodies and information on the properties of cosmic space which were obtained as a result of these unique experiments.

Soviet scientists assumed a considerable portion of the investigations conducted in the course of the International Geophysical Year. However, the Soviet Union made a particularly great contribution to the study of the upper layers of the Earth's atmosphere and cosmic space through the use of rockets and artificial Earth satellites.

All 125 rockets determined by the IGY program were launched in Franz-Josef Land, in the middle latitudes of the Soviet Union, and in the Antarctic. Many of these launchings were important scientific achievements. Highly advanced rocket systems were used for many of these. I have in mind, for example, the well-known flights to altitudes of 200 and 500 kilometers made by heavy rockets profusely equipped with various measuring devices. At the time, these flights were thoroughly covered in the Soviet press.

The list of investigations conducted on the second and third Soviet satellites exceeds everything that was assigned for study in the upper layers of the atmosphere by the IGY program. The results of these investigations were not kept secret. Soviet scientific institutions systematically published and distributed all of the information needed to organize observations on the flight of the satellites in any country. The great size of the Soviet satellites and the considerable power of their transmitters extremely simplified the problem, and such observations were actually conducted in various countries with comparatively simple instruments.

The Academy of Sciences USSR quickly published the basic results of the scientific investigations conducted with rockets and artificial Earth satellites. The first data were printed in the central newspapers, which willingly gave their pages for purely scientific material. More complete articles on the composition and density of the atmosphere, new ionosphere data, the propagation of radio waves, the unique results of biological experiments, radiation belts, and many other subjects were published in the scientific publications.

Soviet scientists follow this rule of informing their foreign colleagues in respect to the cosmic rockets also, the firing of which was outside of the IGY program. The most important results were discussed at several international conferences, at the IGY Assembly in August 1958 in Moscow, at the Conference on the Study of Cosmic Rays conducted in Moscow in 1959, and at many conferences abroad.

The joint discussion of the information obtained in the flights of the Soviet and American satellites and cosmic rockets demonstrated the idea of international cooperation in sciences which permeated the whole IGY program. In this connection, it is impossible not to be surprised at statements appearing, at times, in the American press to the effect that Soviet scientists did not give out information obtained as a result of cosmic investigations, particularly a statement of this nature made at one of the press conferences to N. S. Khrushchev. This reproach should rather be applied to the scientific establishments of the US.

In 1959, for example, it became known that certain US artificial Earth satellites, which were launched in 1958 in conjunction with the IGY program, were actually intended to establish the results of nuclear explosions conducted by the Americans at high altitudes in the fall of 1958. In 1959, the US was able, for the first time, to launch in polar orbits satellites which pass over the whole surface of the Earth. These satellites were of the Discoverer type and, according to newspaper releases, were considerably larger and better equipped than those earlier used in the US. They pass over the territory of the USSR, and observation of them could be very useful. The US scientific establishments, however, refused to give the necessary information (with ephemerides and transmitter frequencies), saying that the firing of these satellites was outside of the IGY program.

Attention should also be given to problems of the organization of international cooperation in investigation of the upper layers of the atmosphere in cosmic space during the period following the IGY. Even in 1958, the Soviet government proposed negotiation concerning the use of cosmic space for peaceful purposes and coordination of the investigation of cosmic space. At a session of the UN General Assembly a year ago, the problem of the coordination of investigations of cosmic space was discussed. It would seem that all countries, particularly the US, would be interested in the broad and equitable coordination of the various states in this important matter. However, in discussions of the composition of a committee which was to be created for this coordination, the US attempted to obtain a composition which would permit it to dictate its will to the Soviet Union and other socialist countries. The Soviet Union, naturally, could not accept this and did not become a part of the committee.

During this same period, at the initiative of the National Academy of Sciences of the US, the International Council of Scientific Unions adopted a resolution to organize a scientific nongovernmental international committee to coordinate investigations of cosmic space. However, even COSPAR (this committee), which was created at the initiative of the US, was constructed in such a way that, of the 19 members, the Soviet Union was the only socialist country and was given one voice, which the US was given 3 voices, England 4, France 2, and Belgium 2.

In discussing the plan for the regulations of COSPAR, in the spring of 1959 at the Hague, the committee itself unanimously recognized that such a structure could not provide any broad international cooperation in investigations of the cosmos and resolved to change this structure.

