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SOVIET BLOC INTERNATIONAL GEOPHYSICAL YEAR INFORMATION

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I. ROCKETS AND ARTIFICIAL EARTH SATELLITES

Danish Translation of Popular Science Book on Space Travel by A. Shternfeld

Sputnik, Raketter og Rumskibe (Sputnik, Rockets, and Space Ships), by A. Sternfeld (Shternfeld), Copenhagen, 1957, 63 pp, is a Danish translation of a Russian popular science pamphlet.

The introduction gives a brief description of Sputnik I and a very brief historical account of the notion of space travel.

Chapter 1, "Space Ships," discusses the possibility of getting out of the gravitational field of the earth with a space ship, and rockets as prototypes of space ships: "Even though the atomic missile does not differ very much from ordinary types, there are a number of difficulties which are hindering its construction. First of all, the extraordinarily high temperatures and pressures produced in an atomic missile must be reduced, because no metal can be found to withstand such stresses. Secondly, measures must be taken to protect space travelers from the radioactive radiation which is released along with nuclear energy. The solution of the problem depends on the discovery of a material which can withstand such radiation and which, at the same time, is light in weight, since excessive weight will limit the range of the vehicle."

Chapter 2, "On Board the Space Ship," discusses the following:

The takeoff, and flight in space ("A space ship which takes off for the Moon with the correct initial velocity will fall 4,000 kilometers short, if the velocity is reduced by only one meter per second").

Life in a space ship ("There are still a great number of problems to be solved in regard to supplying the space traveler with sufficient oxygen, water, and food for the first trip to Mars and Venus, which could last more than 2 years. The problem of purifying air and water aboard the space ship must also be studied in greater detail. The main thing is, however, that it is today practically possible to solve these problems."), the dangers of space flight (meteor bombardments, asteroids, cosmic radiation, ultraviolet, and radioactivity).

The return to earth (skipping in and out of earth's atmosphere to slow craft down to where wings can help glide it to earth).

Chapter 3, "The Artificial Space Station," describes and illustrates a proposed space station made up of sections sent into orbit about 200 km above the Earth by a number of successively launched three- or four-stage missiles and producing its own gravity by means of a rotating horizontal arm at the top of the station. Such a manned space station, if placed in an orbit going through the poles, could make 16 flights around the Earth in 24 hours and photograph the entire surface during daylight and thus give an exact picture of the meteorogical conditions of the entire globe. It will be much easier to get into space from such a station than from the Earth. A velocity of about 3.1-3.6 km per second would be sufficient to go to the Moon, Mars, or Venus from such a station since the space station itself is moving at about 8 km per second, whereas a velocity of 11.2 km per second would be necessary to escape the Earth's gravitational pull.

Chapter 4, "Space Journeys," discusses the possibilities of travel to the Moon, to Mars, to Venus, and to the other planets of our solar system. If a rocket is launched from the Earth at 11.2 kilometers per second, it will reach the Moon in only 51 hours. Not only the first space stations, but also the first Moon rockets will be remotely controlled. Calculations show that a rocket weighing 10 tons, with an escape velocity of 4 kilometers per second, will need only 12 tons of liquid fuel to fly to the Moon and back, if the launching is done from an artificial space station. The same trip, starting from the Earth, would require 150 tons of fuel. At an escape velocity of 2.5 km per second, the corresponding amounts of fuel would be 25 and 840 tons. The speed of a space ship traveling from the space station to the Moon will vary during the trip. The ship will take off with a tremendous velocity, then travel like a stone which has been thrown into the air. After 5 days it will approach the Moon's field of gravity, when the velocity will again increase until it reaches 2.5 kilometers per second at a distance of "a few score" kilometers above the Moon's surface. If the ship is to function as an artificial satellite of the Moon at a height of 10 kilometers above the Moon's surface, the velocity must be reduced to 1.7 kilometers per second, which is the orbital velocity at that height. It will orbit the Moon every hour and 50 minutes and will have a field of view of 186 kilometers; objects on the Moon which are more than 3 meters in size will be visible to the naked eye. Since the Moon's atmosphere is only as dense as that of the Earth at an altitude of 60 kilometers, rockets will have to be used as brakes in landing on the Moon.

The trip around Mars could be made on various orbits. If a 2-year trip is chosen, the takeoff from the space station will take place at midnight, local time, when the Earth, Sun, and space station are on a direct line; thus the direction of motion of the space station and the escape direction of the space ship will coincide. The space ship could take off from the station with a velocity of 4.3 kilometers per second (12.3 km/sec if takeoff were from the earth). A rocket weighing 10 tons and having a takeoff velocity of 4 km/sec would require 19.6 tons of fuel to make the trip from the space station, but 216 tons from the Earth. At the end of one year from the time of takeoff, the rocket will reach its farthest point, 2,175 astronomical units from the Earth, where the velocity will also be lowest. A trip to Mars by the shortest and most direct route could be made in only 85 days, but the vehicle would have to travel at a speed of 39 kilometers per second, which would be uneconomical. On the other hand, a space ship traveling in a semielliptical orbit could take off with a minimum velocity (11.9 km/sec) and land on Mars at the time when its velocity was at its lowest point. To cut down the time required for the trip, however, a parabolic orbit will probably be chosen so that the trip will be made in 70 days, provided the space ship can take off at a speed of 16.7 km/sec.

