(23)

PB 131632-22

SOVIET BLOC INTERNATIONAL GEOPHYSICAL YEAR INFORMATION

July 11, 1958

U. S. DEPARTMENT OF COMMERCE
Office of Technical Services

Published Weekly from February 14, 1958, to January 2, 1959
Subscription Price $10.00 for the Series

Approved For Release 1999/09/08 : CIA-RDP82-00141R000200230001-7

PLEASE NOTE

This report presents unevaluated information on Soviet Bloc International Geophysical Year activities selected from foreign-language publications as indicated in parentheses. It is published as an aid to United States Government research.

SOVIET BLOC INTERNATIONAL GEOPHYSICAL YEAR INFORMATION

Table of Contents

		Page
I.	Upper Atmosphere	1
II.	Meteorology	11
III.	Oceanography	12
IV.	Arctic and Antarctic	14

Approved For Release 1999/09/08 : CIA-RDP82-00141R000200230001-7

Soviet Program on Noctilucent Cloud Observations

In the first article of its kind, V. V. Sharonov discussed the Soviet program of observations on noctilucent clouds as follows:

In the program of observations which will be accomplished during the IGY, observations and the study of a comparatively rare and very little studied formation observed in the upper layers of the Earth's atmosphere and known by the name of noctilucent clouds will be undertaken.

These clouds were discovered in 1885 in Moscow by the famous Russian astrophysicist, V. K. Tserasskiy, and independently by Iesse in Germany. V. K. Tserasskiy, together with his young pupil, A. A. Belopol'skiy, determined the altitude of these clouds, which they estimated at approximately 80 kilometers. Thus was established an important fact for the geophysicist, namely, the existence of the aerosol layers in the upper levels of the Earth's stratosphere.

Subsequently, noctilucent clouds were observed and studied by many scientists, and it was established that they are visible only during twilight, only in summer, and only in a limited latitude zone, primarily from 50°-70°, and also that their altitude fluctuates within narrow limits from 80-85 kilometers with an average of 82 kilometers. However, all of these works did not have any kind of systematic character, and the results did not always embrace the desirable authenticity and accuracy.

During the current IGY, for the first time, regular daily observations of noctilucent clouds by a network of stations and also by a series of special investigations on the principles of cooperation between a number of scientific institutions according to a single plan have been set.

In the USSR, the functions of the "main institutions" responsible for the organization, collection, processing, and future use of completed observations has been placed with the Astronomical Observatory at Leningrad State University, where they will be concentrated in the Photometric Laboratory. In the work on the study of noctilucent clouds, a number of organizations will take part, including the hydrometeorological service, where observations will be established at a network of stations; the All-Union Astronomical and Geodetic Society, where work will be developed in

Approved For Release 1999/09/08 : CIA-RDP82-00141R000200230001-7

all branches situated in a specified high latitude zone; and certain observatories, institutes, and others. For the coordination and scientific supervision of all of these works under the interdepartmental committee for the IGY, a special working group on noctilucent clouds has been organized. Its membership consists of both astronomers and geophysicists engaged in problems of the upper atmosphere, as well as of experienced observers of noctilucent clouds. A group, together with the All-Union Astronomical and Geodetic Society, conducted two extended conferences of observers in Moscow, one on 1 and 2 December 1956 and the other on 9 and 10 April 1957. At these conferences, plans for investigating noctilucent clouds by various institutions and organizations were heard and confirmed. Also, instructions on observations, which were subsequently printed and sent to all localities, were confirmed.

The Astronomical Observatory at Leningrad State University set up a special station for accomplishing its own program of observations and for methodical work and the instruction of observers from other localities. This station is located in the city of Petrodvorets under the Petergofskiy Biological Institute of Leningrad State University. As a headquarters for the station, Building No 10, or "Naryshkinskiy Dvorets," which was destroyed during the war, was rebuilt. On its roof a brick tower was constructed, which makes it possible to see in the necessary directions a perfectly open horizon. The organizer and chief of the station is I. A. Parshin.