In the way, the persistent desire of certain influential circles in the US to provide for themselves, at all costs, a dominating influence in all matters concerning cosmic space interferes with international coordination of the investigations.

Many scientists and a number of political figures in the US, Great Britain, and other Western countries feel that international scientific cooperation in investigations of cosmic space must be constructed on a broad basis, with the equitable participation of the various states, and are sincerely striving to attain this. It is hardly necessary to show that the contribution of the Soviet Union to the investigation of cosmic space is sufficiently important. Attempts, therefore, to limit artificially the participation of the Soviet Union and socialist countries in questions of the organization of investigations of cosmic space and to place them in an inequitable subordinate position will inevitably fail.

This situation is, necessarily, beginning to receive some recognition. As is known, the American representative in the UN supported the proposal of V. V. Kuznetsov that an international conference be conducted on problems of scientific investigations of cosmic space. The International Federation of Astronautics chose Soviet scientist Academician L. I. Sedov as aits president. COSPAR intends to consider a new plan for its composition.

The Soviet Union, as N. S. Khrushchev said in his answer to the American politician V. M. Anfuso, advocates and has always advocated international cooperation in the peaceful use of cosmic space, but only cooperation in which the USSR and other socialist countries which are carrying on extensive investigations in cosmic space are given an equitable position.

The firing of the second Soviet cosmic rocket, which completed a broad program of scientific investigations and reached the Moon, and the exceptional accuracy of operation of the automatic interplanetary station, which has completed a flight around the Moon and is now heading towards Earth, are new evidences of the great success and tremendous capability of Soviet science and technology.

The whole world sees that the Soviet people is directing these capabilities toward peaceful purposes. Each achievement of the Soviet Union brings closer the day when man will be able to pass beyond the limits of the Earth and land on the surface of the Moon and planets. ("'Mine' and 'Ours' in Science," by Ye. Fedorov, Corresponding Member, Academy of Sciences USSR: Moscow, Izvestiya, 11 Oct 59, p 3)

II. ROCKETS AND ARTIFICIAL EARTH SATELLITES

Motion of Third Soviet Cosmic Rocket Discussed by Mikhaylov

The problem of studying the motion of celestial bodies, both natural and artificial, is related to the field of celestial mechanics, says A. Mikhaylov, Corresponding Member of the Academy of Sciences USSR and director of the Pulkovo Observatory, in a Pravda article. The motion of the third Soviet cosmic rocket is discussed in these terms by Mikhaylov, and he speculates on the fate of the rocket.

The rocket, he says, at sometime near the Moon again and in passing through its sphere of action, will be subject to a change in its orbit. This may be to one side or another. It is possible that such a change, in which the perigee distance is somewhat changed, will cause the rocket to enter the dense layer of the Earth's atmosphere and fall to the Earth or burn. But also possible, says Mikhaylov, is the rocket's impact with the Moon.

All of these interesting phenomena, according to Mikhaylov, can be predicted and calculated in detail after optical observations of the rocket during its approach to the Earth. Near perigee, the rocket will be seen as a slowly moving light in the firmament with a stellar magnitude of about 12, which is insufficient to be seen by the naked eye, but fully accessible for photographing with powerful astrographs. If photographs of the rocket are obtained successfully, says Mikhaylov, then its orbit will be defined so precisely that its future motion will become known for a considerable period of time. Soviet observatories are prepared to "trap" the approaching rocket, and it is possible to expect that, in the next few days, its future course will be successfully predicted.

A great quantity of the most valuable and unique information on the physical properties of the media surrounding the Earth and the Moon and also on the Moon has been radioed to Earth from the rocket during its short existence, says Mikhaylov. In addition, the future study of its motion is of enormous scientific interest. Its motion, continues, can give information relating to such problems as determining the location of the center of gravity of the Moon which, according to astrometrical observations, does not coincide with the center of its figure. It can assist in the study of irregularities in the Earth's rotation around its axis and the resulting variations in the length of the terrestrial day. It can help in more precisely defining the magnitude of the oblateness of the Earth and in explaining a number of other actual problems of celestial mechanics, astronomy, and geodesy.