The trip to Venus is more difficult to plan, since Venus' rotation on its own axis has not been determined with accuracy. Some consider it to be 68 hours, others say it is the same as the rotation of the Earth on its axis, and still others say that it coincides with Venus' revolution around the Sun, or 225 days. The angle between the equatorial plane of Venus and the plane in which it revolves around the Sun is not known. It is not likely that these questions will be answered definitely before a space traveler flies around Venus. Only when these answers have been found will it be possible to determine at what altitude and in what direction the space ship will have to enter Venus' atmosphere in order to make a safe landing.

The following table is given to indicate the speed and length of time necessary for a trip to the various planets:

Planet	Minimum Initial Velocity, km/sec	Length of One-Way Trip	
		Years	Days
Mercury	13.5	--	105
Venus	11.5	--	146
Mars	11.6	--	259

Planet	Minimum Initial Velocity, km/sec	Length of One-Way Trip	
		Years	Days
Jupiter	14.2	2	267
Saturn	15.2	6	18
Uranus	15.9	16	14
Neptune	16.2	30	225
Pluto	16.3	45	149

Optical Observation of Sputniks

Prof B. V. Kukarkin of the Astronomical Council of the Academy of Sciences USSR writes that F. V. Yablokov, chief of the Airline Meterological Station at Maykop, conducted systematic observations of the carrier rocket of Sputnik I with the aid of a balloon theodolite. Yablokov described the method of these observations and made a suggestion for attracting others of the aerological network of the hydrometeorological service to sputnik observations. (Priroda, No 2, Feb 58, pp 83-84)

Photo of Soviet Camera Used in Tracking Sputnik I Carrier-Rocket

A Hungarian newspaper source contains a photograph of a new Soviet apparatus called a "Meteor Patrol" with which the carrier-rocket of Sputnik I has already been successfully photographed. (Budapest, Nepszabadsag, 28 Dec 57, p 6)

Czech Observatory Successfully Tracks Soviet Sputniks

After Sputnik I was launched, the astronomical observatory on Skalnate Pleso (lake) was given a new role to play in the IGY, according to Jan Mihajlo in "Contribution of Skalnate Pleso to the IGY." In a short time the observatory showed that it could contribute more in this department than was expected. The results of their satellite observations were so valuable that the observatory was invited by Moscow to work in close cooperation, not only in observing the satellite, but also in making calculations. The calculations that were made aroused the attention of Soviet specialists.

The destruction of the first sputnik was calculated at Skalnate Pleso a month in advance with a margin of error of one day. The observatory has a unique photograph of Sputnik I. As of 22 January the observatory had taken more than 50 photographs of satellites and made more than 150 measurements.

Record-breaking observations were made in December when the observatory observed Sputnik II at great distances, over the Ural Mountains and over the Sahara Desert. Written material now coming from America shows that, despite the Americans' better equipped observatories, results obtained at Skalnate Pleso are not behind in any respect. (Prague, Svobodne Slovo, 9 Feb 58)

Czech Scientist Claims Sputnik Rockets Were Three-Stage

In an article entitled "Artificial Satellites and Their Movement," Dr Otto Oburka explains the movement of earth satellites. In one paragraph on the launching of the satellites, Oburka says that the carrier rockets of both Soviet satellites were three-stage rockets, and he describes the flight of each stage of the rockets, when they launched the satellites. The article does not identify Oburka's position, but in a previous article by Oburka he was identified as affiliated with the People's Observatory in Brno. (Brno, Rovnost, 9 Feb 58)

Model of Six-Stage Rocket at Berlin Exhibition

A Czech newspaper reprints a photograph of a model of a rocket on display at an exhibition of Soviet satellites in Berlin. The caption says that this is a six-stage rocket which is 120 meters long and 20 meters in diameter. (Prague, Prace, 9 Feb 58)

Dynamics of Lunar Flight Discussed

V. A. Yegorov, Candidate of Physicomathematical Sciences, presents readers of the Soviet periodical Priroda with a popular version of his original article, "Certain Problems on the Dynamics of Flight to the Moon," which appeared in Uspekhi Fizicheskikh Nauk, Volume 63, No 1-a September 1957, pp 73-117.

The problems center on minimum initial velocities, lunar impact trajectories, circling the Moon and returning to Earth, circling the Moon and returning to the Earth's atmosphere at an inclined angle, periodic circling trajectories about the Earth and Moon, maximum acceleration with the help of the Moon, and the effect of errors in initial data on the trajectory to the Moon. (Priroda, No 2, Feb 58, pp 3-9)