The basic task which should be solved by the observations completed during the IGY is a precise establishment of the limits of appearance of noctilucent clouds according to time and according to latitude. As mentioned before, at present, our information on this problem is based on random and spurious material which in no way satisfies the requirements of scientific climatology. Suffice it to say that separate reports indicating the frequency of appearance of noctilucent clouds at one or another station do not take into account even such an important factor as tropospheric cloudiness.

In the USSR, regular daily observations of the appearance of noctilucent clouds are being conducted by more than 200 stations within the system of the Hydrometeorological Service (GMS) and also by volunteer observers at stations organized by the branches of All-Union Astronomical and Geodetic Society. In the simplest case, observation is limited by the statement of the very fact of the presence or absence of noctilucent clouds within the limits of range of vision of the station during the period of observation. At the same time, it is necessary to conduct a registration of tropospheric cloudiness as a fundamental factor determining the possibility or impossibility of seeing noctilucent clouds in the case of their presence. A more qualifying variation of observation requires the fixation of the curve of the area occupied by noctilucent

clouds in the sky, which is accomplished more easily by photographic means, but can be accomplished with the aid of the usual theodolite. As far as the altitude of noctilucent clouds is concerned, this may be calculated by standard means. This makes it easy to obtain a projection of the cloud cover over the Earth's surface. As supplementary data, there are registered the visible brightness (the contrast with the background of sky) and the structure of the clouds evaluated according to a special classification proposed by N. I. Grishin.

A very important task is the regular, exact determination of the altitude of the clouds. The most natural method is synchronous photographing from two sufficiently remote points and a subsequent processing of the obtained negatives by photogrammetric methods. Generally speaking, it is necessary to use a phototheodolite here because it is necessary to have the elements of external orientation for the pictures. However, the use of phototheodolites in the practice of our topographic organizations is rather limited,...instruments of this type are not constructed by us. The other alternative is the use of aerial photographic surveying cameras. Photographs turning to the horizon may be oriented according to terrestrial objects, the altitude and azimuth of which is determined by visual theodolite. For the sections of the celestial sphere with a slight zenith distance, the reflections of the stars may be used, but on pictures of the twilight sky, the latter is not always obtained.

The problem on the most suitable direction of a base line is disputable. Some recommend placing it along a geographic parallel, referring to the fact that noctilucent clouds usually are visible on the northern side of the horizon, in the specified direction, and with a sufficient base line, the triangle will have the form, from a trigonometric point of view of being the most suitable. Inasmuch as parallactic displacement is directed according to the almucantar, the zenith distances cut by the points of a cloud through both stations will be roughly the same, which decreases the error connected with the inexact calculation of differential refraction, as well as the systematic effects, depending on differences in the brightness of a twilight sky background. However, these advantages may not be explained by the fact that the structural details of the field of noctilucent clouds occasionally have a character of threads and banks parallel to the horizon.

Approved For Release 1999/09/08 : CIA-RDP82-00141R000200230001-7

Under such conditions, the measurement of parallax displacement, which is also parallel to the horizon, will be very difficult. Therefore, a more suitable direction of the base line along the meridian is preferred. In this case, parallax displacement, roughly perpendicular to the structural parts, is manifested and easily measured.

In view of insufficient clarity of the problem on the most suitable direction of the base lime and the possibility of the appearance of clouds with a completely varied structure, an entirely expedient suggestion should be considered to make simultaneous observations from three or a greater number of points. Thus, the Sverdlovsk Branch of the All-Union Astronomical and Geodetic Society plans to take photographs from nine points, the combination of which gives a base of broad, long, and oblique directions. Observations from four points are planned for Riga. Altitude determination will be made from Moscow, Kiev, Khar'kov, Saratov, Gor'kiy, and other stations.

The second very important task of precision photogrammetry of noctilucent clouds consists of the investigation of their movement along the Earth's surface. It is known that such "drifting" of clouds may occur with great speed, usually exceeding 100 miles per second and its direction differing in various regions of the Earth. Accomplishing favorable photography of the area of noctilucent clouds from two points, the displacement in space of individual prominent parts -- cloks, crests, crossings of hail -- may be obtained. Great prospects are presented in this field for motion pictures, which have already been used in the past with great success in the work of the Geophysics Institute of the Academy of Sciences USSR.