It is possible to expect, concludes Mikhaylov, that, soon, with further perfection of rocket engineering, which is used in many scientific aims, by Soviet scientists, engineers, and workers, much more new data on other bodies of the solar system will be obtained. ("The Soviet Cosmic Rocket Approaches Perigee," by A. Mikhaylov; Moscow, Pravda, 18 Oct 59, p 3)

Orbit of the Third Soviet Cosmic Rocket

A. A. Orlov, Candidate of Physicomathematical Sciences, writes as follows on certain characteristics of the orbit of the third Soviet cosmic rocket.

On the first day of the rocket's flight, while still far from the Moon, the principal effect on its orbit was rendered by the Earth's gravity. Consequently, the part of the orbit which the station described during this period was close to the arc of an ellipse, in one focus of which stood the Earth. If the Moon's attraction had not acted on the rocket, it would have continued to move according to its initial ellipse, now going away from our planet and then approaching it again. At present, the cosmic station also moves according to an elliptical orbit. But this is still another ellipse. The reason for this is that the nearer the rocket came to the Moon, the more the latter's attraction acted upon it. Under its influence, the orbit changed.

Finally, when the rocket neared the Moon at a distance of several tens of thousands of kilometers, the force of the Moon's gravity became dominant. At this time, the rocket's orbit underwent an especially strong change: the magnitude and direction of the rocket's velocity was sharply altered. In relation to the Moon, the rocket's orbit passed close to the Moon and became hyperbolic with a focus in the center of the Moon.

On 6 October at 1716 hours, the automatic interplanetary station reached its closest approach to the Moon. It passed at a distance of 7,000 kilometers and then traveled away from it. Thereafter, the force of the Moon's attraction became weaker and weaker until it was insignificant. The principal force determining the motion of the station, again, was the Earth's attraction. The third Soviet cosmic rocket was transformed into an artifical earth satellite.

This orbit differs considerably from the orbits of earlier launched satellites. No other satellite moved along an orbit of such a gigantic size. This orbit's apogee is 470,000 kilometers, and its perigee, 47,500 kilometers. Its major axis is more than 517,000 kilometers.

The orbits of the preceding artificial earth satellites had a form close to that of a circle. The orbit of the third cosmic rocket is characterized by its great elongation. It minor axis is about 275,000 kilometers, almost one half that of its larger diameter. The plane of its orbit is almost perpendicular to the plane of the Moon's motion, and it forms an angle somewhat less than 80 degrees with the Earth's equator.

In the future, the form of the orbit and its position in space will be changed considerably under the influence of the attraction of the Moon and the Sun. These alterations will be especially strong if the cosmic station will pass near the Moon. It is possible to assume that, under the influence of lunar attraction, the cosmic station will acquire such a large positive velocity that, having rounded the Moon, it will go off into interplanetary space. Then it will be transformed into an artificial planet. The possibility is not excluded that, as a result of a number of changes in its orbit, the cosmic station will collide with the Moon later on. However, the probability of such a collision is small. Now it is certain only that the cosmic station will exist for a long time as a satellite of the Earth, moving around it along a gigantic elongated orbit. ("Investigation of the Cosmos Continues," by A. A. Orlov, Candidate of Physicomathematical Sciences; Moscow, Sovetskaya Aviatsiya, 21 Oct 59, p 3)

Information on Cosmic Rocket III From Daily Bulletins

The automatic interplanetary station was in the constellation of Hercules on 15 October at 2000 hours Moscow time. Its coordinates were 17 hours 5 minutes 41 seconds right ascension and 25 degrees 33 minutes declension. At this time, the station was over a point in the Atlantic Ocean southwest of the Canary Islands. The points coordinates were 22.1 W 25.6 N. The station's distance from the Earth was 339,200 kilometers, and its speed, about 0.9 kilometer per second.

Reduction of data on the stations trajectory confirmed that the station is continuing along a trajectory which is very close to that calculated. All apparatus are functioning normally. ("On the Motion of the Third Soviet Cosmic Rocket"; Moscow, Pravda, 16 Oct 59, p 1)

At 2000 hours Moscow time on 16 October, the station was at a distance of 267,000 kilometers from the Earth, and its speed was about 1.2 kilometers per second. At this time, the station was still in the constellation of Hercules at a point whose coordinates were: 17 hours 15 minutes 15 seconds right ascension and 34 degrees 53 minutes declension. ("Rocket in Motion"; Moscow, Izvestiya, 17 Oct 59, p 4)

The automatic interplanerary station was 166,500 kilometers from the Earth at 2000 hours Moscow time on 17 October. The station's speed at this time had increased to 1.7 kilometers per second. According to processed data, the station will reach its minimum distance from the center of the Earth, about 47,500 kilometers, on 18 October toward 1950 hours Moscow time. At this time, the station will be over a point on the surface of the Earth in the Solomon Island region and will be moving in a northwest to southeast direction.