Kazakh State University Using Neutron Monitor for Cosmic Ray Studies

On the second floor of one of the buildings of the Kazakh State University a small room is equipped completely with instruments for studying cosmic rays. The largest piece of equipment in the room, which is part of the Chair of Experimental Physics headed by Prof V. V. Cherdyntsev, is a neutron monitor. Cosmic rays passing through the lead block of the monitor form neutrons. The birth of each new neutron is accompanied by a flashing of light on the panel. The basic task of this cosmic ray station is to separate particles arriving from the cosmos from similar particles which are sent to Earth by the Sun. Therefore, it is necessary to clarify the quantitative relationship of these particles, their original, and intensity in relation to time, day, and year. A comparison of data obtained by the university installation with data of other stations of the country will make it possible to measure the energy of cosmic rays and to study their properties more completely. (Alma-Ata, Kazakhstanskaya Pravda, 15 Jan 58)

Geophysical Work of Academy of Sciences Turkmen SSR Reviewed

In his annual report to the Presidium of the Academy of Sciences Turkmen SSR, M. V. Pentkovskiy, academician-secretary of the Department of Physicomathematical Sciences of the academy, reviewed accomplishments of his department in the field of geophysics as follows:

"The Astrophysics Institute, a participant in the IGY, has successfully completed projects in the IGY program.

"On the basis of general dynamics of stellar systems, a demal model of our galaxy, which is in better agreement with observations than a previously supposed model, was developed. Conclusions were made on the part of interstellar matter composed of molecular hydrogen. The significance of the ion concentration in coronal rays and cosmic space was determined. The Sun service conducted regular, intensified observations in connection with the IGY.

"Expanded observations of zodiacal light were conducted. For this purpose, in particular, a special expedition under the direction of Academician V. G. Fesenkov went to Egypt. This was also included in the IGY program....

"Electrophotometric measurements of Mars during the time of its great opposition, with which the Sector of Astrobotany was concerned, assisted in determining color indices of individual localities on the surface of this planet, the albedo of the seas and deserts, and the optical thickness of the atmosphere." (Vestnik Akademii Nauk Kazakhskoy SSR No 2, Feb 58, pp 102-104)

New Soviet Radiotelescope Completed

It was announced on 29 November 1957 at a conference of radioastronomers that the Soviet Union had completed construction of the world's largest radiotelescope, according to a Budapest newspaper. The telescope is 130 meters long, and the area of the "radio mirror" is 400 square meters.

The giant apparatus is driven by a dozen high-power electric motors and a semiautomatic installation having a special system.

The results of observations are automatically recorded. The telescope makes possible the study of ionospheric and solar phenomena and, consequently, the prediction of magnetic storms. (Budapest, Magyar Nemzet, 3 Dec 57)

Results of Early 1957 Aurora Observations Published

On the night of 21-22 January 1957 in Moscow, Kiev, Kishinev, and other regions of the Soviet Union, intensive aurora reaching far to the south was observed. According to data of the Scientific Research Institute of Terrestrial Magnetism, Ionosphere, and Radiowave Propagation (NIZMIR) in Krasnaya Pakhra near Moscow the intensive aurora was observed from 2100 hours on 21 January to 0030 hours on 22 January, Moscow time, in the form of a shimmering arc of light turquoise color. The emission took place continuously, rose to the zenith, and in the form of a purple drape passed through the zenith.

A review of the reports on this phenomenon received by the editors of the monthly popular science journal of the Academy of Sciences USSR appears in the December 1957 issue of that journal.

Some of the conclusions are given as follows:

As is evident from the description given and the reports received in the Murmansk Branch of NIZMIR, the characteristic feature of this aurora is the principal red coloring in the southernmost regions (which are an indication of its altitude) and the increased intensity (2-4 force). At the Zvenigorod station the spectrum of this emission was taken. According to the report of A. N. Shefov, the red oxygen radiation (O_1) 6300 Angstroms, predominated over the green radiation, (O_1) 5700 Angstroms, which is characteristic for high aurora. In addition to the regular lines and bands belonging

to atomic oxygen and molecular nitrogen, an intensive hydrogen line (H-alpha 6562 Angstroms) was revealed, as well as the manifestation of radiation of atomic nitrogen, (N_1) 5200 Angstroms, (also characteristic for high low-latitude aurora). The aurora was accompanied by very intensive ionosphere-magnetic perturbations and disturbances of radio communications on nearly all main lines of communication. In the beginning, very large magnetic storms with a prolonged active period and very high rates of variations in the magnetic field were recorded at 1245. The disturbances continued until 25 January. An exceptionally great effect was observed in cosmic rays: the intensity of cosmic rays dropped more than 4% and to the end of the month lagged behind the average monthly value.

The aurora of 21-22 January 1957 belongs to the leading geophysical phenomena. Its original is connected with an increase of solar activity. During the IGY, observation of aurora will receive great attention. In addition to instrument investigations of aurora, visual observations will be made to which, besides the wide network of meteorological stations, crews of airplanes on airlines, amateurs united by the All-Union Astronomical and Geodetic Society, and a broad section of the population will be attracted. The collection and processing of data are done at a special center organized under the Institute of Terrestrial Magnetism, Ionosphere, and Radiowave Propagation of the Ministry of Communications USSR. All types of material on observations are to be sent to this institute, whose postal address is Moscow, Institute of Terrestrial Magnetism, Ionosphere, and Radiowave Propagation; telegraph address, Moscow NIZMIR. (Priroda, No 12, Dec 57, pp 83-85)