Optical investigations of noctilucent clouds constitute a highly important but difficult problem. Their task is to give material which will make it possible to draw a conclusion on the possible nature of the particles forming the cloud. It is desirable to determine the following optical parameters: distribution of the scattering flow according to direction, i.e., so-called indicatrices of dispersion; change of the scattering ability with long waves; degree and orientation of polarization for light scattered in clouds; absolute values for the coefficient of dispersion for noctilucent clouds of various density; weakening of the light of celestial bodies observed through a cloud cover. In addition, the opinion is expressed that the luminosity of noctilucent clouds is determined not only by the dispersion of the sun's rays, but also by the fluorescence of particles of a cloud under the influence of ultraviolet or corpuscular radiation of the sun. This brings up the task of searches of emission bands in the cloud spectrum and a more detailed study of their luminosity under various conditions of radiation.

Approved For Release 1999/09/08 : CIA-RDP82-00141R000200230001-7

The fulfillment of the investigations enumerated above, coupled with a number of difficulties, created by optical effects arising in the layers of the Earth's atmosphere, are situated both below the level of the noctilucent clouds, as well as above this level. Here are related the weakening of the stream of the Sun's rays on their way to the clouds, the weakening of the latter's brightness by its extinction in the layer of air lying between the cloud and the observer, and also the brightness of the twilight sky imposed both on the visible picture of the clouds, as well as seen through them. All of these effects must be calculated and excluded from the brightness of the cloud finally obtained in the proper way, which naturally presents its own extremely complex problem, especially if it is considered that noctilucent clouds are usually observed at great zenith distances, and besides this, in a wide zone where there is no basis to expect stable optical and atmospheric conditions.

Optical observations of noctilucent clouds are the principal task of the Astronomical Observatory of Leningrad State University in Petrodvorts, and also of the expeditions organized by the Leningrad Branch of the All-Union Astronomical and Geodetic Society by forces of students of the Leningrad State University (a group of the latter is headed by O. Vasil'yev, a student). Observations are also conducted in Moscow, Kalinin, Tarta, and in other cities.

The collective work for absolute photometry of clouds which is done by stations located along the Moscow-Leningrad line of Ryazan', Perkhyshkovo (near Moscow), Kalinin, Bolgoye, and Petrodvorets is unique. At the hour of day when the sun intersects the plane of the great circle formed by this line, one and the same cloud is visible from all of the points named, but at different zenith distances and, consequently, from different directions. This makes it possible to construct an indicatrix of scattering for the cloud particles. Naturally, the fulfillment of such work requires clear weather along the whole line of the uniform photometric system and of the careful exclusion of atmospheric influences from the observations made in all of the stations. However, in principle, the execution of such work is possible and therefore there is the expectation that in the case of the appearance of noctilucent clouds concurrent with favorable meteorological conditions, it will be successfully realized

(Vestnik Leningradsoga Universiteta, Seriya Matematiki, Mekhaniki i Astronomi, No 19, Issue 4, 1957, pp 184-187).

Features of Long-Period World-Ocean Tide

An article, "The Long-Period Lunar-Solar Tide in the World Ocean," by I. V. Maksimov, gives the following information:

The long-period tide of the world ocean represents a two-node standing wave, the nodes of which are located in the vicinity of 30 degrees north and south latitude, and the antinodes of which are at the equator and in the polar regions of the sea. In the equatorial region, the positive anomalies of the values of the excitation force coincide with the locations of the highest level of the sea. In the polar regions, on the other hand, the positive anomalies of the excitation force coincide, in respect to time, with the negative anomalies of the level. Observed data thus confirm the conclusions of the theory of the long-period tide in the ocean.