The station will reach its greatest value, 3.91 kilometers per second, while passing at the minimum distance from the Earth. All apparatus are functioning normally. ("On the Motion of the Third Soviet Cosmic Rocket"; Moscow, Pravda, 18 Oct 59, p 1)

On 18 October at 1950 hours Moscow time, the automatic interplanetary station completed its first revolution of the Earth. Scientific investigations of the space near the Earth and Moon were made by the station. During the flight around the Moon, the other side of the Moon, invisible from the Earth, was photographed.

The data of the scientific measurements and the photographing are being processed. The results of the processing will be published. Having completed the first revolution and going away from the Earth, the automatic station will not be observed from the territory of the Soviet Union. ("On the Motion of the Third Soviet Cosmic Rocket"; Moscow, Pravda, 19 Oct 59, p 1)

At 2000 hours Moscow time on 21 October, the station will be over a point on the surface of the Earth in the region of the city of Rio de Janiero with coordinates of 37 W and 21 S. The station will be 342,000 kilometers from the Earth at this time, and its speed will be 0.89 kilometer per second. ("On the Motion of the Third Soviet Cosmic Rocket"; Moscow, Sovetskaya Aviatsiya, 22 Oct 59, p 1)

Earth-Moon Routes Discussed by Pokrovskiy

The Soviets have mastered three variations of Earth-Moon region routes, says Prof G. I. Pokrovskiy, Doctor of Technical Sciences, Major General of the Engineer-Technical Service. This can be seen, he says, from the successful flights of the first, second, and third Soviet cosmic rockets.

The first cosmic rocket is now moving around the Sun along an elliptical orbit located between the orbits of Earth and Mars. The second, launched on 12 September 1959, impacted the Moon. The third passed at a comparatively close distance to the Moon and curved around it. Such a rocket flight as the latter is very favorable for initial investigations of the Moon's far-side, says Prof Pokrovskiy. It makes it possible to conduct various measurements using automatic apparatus, store the results, and transmit them to Earth upon radio command from ground-based stations. A flight around the Moon close to its surface requires no great expense of energy in braking for a Moon landing or for a return to Earth.

If, Pokrovskiy goes on to say, a version of rocket with apparatus for a Moon landing were selected, then a considerable part of the space craft would be allotted for the fuel and motors intended for a soft-landing on the lunar surface. The payload of the Moon ship would be low in comparison with the payload it could carry on a flight around the Moon.

Flights with Moon-landing apparatus also are certainly not excluded for the future, says Professor Pokrovskiy, although the first such flight obviously will be made without provision for a return to Earth. This version of a lunar flight is necessary for a detailed study of the composition and structure of matter located on the surface of the Moon.

One of the main possibilities of such a flight also is a study of the Moon's mineral resources. For such a study, Pokrovskiy foresees the use of automatic drilling rigs and automatic analysis of samples of the layers being drilled. It will be possible to use shot-hole methods, as in seismic prospecting, also. Finally, it will also be possible to conduct a luminescent analysis of the surface layer of the Moon. This will be done by illuminating the Moon's surface with ultraviolet rays and recording the natural illumination of the substances on it with appropriate apparatus.

Returning to his subject, Pokrovskiy says that in returning from the region of the Moon to Earth, several variations in the motion of a rocket are possible. The simplest is considered to be a flight around the Earth without landing. This flight can be completed at an altitude of several hundreds or thousands of kilometers over the Earth's surface. The passage

at a comparatively small distance ensures the transmission of extremely detailed scientific information from the rocket's automatic apparatus to Earth by radio. In particular, says Pokrovskiy, television pictures, preliminarily recorded on magnetic tape or by some other method, can be transmitted.

Still another means, according to Pokrovskiy, would be for the rocket to eject a small container. In this case, the container would have to have small jet motors for braking its speed relative the Earth to ensure its dropping to the Earth and also some form of aerodynamic brakes for slowing it down during its entry into the upper atmosphere. In addition, the usual parachute system for the last part of its descent would have to be provided. The provision of a radio beacon facilitating its location in case it landed at sea must also be foreseen.