 Method of Increasing Sensitivity of Radio Interferometer

A photographic method of prolonged accumulation used for increasing the sensitivity of a modulating radio interferometer by means of commutating the output current is described by V. A. Sanamyan ("A Method of Prolonged Accumulation of a Signal and Its Use in Increasing the Sensitivity of an Interference Radiometer Operating With Phase Inversion,") Soobshcheniya Byurakanskoy Observatorii, No 33, 1957, pp 3-33 The commutation period equals, within fractions of a second, the half period of the interference diagram, and is regulated in relation to the declination of the observed source. The ambiguity resulting from the change in the signal phase during commutation was eliminated by the use of a double storage output device in which the instants of inversion are shifted in phase to $\pi/2$. The commutation of the output current is accomplished by means of periodic 180° phase shift of the reference voltage at the synchronous detector of the interferometer. The method was tested on 4.2 m wavelength of radio emission from discrete sources in the constellations of Gemini, Taurus, and Perseus. It was established that the sensitivity was increased by one order. (Referativnyy Zhurnal -- Astronomiya, Geodeziya, No 9, Sep 57, Abstract No 7449)

Studies on Night Sky Radiation in Georgian SSR

The results of systematic measurements of intensities of night sky radiation made at the Abastumani Astrophysical Observatory, Academy of Sciences Georgian SSR, from September 1952 to November 1954 are presented by L. M. Fishkov in "Seasonal Variations of Night Sky Radiation Intensities," (Soobshcheniya Akademii Nauk Gruzinskoy SSR, Vol 16, No 9, September 1955, pp 681-686) Measurements were made with the aid of an electrophotometer in four spectral ranges: 900-1040, 730-820, 610-720, and 480-600 mu.

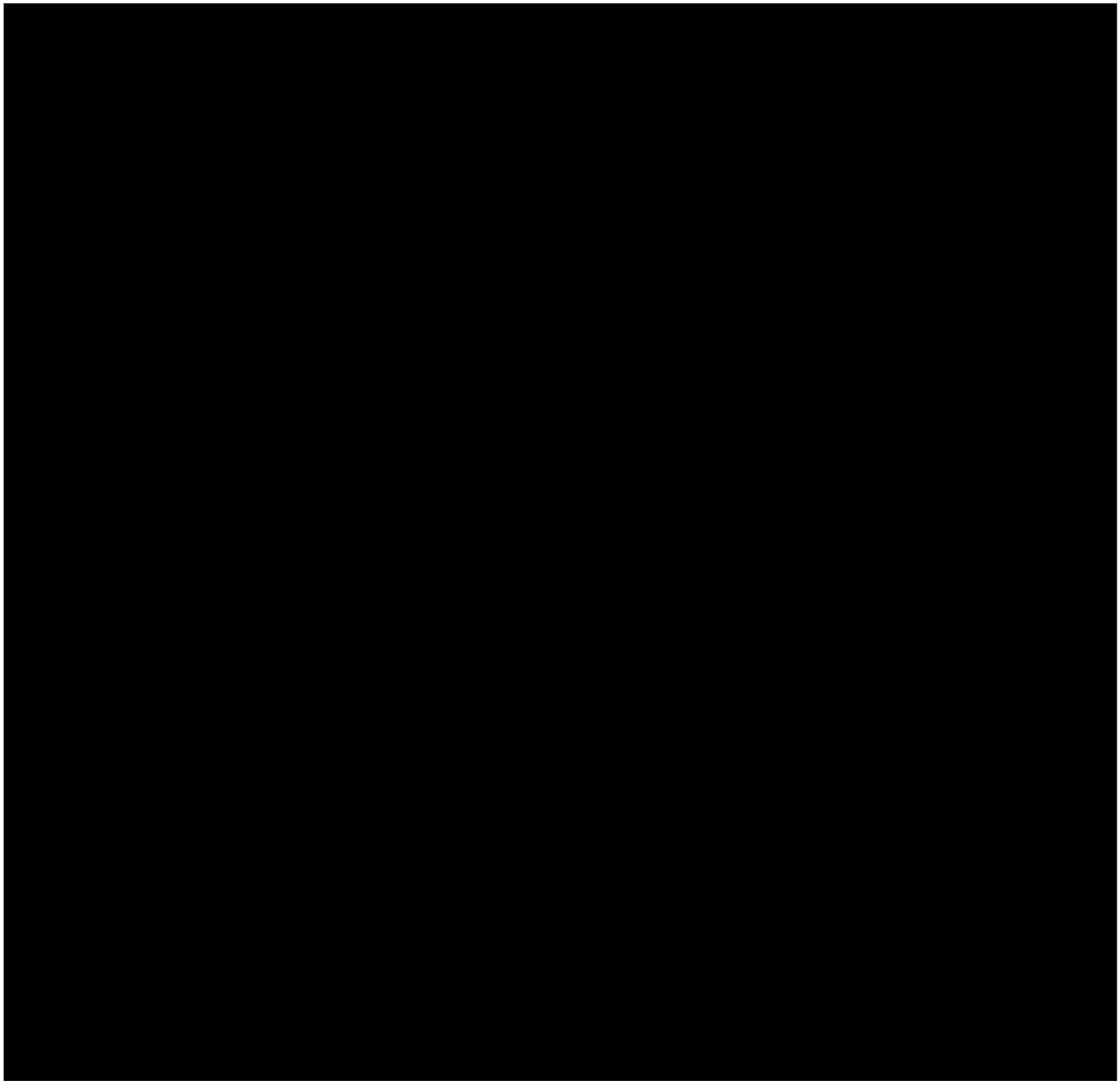
Seasonal variations of intensities in these ranges were found to be approximately identical. Maximums occurred in November-December, and minimums in the spring and summer, on which were imposed less distinct and not always recurring maximums. The magnitude of the maximum intensity changes by more than twice from year to year. The connection of the activity of night sky radiation with solar activity expressed in Wolf numbers is not always apparent. Best night sky intensities are connected with chromospheric eruptions. Wolf numbers are insufficient indexes for connecting solar activity with phenomena in the earth's atmosphere.