The wave of the long-period tide is a forced wave, but the phases of this wave do not coincide with the value of the force phase of the wave. A lag of the phase of the wave with respect to the phase of the force has been observed in the case of all the components of the waves of the long-period tide. The average value of the difference between the level phase and the force phase has been found to be equal to plus 1.1 days for the lunar semimonthly wave M_f, plus 1.9 days for the lunar-solar semimonthly synodical wave M_f, plus 1.6 days for the lunar monthly wave M_m, and 0.3 month for the solar semiannual wave S_{sa}. The average value for this phase displacement for the semimonthly and monthly wave of the long-period tide is therefore equal to 1.5 days. This is not unexpected, since G. Lamb (Gidrodinamika [Hydrodynamics], Moscow-Leningrad 1947) already pointed out in the dynamic theory of the long-period tide that the deviation for this type of oscillation does not depend solely on the disturbing force, thus, phase displacements occur between the oscillations and their stimulating forces, depending on the frequency of the oscillations.

It was found that the size of the waves of the long-period tide in all cases considerably exceeds the size anticipated for these waves by the static theory of the long-period tide. In the northern hemisphere, in the zone most convenient for observations (between 40 and 60 degrees north latitude), the average value (average for 53 cases for semimonthly and monthly waves and average for 86 cases of the solar semiannual wave) of the amplitudes of the individual waves of the long-period tide were found to be equal to 26.4 millimeters for the M_f wave, 25.0 millimeters for the M_{sf} wave, 32.5 millimeters for the M_m wave, and 39.3 millimeters for the S_{sa} wave. This means that the semimonthly and monthly waves together may change the average level of the sea by 168 millimeters in

these latitudes. In the oceans of the high latitudes, this value, obviously, becomes considerably higher. The static theory of the long-period tide gives a value equal to only 34 millimeters for this characteristic elevation of the combined semimonthly and monthly tides. Thus, the value of the actual long-period tide in the middle latitudes is at least five times greater than the theoretical value.

The long-period tide in the world ocean is a force capable of influencing the velocity of astronomical flow, thus effecting the circulation of water and the drift of ice in the higher latitudes. (Doklady Akademii Nauk SSSR, Vol 118, No 5, 11 Feb 58, pp 888-890)

Use of Electronic Devices in Astronomy Discussed by Soviet Scientist

In an article entitled "The Utilization of Electronic Methods in Astrospectroscopy," N. F. Kuprevich, Candidate of Physicomathematical Sciences (Pulkovo), discusses the use of electron-optical light converters in combination with photographic plates by means of which the effective power of modern telescopes and spectrographs was increased.

The image on the output screen of a converter proved to be considerably brighter than a representation of it on a photocathode. This ensures a gain in exposure, but, unfortunately, not in resolving power.

Recently, states Kuprevich, attempts using an electron converter for photographing stellar spectra in the nearest infrared region were made. For example, in the Canadian Astrophysical Observatory, a single-stage converter was used for this purpose. The image of the infrared region of the spectrum formed by a spectrograph in combination with a telescope (reflector with a main mirror diameter of 180 centimeters), was projected by the photocathode of an electron-optical converter.

Images of the spectra of the star α Bootes and ε Ursa Major of increased brightness obtained on the screen were photographed using an auxiliary light-gathering optic on highly sensitive photoplates. During the photographing of these spectra in the 11,000 Å range the exposure was found to be 6.5 times shorter than in the case of direct photographing of the spectra with the same apparatus but without the use of the convertor.

Experimental photographing of the spectrum of α Lyra during the day in the infrared region of the spectrum was also conducted. Visible in the spectrum obtained were Paschen series lines in the infrared region of the hydrogen spectrum, telluric bands (molecular), etc.

Kuprevich states that the application of the television method for intensifying the brightness of images in astronomy in general and in stellar spectroscopy in particular promises great prospects. Unfortunately, the conventional television transmission tube of "superorthicon" type possesses comparatively little sensitivity. These tube systems cannot store energy in the image over a long time. In TV transmitting tubes, the superorthicon included, the image is accumulated in the form of electrical charges on their targets. The usual storage time is 1/25 second.

Recent experiments in California on the possibilities of increasing the storage time of images in the superorthicon, that is, of increasing its sensitivity are mentioned by Kuprevich. In these, the storage time was successfully brought up to 20 minutes and more. In achieving this, it was found necessary to reduce the voltage in the photocathode tube from 500 to 50 volts, to cool the tube down to a temperature of -70 degrees, to decrease the current of the electron scanning beam in the tube, and to increase the scanning time up to 5 seconds.