In the realization of space flights, continues Pokrovskiy, both the velocity and direction of the craft must be precisely controlled. All the fuel must not be expended during the powered portion of the flight; a reserve must be maintained for future corrections of the flight path. To ensure such corrections, the rocket must be continually tracked with special radio apparatus. The date of the observations must be fed into computers which determine the necessary corrections in the trajectory of the rocket. These corrections can then be transmitted to the rocket by radio control. To achieve the necessary results through this control, the axis of the rocket must be stabilized in space and then turned in the assigned direction. In principle, says Pokrovskiy, the solution of such a problem is not difficult in modern conditions; however, its practical solution requires a high scientific and technical know-how.

Pokrovskiy gives four possible variations of flights on the Earth-Moon route, depending on the conditions of controlling the velocity and direction of the rocket's flight in the initial portion of the trajectory. The rocket can impact the surface of the Moon; with small changes in direction and velocity, the rocket goes around the Moon, returns toward and falls on the Earth; by increasing the rocket's velocity, it will also go around the Moon and return toward the Earth, not falling upon it, but circling around it and again going toward the Moon; and finally, if the speed of the rocket is sufficiently great, then it only partially circles the Moon and then goes off into space, leaving the region of the Earth and the Moon.

Conditions for navigation between the Earth and the Moon being developed now are rather complex and varied, says Pokrovskiy. In the future, he concludes, when rockets will possess considerable fuel reserves, the variety of routes and the possibilities for manuevers during Earth-Moon flights will increase. ("On the Earth-Moon Routes," by Prof G. I. Pokrovskiy, Maj Gen Engineer-Technical Service, Doctor Technical Sciences; Moscow, Sovetskaya Aviatsiya, 16 Oct 59, p 3)

Use of Obturators in Satellite Photography Described

A device, the use of which makes it possible to obtain pictures of a satellite trail with sufficient fineness and uniform thickness, independent of its speed, visible motion, and brightness, is described by D. A. Rozhkovskiy. The apparatus, in the form of an obturator with rotating blades mounted in front of the objective of a powerful camera, automatically changes the effective opening of the objective from 0.05 of the full opening up to 0.50. Twice each second, the obturator sends pulses causing rapid oscillations of a plane-parallel plate, which ensures obtaining sinusoidal parts of the track of a satellite. The obturator being employed in the mountain astrophysical observatory in Alma-Ata decreases to one tenth the brightness of a satellite during one cycle of the plate's oscillation in comparison with the succeeding cycle. The design of the obturators and the reduction of the effective exposure for stars and satellites they produce must be selected in accordance with the optical properties of the cameras with which they will be used. ("On the Application of an Obturator in the Nature of a Variable Diaphragm in Photographing Artificial Earth Satellites," by D. A. Rozhkovskiy; Astron. Tsirkulyar, No 193, 3 Jul 58, pp 10-12; from Referativnyy Zhurnal, Astronomiya, Geodeziya, No 9, Sep 59, Abstract No 7317 by G. A. Manova).

Photographic Photometry of Sputnik II

The method of determining the brightness of an artificial earth satellite according to the images of its track obtained with the NAFA 3S/25 camera is described. Results of photometric processing for ten positions of the second Soviet artificial earth satellite on 20 March 1958 are given. These results are based on two images of the track obtained on one and the same frame on film bearing previously printed standards. The period of the change in the brightness of the satellite was determined as being equal to one minute 15 seconds. ("Photographic Photometry of the Second Satellite," by V. I. Ivanikov; Astron. Tsirkulyar, No 193, 3 Jul 58, pp 8-10; from Referativnyy Zhurnal, Astronomiya, Geodeziya, No 9, Sep 59, Abstract No 7326)

Precise Positions of Sputnik II

The processing of photographs of the second Soviet artificial earth satellite obtained at the State Institute of Astronomy imeni P. K. Shternberg has been conducted. Seven to nine reference stars and one star near the optical center of the negative were selected along the satellite's trail. Measurements were made on the KIM-3. The electronic computer "Strela-4" was used for calculations. The error in position of Sputnik II

consists of 4-6 minutes. Eighty-nine precise positions for Sputnik II were determined for March-April 1958. ("Precise Positions of the Second Artificial Earth Satellite," by A. Sosnova; Astron. Tsirkulyar, No 194, 26 Apr 58, pp 3-5; from Referativnyy Zhurnal, Astronomiya, Geodeziya, No 9, Sep 59, Abstract No 7327)

III. UPPER ATMOSPHERE

February Issue of Kosmicheskiye Dannyye Published

Kosmicheskiye Dannyye (Cosmic Data), No 2(36), 1959, a monthly review by the Scientific Research Institute of Terrestrial Magnetism, the Ionosphere, and Radiowave Propagation (NIZMIR), Academy of Sciences USSR, has been published for February 1959.