Night variations of night sky intensities agree with results of earlier observations which were made by S. F. Rodionov, Ye. N. Pavlov, L. M. Fishkov, and M. S. Sominskiy. During periods of increased activity of night sky brightness, nights with maximum intensities in the middle of the night or with irregular fluctuations during the night predominate. Periods with lowered activity are characterized by a uniform variation of intensity with a noted decrease from evening to morning. (Referativnyy Zhurnal -- Geofizika, No 3, Mar 57, Abstract No 2261)

III. METEOR OBSERVATIONS

Observation of Orionids at Vannovskoye Astronomical Obervatory

The text of a report by Kh. D. Gul'medov of the Institute of Physics and Geophysics, Academy of Sciences Turkmen SSR, titled "Activity of Orionids in 1957 According to Observations At the Astronomical Observatory in Vannovskoye" follows.



Date	Interval	Greater than	0	0	1	2	3	4	5	Total		Mo	Mo
22 Oct	285	19-2400	0/3	2/2	9.8	16/4	22/36	12/10	9/6	70/69	49	2.9	2.9
23 Oct	230	19-2300	0/0	2/1	7/8	12/7	14/8	15/13	4/2	54/39	42	2.8	2.8
24 Oct	240	19-2400	0/1	2/1	11/8	5/2	9/4	10/5	5/1	42/22	34	2.7	2.3
Total for 23.4 hours:			1/11	8/13	49/41	59/41	120/98	73/62	37/11	347/277	44	2.9	2.6

Table 2. Hourly Rate of Orionids (Background/Stream) in 1957 at Vannovskoye

Date	Greater than	0	0	1	2	3	4	5
19 Oct		0.3/0.0	0.3/0.8	0.6/0.8	3.0/2.1	5.4/3.7	3.7/4.1	0.6/0.0
20 Oct		0.0/0.4	0.2/1.3	2.4/1.8	2.2/2.6	7.1/4.7	2.4/4.0	1.8/0.4
21 Oct		0.0/0.2	0.0/0.0	2.2/1.4	1.4/2.9	5.8/4.0	3.0/3.0	2.2/0.0
22 Oct		0.0/0.6	0.4/0.4	2.0/1.7	3.4/0.8	4.8/7.8	2.5/2.1	2.0/1.3
23 Oct		0.0/0.0	0.5/0.2	1.8/2.1	3.1/1.8	3.6/2.1	4.0/3.4	1.0/0.5
24 Oct		0.0/0.2	0.5/0.2	2.7/2.0	1.5/0.5	2.2/1.0	2.5/1.2	1.2/0.2
Avg		0.0/0.2	0.3/0.5	2.0/1.6	2.4/1.8	4.8/3.9	3.0/3.0	1.8/0.4

In both cases the maximum hourly rate drops by three star magnitudes, depending on conditions of visibility. The hourly rate from 19 to 24 October 1957 for the meteors of the background (first value) and the stream (second value) is thus 13.6/8.9, 16.2/14.3, 14.3/11.5, 15.0/14.7, 14.0/9.9, and 10.5/5.2.

The average hourly rate on all nights of observation was 14.9 meteors per hour, respectively. From the data presented it follows that the hourly rate of meteors of the background generally was sufficiently uniform, whereas the relative index of activity and absolute hourly rate of Orionids indicate a relative minimum on 21/22 October 1957, which was probably caused by a local gap in the stream. Inasmuch as the average brightness

of the Orionids on this night was greater, the gap was produced by a lack of weak meteors. From Table 2 it can be seen that, for meteors of various brilliance, the date of the maximum varied. The entire number of meteors measured during the 23.3 hours of observation amounts to 347 for the background and 277 for the stream. (Izvestiya Akademii Nauk Turkmenskoy SSR, No 1, Jan 58, pp 190-110)

Duration of Meteors During the Night

Kh. D. Gul'medov of Institute of Physics and Geophysics, Academy of Sciences Turkmen SSR, in a report titled "Variation of the Duration of the Flight of Meteors in the Course of the Night," gives the following information:

[redacted]