A similar "cooled superorthicon" obviously can be used in photometry of the solar spectrum, concludes Kuprevich, and it is certain that its application in stellar spectroscopy will also be very effective. (Priroda, No 5, May 58, p 74)

Soviet Scientist Summarizes Some Results of Upper Atmos re Rocket Studies

V. V. Mikhnevich, Candidate of Physicomathematical Sciences at the Institute of Applied Geophysics, Academy of Sciences USSR (Moscow), gives "Some Results of Investigations of the Upper Atmosphere," which appeared in a popular science periodical of the Academy of Sciences USSR, as follows:

"The study of the structure of the Earth's atmosphere, of the ultraviolet, X-ray, and corpuscular radiation of the Sun, and of the illumination of the day and night sky enters into the IGY program. The structure and composition of the ionosphere, terrestrial magnetism, and meteors and micrometeors are also studied.

"Rocket investigations, aiding in the study of the physical regularities and processes arising in the upper layers of the atmosphere, and solar radiation and its effect in the Earth's atmosphere occupy an important place in the solution of these problems.

"The weight and the height to which scientific apparatus has been lifted into the upper layers of the atmosphere have been increased considerably of late. In the first vertical rocket launchings in the USSR in 1949, the atmosphere was probed up to altitudes of 110 kilometers. At this time the weight of the scientific apparatus lofted did not exceed 120-130 kilograms. Owing to the creation of powerful geophysical rockets in the Soviet Union, the ceiling of the investigations in vertical launchings has considerably increased. In 1957 rockets with scientific apparatus reached an altitude of 212 kilometers, and on 21 February 1958 had already gone to an altitude of 473 kilometers.

The scientific program in the last rocket launchings was considerably expanded. In the first rocket investigations the structure of the atmosphere (pressure, density, temperature, composition of the air, and the velocity and direction of the wind) and the intensity of cosmic radiation were studied. Now, in addition, studied of the ionosphere, solar radiation, the motion of meteors, etc., are conducted.

"A wide variety of scientific apparatus was installed in the rocket.

"The concentration of electrons in the different regions of the atmosphere was measured with the aid of a dispersion interferometer. The temperature of electrons was determined, using special sondes, by a method of sounding characteristics. The ion composition of rarefied gases was established by a radio-frequency mass-spectrometer, and the concentration of positive ions was measured by ion traps located on the rocket's surface.

"Ionization and magnetic manometers gave information on the pressure of the air.

"The energy and number of micrometeors was registered by special piezoelectric transducers. The intensity of the electrical field on the rocket's surface was measured by special dynamic electrometers.

"In some launchings a spectrometer was installed in the rocket which made it possible to photograph the solar spectrum in the short-wave ultraviolet region.

"Particularly interesting results were obtained during the flight of the rocket on 21 February 1958 up to an altitude of 473 kilometers.

"The flight of the rocket was stabilized. This is essential for a whole series of experiments.

The total weight of the scientific instruments, the radiotelemetering apparatus, the power sources, and the auxiliary systems together with the structure of the instrument container was 1,520 kilograms.

"This ascent, as to both the extent of the scientific program and the altitude achieved, exceeds investigations of the upper layers of the atmosphere previously conducted in the USSR and abroad in vertical rocket launchings.

"As a result of the investigations conducted, first of all a whole new range of information concerning the upper atmosphere was obtained. Thus, the measurement of electron concentration showed that, in contrast to earlier assumptions, there is no sharply expressed ionospheric layer at an altitude of 110-120 kilometers; the electron concentration above 110-120 kilometers decreases insignificantly and increases evenly to an altitude of 250-300 kilometers. Above the maximum, located at an altitude of about 300 kilometers, the concentration of electrons decreased slowly so that at an altitude of 470 kilometers the electron concentration equaled one million electrons per cubic centimeter. This was shown by recent investigations by the Soviet geophysical rocket.

"It should be noted that American investigations (Berning), conducted up to altitudes of 380 kilometers, are in conflict with these recent results. According to their data, electron concentration is already negligible at an altitude of 380 kilometers.