The review contains the results of observations of geophysical phenomena concerning the electric and magnetic state of the upper atmosphere (geomagnetic variations, the ionosphere, cosmic rays, and earth currents) and also data on solar activity.

The February issue contains the data for February 1959, the tables of magnetic activity for the fourth quarter of 1958, and an explanation for these tables. (Kosmicheskiye Dannyye, No 2(36), Feb 59)

Astrophysics Research Institute in High Tatra Mountains, Slovakia

Central Europe's Highest Observatory is being built in the High Tatra Mountains under the guidance of the Slovak Academy of Sciences. An astrophysics research institute will be built here also. ("Central Europe's Highest Observatory"; Budapest, Nepszabadsag, 27 Sep 59, p 11)

IV. GEOMAGNETISM

Hungarian Research Links Magnetic and Gravitational Changes in Earth

At the 12 May 1959 meeting of the Main Committee on Geophysics of the Hungarian Academy of Sciences, Gyorgy Barta reported on the results of his most recent research. According to his investigations, there must be a close causal interdependence between the triaxial ellipsoid shape of the Earth and the eccentricity of the magnetic field

of the Earth. According to magnetic measurements, the magnetic center of the Earth, that is, the inner core of the Earth, moves in relation to the surface, and by this movement, one can explain, according to direction and magnitude, the fluctuations in the Earth's rotational speed, as well as a good part of the fluctuations of the sea level. Accordingly, it can be hypothesized that the triaxiality of the Earth changes in time, and, in this sense, new light is also thrown on the question of changes, over the centuries, in the gravitational field. ("From the Life of the Hungarian Academy of Sciences"; Budapest, Magyar Tudomany, Jul/Aug 59; p 410)

Hungarian Astronomers Observe Morphological Changes on Moon

In a brief review of the history of lunar observations, especially the observation of "volcanic activity" in the Crater of Alphonsus by Soviet astronomer Kozyrev, which appeared in a Hungarian newspaper, the author makes the following statement in connection with the morphological changes, i.e., a spot which changed color, following the observation of the emission of gas.

"Workers at the Budapest Urania Exhibition Observatory also observed the change, using color filters. The equipment used makes it possible to see a /lunar/ formation 1.2 kilometers in extent, and since the new spot is 2.5 kilometers in extent, according to both local and other observations, the observations must be considered realistic." ("Observations of Lunar Vulcanism" by Jozsef Sinka; Budapest, Muszaki Elet, 9 Jul 59, p 2)

Hungarians Report Soviet Measurement of Earth's Tail

The following passage, discussing recent Soviet work, was taken from a newspaper article dealing, in general, with the sort of scientific research which could be conducted advantageously from the Moon.

"Fesenkov, the world-famous Soviet astronomer, proved, in the course of his recently completed studies, that the Earth "loses" about 11,000 tons of air daily. At first glance, this appears to be a gigantic quantity, but since we can estimate the entire mass of the Earth's atmosphere at 5.2 trillion tons, the amount lost daily is insignificantly small.

"A gigantic 'tail,' 100,000 kilometers long, is formed by the particles lost from the atmosphere. The 'tail' always points away from the Sun because the repelling effect of the Sun's radiation forces the

particles in the opposite direction from the Sun. The tail does not participate in the rotation of the Earth around its axis. In form, it resembles the tail of a comet, and it is made up primarily of nitrogen and oxygen.

"One of the tasks of observations made from the Moon will be to determine whether or not the Earth's tail changes form or dimension in correspondence with sun spot activity." ("Scientific Research Work on the Moon," by Peter Hedervari, member of the International Lunar Society; Budapest, Magyar Nemzet, 17 Sep 59, p 3)

V. ARCTIC AND ANTARCTIC

Observations Made by Severnyy Polyus-6

The results of observations conducted by the last group of scientists working on Severnyy Polyus-6, when compared with research materials of preceding years, make it possible to determine changes which have occurred in the nature and climate of the Arctic.