Mean Solar Time	τ <0.20	0.20-0.35	0.36-0.60	>0.60 seconds	Total	Meteors
0100-0200	10	56	18	16	100	416
0200-0300	9	63	17	11	100	234
0300-0400	16	59	16	9	100	165
0400-0500	3	71	13	13	100	30
Avg (%)	7	54	17	18	100	Total 2,480

"Inasmuch as the number of hours of observation during the night was not the same, the last column does not represent the diurnal variation of the meteors. The table shows that the range of distribution for τ is 0.20 to 0.35 second. The diurnal variation is obvious, since the number of fast meteors (τ less than 0.20 second) almost doubles from night to morning. Likewise, there is a systematic increase of meteors with τ = 0.20 to 0.35 second toward the morning. On the other hand, the percentage of slower meteors (τ = 0.36 to 0.60 second) decreases during the night, which is especially evident for even more persistent meteors with τ greater than 0.60 second." (Izvestiya Akademii Nauk Turkmenskoy SSR, No 1, Jan 58, p 111)

Radio Observations of Quadrantids at Ashkhabad

V. Mollakov of the Institute of Physics and Geophysics, Academy of Sciences Turkmen SSR, gives the following information in a brief report titled "Radio Observations of Quadrantids in 1957 at Ashkhabad."

Observations of Quadrantids were made during the night of 3/4 January 1957 with instruments of the Ionosphere-Wave Laboratory of the Institute of Physics and Geophysics, Academy of Sciences Turkmen SSR. For the purpose of comparison, observations were also made on 7 January 1957, when the stream was not active. The measurement range was 8.7 to 9.7 Mc. The instant of the occurrence of the radio echo from the meteor was recorded, as was the amplitude of the radio echo in units of standard interference A. The durations τ_s of the visibility of especially stable reflections, greater than 10 seconds, were also measured. The results are given in the following table.

Distribution of Radio Echoes of Meteors According to Amplitude

Date 1957	Interval	A= 0.5	1	2	3	4	5	6	7	8	9	10	10	n_m
3 Jan	2213-2251	3	9	8	5	1	0	0	0	0	0	0	0	0.7
	2315-2349	0	18	11	1	2	2	0	0	0	0	0	0	1.0
4 Jan	0012-0059	0	14	30	16	10	2	4	0	1	0	1	0	1.7
	0100-0102	0	0	2	0	0	0	0	0	0	0	0	0	[1.0]
7 Jan	2212-2350	0	13	6	9	6	1	1	0	1	0	1	0	1.0
8 Jan	0014-0105	0	41	34	11	1	2	1	0	2	0	1	3	1.9

Both nights reveal a diurnal variation of the number n_m of radio meteors per minute (last column). The table shows that, in the period of Quadrantid activity, the amplitude distribution dropped to A = 2, if we take the data for the entire night, and to A = 1 for the control night of 7/8 January 1957, which could tally with the longer echoes of the meteors of the stream in comparison with the others. Actually, among the first 130 meteors on the night of 3/4 January 1957, 21 meteors had a τ_s greater than 10 seconds, some reaching 147 seconds, whereas the first 130 meteors of the control night included only 14 with values of τ_s greater than 10 seconds, with a maximum of 75 seconds; the average arithmetic value of τ_s was 25 and 24 seconds, respectively. No connection with the sporadic E layer could be found. (Izvestiya Akademii Nauk Turkmenskoy SSR, No 1, Jan 58, p 110)

IV. METEOROLOGY

Ground Level Temperature Measurement With Actinometric Instruments

In "Indirect Method of Ground Level Temperature Determination by the Use of Standard Actinometric Measurements" by K. Ya. Kondrat'yev and Z. A. Loginova, the authors confirm the radiometer, studied previously by them, to be the most reliable instrument for ground level temperature measurements. However, the complexity of this equipment makes it desirable to investigate whether or not standard actionometric methods could be used with success. Nevertheless, the introduction of empirical corrections to these measurements could improve the results. An indirect method is also suggested by using for corrections ground level temperature data of various climatic zones obtained by radiometers. (Vestnik Leningradskogo Universiteta, Seriya Fiziki i Khimii, No 4, 1957, pp 79-84)

Sounding Balloons To Be Launched in Yugoslavia

The Hydrometeorological Station in Pula (Pulska hidrometeoroloska stanica) will also soon begin launching sounding balloons to measure wind direction and velocity at high altitudes. Data obtained will be used in weather forecasting. The balloons will be launched twice daily and at 0100 hours and 1300 hours and will be clearly visible with the naked eye. Balloons launched at 0100 hours will be white in color, and those launched at 1300 hours will be red. (Borba, 28 Jan 58)

Method of Wave Element Analysis

Certain peculiarities in the results of wave graph observations were noted by G. V. Rzhenlinskiy during operations of the Antarctic Expedition of the Academy of Sciences USSR. He pointed out that failure to recognize these characteristics can lead not only to erroneous opinions concerning the nature and content of the results of the observations, but also to their incorrect use in the solution of practical problems.