"The existence of large concentrations of electrons at altitudes of 400-500 kilometers, where the concentration of neutral particles is approximately on the order of large electron concentration, may be explained by the intensive diffusion of electrons from the underlying region of the ionosphere.

"The establishment of the fact that at 100 kilometers there is no diffusion separation is another fundamental result of rocket investigations. This was determined by the analysis of air samples taken by special balloons at altitudes of up to 120 kilometers. The ion composition of atmospheric air up to altitudes of 206 kilometers was determined with the aid of the mass-spectrometer.

"Measurements of the energy and number of meteor particles makes it possible to obtain the distribution of microparticles according to altitude. In the 21 February experiment the impingement of particles up to altitudes of 300 kilometers was reliably registered.

"No less interesting data were obtained in regard to the pressure and density of the upper atmosphere. The greatest altitude to which measurements of pressure were conducted, 260 kilometers, was achieved during rocket investigations in the USSR.

"Investigations of the upper atmosphere with the aid of vertical launchings of rockets and artificial earth satellites, which are planned according to the IGY program, make it possible to improve the accuracy of existing information on the upper atmosphere and to obtain new data on the processes taking place in it." (Priroda, No 5, May 58, pp 71-72)

II. METEOROLOGY

Solar Activity and Atmospheric Circulation*

"Certain Hypotheses on the Connection of Solar Activity With Atmospheric Circulation," by A. A. Dmitriyev, appeared in Solnechnyye Dannyye, No 1, 1957, pp 153-159.

Taking as a basis one of the earliest hypotheses concerning the physical connection of solar activity with atmospheric circulation, the so-called condensation theory, Dmitriyev proposes that an increase in solar activity is accompanied by an increase in the number of condensation nuclei in the atmosphere by the action of ultraviolet radiation and, therefore, more favorable conditions for the release of the energy of unstable moisture content.

The data of some laboratory experiments and rocket ascents confirming this theory are given by the author.

Theoretical investigations explaining the role of strong fluctuations of circulation in the upper troposphere were conducted. These showed that the effect of variations of velocity even at twice the altitude of the tropopause and at near tropopause velocity were negligible.

During investigations of the mechanism of the process of convection by rotating models as it applies to the atmosphere, the predominance of cyclonic circulation near the Earth with an increase of temperature in the upper layers of the atmosphere through their more intensive irradiation by ultraviolet rays was established.

Dmitriyev concludes by saying that the fact, noted in literature, of the change of zonal circulation during fluctuations of solar activity leads to radical expansions of the gaseous envelope of the atmosphere. (Referativnyy Zhurnal -- Geofizika, No 2, Feb 58, Abstract No 1429, by G. I. Morskoy)

III. OCEANOGRAPHY

Results of Seismic-Acoustic Studies of Bottom of Japan Sea

The results of seismic-accustic investigations in the western part of the Sea of Japan, which were conducted in April 1957 by an oceanographic expedition aboard the Soviet ship Vityaz', are given in an article by N. N. Sysoyev, G. B. Udintsev, and I. B. Andreyeva, Institute of Oceanology, Academy of Sciences USSR, and the Acoustics Institute, Academy of Sciences USSR.

The studies were conducted along two mutually perpendicular profiles, located in the transition zone between the Asiatic continent and the bed of the Pacific Ocean. One profile ran approximately northwest to southeast, transverse to the continental shelf, and the other from northeast to southwest along the strike. This location was chosen with the aim of showing the conditions of seismic wave propagation in relation to the structure of the continental slope, and in particular to the presence of supposed discontinuous dislocations.

The method used in the operations was, basically, the reception and analysis of reflected and refracted sound waves spreading in the mass of water and the porous sedimentation and rock lying at the botton of the sea. The work was conducted from two ships -- one setting off charges of TNT at fixed intervals of time, and the other (the Vityaz') lying at drift at the beginning of the profile receiving the acoustical signals of the explosions using hydrophones. The profiles were worked in both directions.