As the drift station Severnyy Polyus-6 approached the Greenland Sea, abrupt changes in the ocean depth were noted. The depth was reduced from 5,200 to 840 meters, then it increased to 2,000 meters, and then once more decreased [9 September]. The sudden decrease in depth in this area [i.e., about 230 kilometers north-northwest of Spitsbergen] came as a surprise, as the maps of this region indicate depths of about 3,000 meters.

The study of the soil of the ocean bottom along the route of the drift made it possible to determine several sharply differing historical periods indicating changes in the regime and ocean currents and also to determine annual deposits on the ocean bottom. A further processing of materials will enable scientists to define the boundaries between the spheres of influence of waters of different origin and the influence of the Atlantic current.

Data collected on the interrelations between various water masses and changing currents are also of interest. A great deal of noteworthy information has been obtained in the field of terrestrial magnetism and the ionosphere. ("Last Days on the Ice Island"; Leningradskaya Pravda, 9 Sep 59)

Hydrographic Expedition Returns to Leningrad

The expedition of the Arctic and Antarctic Institute, which had been conducting scientific research in the northern part of the Greenland Sea on the hydrographic ship Shtorm, has returned to Leningrad.

According to expedition chief V. A. Shamont'yev this was the third voyage of the ship during 1959. The weather was frequently stormy; therefore, it was often necessary to interrupt scientific observations and to lay over near the west and northwest coast of Spitsbergen.

Despite these difficulties, the expedition members exceeded their program for oceanographic work. Three hydrological sections were established in the northern part of the Greenland Sea, and more than 30 deep-water studies were made. The obtained material provides detailed information on the hydrological regime of water masses in this part of the Greenland Sea.

The scientists were actively assisted by the crew of the Shtorm, under Captain Yu. P. Kopytov. ("The Shtorm in the Greenland Sea"; Moscow, Vodnyy Transport, 15 Oct 59)

Antarctic Train Moving South

The sled-tractor train advancing into the interior of Antarctica has passed the station Pionerskaya and is traveling further south.

Scientific observations were conducted during the stop at Pionerskaya. It was very interesting to note the readings of instruments that had been left behind at this place 9 months ago by members of the Third Antarctic Expedition. For example, the readings on the minimum thermometer indicated that the air temperature in the area of Pionerskaya during the 1959 antarctic winter dropped to minus 69.4 degrees centigrade. This was 2.6 degrees lower than the minimum temperature recorded by Soviet scientists at Pionerskaya in 1956.

On 14 October, the train was located 675 kilometers from Mirnyy, at an altitude of 3,210 meters above sea level. On 13 October, the train crossed the area where the Soviet interior station Vostok-I has been in operation during March-November 1957. The snow vehicles are traveling over loose snow and meeting occasional sastrugi. Snowstorms are frequent.

Sixteen Soviet expedition members are taking part in this difficult traverse. Some of them have wintered in Antarctica before, including Kapitsa, seismologist; Gavrilov, physician; and Maksimov and Lyubarets, radiomen.

The train has about 200 kilometers left before reaching Komsomol'-skaya and has to ascend a glacial slope to a height of 3,400 meters above sea level. After that, the scientific research train will be formed. The research train will proceed further into the interior of Antarctica, in the direction of the station Vostok. From there, the train will head toward a region which has not yet been explored by man and will proceed to the South Pole, where Soviet explorers will meet with American scientists wintering at the station Amundsen-Scott.

Station Lazarev Continuing IGC Program Activities

During the past month, the weather on Queen Maud Land was mostly fair and relatively calm. The air temperature was about minus 30 degrees centigrade. The storms have abated, and the period of daylight has increased.

The sea near the coast is covered with ice. The shore ice reaches a thickness of one meter.

The small group of scientists at the station Lazarev (chief, Yu. Kruchinin) is successfully continuing scientific observations under the IGC program. A plane from Mirnyy is expected to arrive soon. This will be the first flight from the Pravda Coast to the station Lazarev. A landing strip has been built on the ice shelf. ("Today in Antarctica"; Moscow, Vodnyy Transport, 15 Oct 59)

* * *