The author observes that because of the great distance from shores and the almost unlimited run of the waves, swells (of one or several systems) and wind waves, both caused by the wind, can almost always be observed in the storm zone of the Antarctic sector of the Indian Ocean. This same is true of the trade wind zone of the Indian Ocean, with this exception only, that in this zone the swells and wind waves are mainly radiated in only one direction. Here the swells are caused by the same trade winds that cause the wind waves; the swells are formed as a result of a steady wind over a great distance, while the wind waves reflect a more local and unsettled process of wave development under the action of this same wind.

Wave heights and periods in the ocean are almost never directly related to wind action since with very few exceptions, systems of large wave swells are observed together with wind waves. Because of this, the direct results of wave graph observations cannot be used (except for rare cases when wave swells do not exist) for confirming theoretical calculations of wave elements by present known methods.

The development of a method for calculating wave elements for cases of mixed waves suitable to vast ocean areas is of great significance.

In ocean conditions, in the presence of several wave systems, the oscillations of the wave level at a point are the result of a combination of the wave levels of all the waves, and do not directly reflect either the height, period, or variety of the waves belonging to the different wave systems.

In the case of large swells, propagated at a higher speed than simultaneously occurring wind waves, the oscillations of the level at a point will match the results of a compilation of these wave systems with the direct displacement of their phase in time.

A wave graph profile does not wholly agree with the true profile of the sea surface as recorded by a stereophotogrammetric survey of the waves at the same point. It does not show the presence of wind waves whose height are of the same order as the swell waves.

A wave graph recording and the results of a stereo survey would agree only when both wave systems had similar group velocities of propagation.

Thus, in the presence of swells, wind waves with a considerably lower group propagation velocity are, in general, not reflected on the wavegram. They are only registered accidentally in the form of disturbances on the steepest parts of wave crests and troughs, and recorded by wave graphs as basic wave level oscillations. Consequently, they are secondary on the basis of their relation to the basic oscillations of the wave level at a point. They are not included in the computations. These waves belong to the system of waves which can be considered secondary not so much because of the size of the waves as according to the index of the relatively low group velocity of propagation. Thus, wave level oscillations at a point, in the presence of different wave systems cannot directly give a presentation of the character of the wave field and of the variety of waves on the ocean's surface.

The only means by which a true representation of the variety and systems of waves causing oscillations of wave level at a point can be made is by introducing into wave study practice simultaneously with the production of wave graph observations, a method of spectrum analysis of wave grams. (Meteorologiya i Gidrologiya, No 1, Jan 58, pp 44-46)

Soviet Deep Sea Color Photography

According to a Hungarian newspaper, the Soviet research vessel Vityaz' carries special photographic equipment developed by Zenkevich. Zenkevich maintains that the apparatus can be used underwater at depths as great as 8,000 meters and can take pictures in color. (Budapest, Nepakarat, 17 Dec 57)

VI. GLACIOLOGY

CPYRGHT

Speed of Fedchenko Glacier Clocked at 50 Centimeters Per Day

Workers of the Academy of Sciences Uzbek SSR wintering in the Pamir Mountains, established for the first time the speed of drift of the largest glacier in the world which bears the name of the noted explorer of Central Asia, A. P. Fedchenko.

It was established that in the firn zone -- above the snow line -- the speed of drift of the enormous glacial mass in winter atains an average of 50 centimeters in 24 hours. (Moscow, Pravda, 25 Mar 58)

New Glacier Found in Northern Urals

While traveling in the northern Urals in the summer of 1956, V. V. Gorbachev, Moscow State University imeni M. V. Lomonosov, and party discovered a hitherto unknown glacier, lying considerably farther south than any in these regions. The newly discovered glacier lies in a square on the southeastern slopes of Tel'vos-Iz, approximately one degree farther south than the glaciers of the Sablinskiy Mountains, which were considered for some time the southernmost glaciers of the Urals.

In its upper part, where the snow becomes ice, the glacier is about 500 meters wide and at its end about 150 meters; length about 800 meters, and area approximately 0.18 square kilometers. The upper limit of the glacier's lower edge is 1,050 meters high. Many well-defined fissures, some 1.5 meters wide and 5 meters deep, were found. Lying below the glacier is a bog, separated from the end of the glacier tongue by a terminal moraine and a dike 20 meters high. The Tel'pos-Yu River flows from the lake. There is a pass around the lake. The glacier cannot be seen from this pass because the dike only permits a view of the snow which is above the glacier. (Priroda, No 1, Jan 58, p 115)

VII. ANTARCTIC

Soviet Research in the Antarctic

During a 2-year period, February 1956 to February 1958, Soviet scientists in the Antarctic have accumulated a huge quantity of factual material and have discovered many natural laws concerning phenomena in the Antarctic.

For the first time in the Antarctic, glaciological research has been conducted on a large scale. In coordination with seismic research, geodetic work, and the study of the movement and melting process of the glacial cover, it has been possible to revise the former theories concerning the present status of glaciation. The Complex Antarctic Expedition determined that the extent and thickness of the present glacial cover is much greater than was previously assumed; some of the concepts regarding the nature of the antarctic land below the ice have been changed. On the basis of observations, it is now considered doubtful that Antarctica is one single continent, and it appears necessary to revise former theories regarding the dimensions of the continent, especially of the eastern portion.