The data obtained indicated the presence of very thick depositions in the western part of the Japan Sea which had no clear separations signifying sharp changes in their density, and indicated that these depositions were the result of continuous accumulations under marine conditions. Changes in the thickness of the layer of porous depositions are obviously connected with the inflow of sedimentary material from the landward side and the relief of the basement layer. The nearness to the surface of the basalt layer, and in particular the shallow occurrence of the Mokhorovichicha separation, indicate that the structure of the Earth's crust in the transition zone of the basin of the Japan Sea is very similar to the structure of the crust in the bed of the Pacific Ocean. The increase of the depth of the occurrence of the Mokhorovichicha separation in the southeast direction corresponds to the increase in the thickness of the basalt layer under the rock structures of the submerged elevations of the Yamato and Japanese island arc. (Doklady Akademii Nauk SSSR, Vol 119, No 3, 21 Mar 58, pp 575-578)

Wegener's Displacement Theory and Zoogeography

"At present the majority of geologists and paleontologists find that Wegener's Displacement Theory on the shifting of continents contradicts well-established scientific facts, but among biologists, that is, those biologists studying modern fauna and flora, this hypothesis is widely supported."

This circumstance induced S. V. Maksimova, Candidate of Geological-Mineralogical Sciences, Institute of Petroleum of the Academy of Sciences USSR, to consider Wegener's hypothesis, namely, in its relation to the problems of zoogeography, and more so because this side of the problem was the least touched on in Soviet literature.

In "A Hypothesis of the Displacement of Continents and Zoogeography," Maksimova selects certain zoogeographic problems relating to the actual interconnection of continents which it is thought can be explained only by Wegener's hypothesis.

In turn, Maksimova considers the zoogeographic connection of the southern continents, the fauna of Australia, and the fauna of Madagascar.

Maksimova states that the divergence of Wegener's construction from large and objective factual material collected by geologists and paleontologists concerning the formation of different groups, their evolution, their ties of relationship, their paths of travel, etc., can be easily seen. This deviation is more sharply brought out by the graphic presentation of G. G. Simpson's scheme. In it the mutual relationship of the continents in the Eocene period, favorable to Wegener's hypothesis, and the

relationship according to the data of paleontologists and geologists, are shown. According to Wegener, South America, Africa, and Australia in this epoch are directly connected, as is North America with Europe. On the contrary, careful study of the history of the Earth and the history of life shows that Australia and South America in the Eocene period were island continents; North America was joined not with Europe, but with Asia in the region of the Bering Strait; and Africa was connected with Europe somewhere in the region of the Mediterannean Sea. Shown on this representation is a dotted line connecting Australia with Southeastern Asia marking the path of travel of Asiatic animals which migrated into Australia along the chain of islands with the aid of accidental methods of settlement.

"The criterion of the truth of any scientific hypothesis is its agreement with all factual material related to it."

The sharp contrast of the drift theory to zoogeographic data, including the study of fossilized fauna, is no less marked than that noted in its deviation from other branches of the sciences of the Earth. The presence of the sial sheath on the bottom of the Atlantic Ocean, the complex relief of the bottom of this ocean, the distribution of the epicenters of deep focal earthquakes, and many facts are incompatible with such a theory of the drift of continents.

Such a theory, concludes Maksimova, is attractive because of its simplicity, but it in no way explains the complex phenomena of active life. "Wegener's hypothesis must be rejected as unfit and especially so in the field of biogeography, since in giving a fictitious solution of a number of problems it hinders the explanation of the true course of the history of life." (Priroda, May 58, pp 21-30)

IV. ARCTIC AND ANTARCTIC

Glaciological Research in Antarctica

A 16-page report on the preliminary results of glaciological research of the First Soviet Continental Expedition in Antarctica, written by L. D. Dolgushin, B. I. Vtyurin, Yu. M. Model', and A. P. Kapitsa, including a map of the routes and areas of glaciological field trips during 1956-1957 and a number of photographs, was published in a recent issue of the bimonthly publication of the All-Union Geographic Society. (Izvestiya Vsesoyuznogo Geograficheskogo Obshchestva, No 2, Mar-Apr 58, pp 118-133)

* * *