Considerable material has been collected by the Complex Antarctic Expedition as a result of regular studies of the atmosphere. It has been possible to establish a set of rules for atmospheric processes in Antarctica by various methods, including the launching of a large number of radiosondes (totaling over 1,600 up to October 1957), frequent flights of airplanes conducting meteorological research, careful processing of synoptic charts, and observations of wind and temperature by mobile field units. Soviet scientists assume that the minimum temperature in the interior of the continent is about minus 80-85 degrees. The formation of slope or glacier winds causes considerable cooling of the air above the ice sheet, as a result of which the air is impelled by gravity to flow downward, in the direction of the coast. Atmospheric pressure in Antarctica is low throughout the year; the changes in pressure in the course of a year are exactly opposite those in the northern hemisphere, i.e., the winter atmospheric pressure in the Antarctic is lower than the summer.

According to the IGY program, the Mirnyy observatory and the interior stations are conducting continuous observations of cosmic rays and auroras, as well as hydrological, seismic, magnetic, and ionospheric observations. The seismic station at Mirnyy has recorded a large number of earthquakes during the past 2 years, including some with great destructive force. The epicenters of these earthquakes were in various parts of the globe.

Soviet scientists are striving to conduct all their observations and research in the Antarctic in close cooperation with expeditions of other countries. The Soviet expedition maintains continuous contact with the antarctic bases of the US, Australia, France, Great Britain, Japan, and Norway, and exchanges information with these stations on questions of aerometeorology, geophysics, glaciology, and other subjects.

All observations and research materials on the Antarctic are being generalized and will be published in a special publication called Trudy Kompleksnov Antarkticheskoy Ekspeditsii (Works of the Complex Antarctic Expedition). The Council for Antarctic Research, Academy of Sciences USSR, has already released for printing the first volume and two issues of the second volume of the Trudy, a total of about 80 printer's sheets [1,280 pages]. (Moscow, Priroda, No 2, Feb 58)

Soviet Ship Visits Uninhabited Island in the Antarctic

The research ship Slava-15, which is in the Antarctic as a component part of the whaling flotilla Slava, landed a group of Soviet scientists and seamen on Ostrov Zavadskogo [56-20 S, 27-35 W], one of the uninhabited islands discovered 137 years ago by the Russian expedition of Bellingshausen and Lazarev.

The landing was made on the southwest shore of the island, which has a high, steep coast consisting of volcanic rock and is almost unapproachable from the sea.

Ostrov Zavadskogo is covered with snow and ice. However, there are a few open places where the temperature of the soil reaches plus 25 degrees. The small, dry elevations of the islands are occupied by nests of penguins. The plant life of the island consists of only one type of lichens and one type of moss. In addition to penguins, the expedition members captured so some large stormy petrels and other birds. Near the coast of the island, the expedition members caught several rare types of fish. The collected samples will be sent to Soviet museums.

To commemorate their visit to the uninhabited volcanic island, the scientists planted a 4-meter metal pole topped by a five-pointed star. (Kishinev, Sovetskaya Moldaviya, 17 Jan 58)

Sledge-Tractor Train Returns From Interior Expedition CPYRGHT

The sledge-tractor train, which left for the interior on 26 December, has returned from its long overland expedition. The heavy caterpillar tractors, produced by the Khar'kov Tractor Plant, have completed an unprecedented trip across the ice of Antarctica. Members of the interior expedition traveled about 4,000 kilometers in a period of 69 days. Several hundred tons of miscellaneous freight were hauled for the stations Pionerskaya, Komsomol'skaya, Vostok, and Sovetskaya. During a relatively short period, members of the expedition visited Vostok Station near the south geomagnetic pole, and then proceeded to the region of the pole of relative inaccessibility, where they helped to set up and equip the new station Sovetskaya. (Moscow, Vodnyy Transport, 13 Mar 58)

CPYRGHT

Kooperatsiya Visits Australia CPYRGHT

On 26 February, the Kooperatsiya arrived at the port of Adelaide after crossing the ocean from Antarctica. The Kooperatsiya spent 10 days in Australia, during which period hundreds of visitors came to see the ship daily.

Members of the Soviet Antarctic Expedition were invited to visit the University of Adelaide, where they met students and instructors of the university.

A group of polar scientists and seamen attended a reception organized by the Society for Australian-Soviet Friendship in honor of the arrival of Kooperatsiya. The Australians escorted the Soviet expedition members to see points of interest in Adelaide, including museums. and picture galleries, and in the suburbs.

The Kooperatsiya was also visited by the well-known Australian scientist and explorer Douglas Mawson. He presented the Soviet polar scientists with a volume of scientific works of the Australian Antarctic Expedition of 1911-1914 on the ship Aurora, which expedition had been headed by Mawson.

Several days ago, the Kooperatsiya left Adelaide on its homeward voyage to the USSR. (Moscow, Vodnyy Transport, 15 Mar 58)

CPYRGHT

Soviets Briefly Review Foreign Expeditions to Antarctica

Prof K. K. Markov of Moscow State University presents a concise 3-page review of US and UK expeditions to Antarctica in a recent issue of the popular science monthly of the Academy of Sciences USSR. (Priroda, No 2, 1958, pp 59-61)

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