GEOLOGY IN THE U.S.S.R.

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The meeting of the 17th International Geological Congress in Moscow in July 1937, and the numerous excursions held both before and after the Congress, afforded a good opportunity of assessing the present state of geological science in that vast region, covering one-sixth of the land surface of the globe, which is comprised in the Union of Socialist Soviet Republics.

The 16th Congress held at Washington in 1933 attracted 1182 applicants of whom 836 were Americans and 346 foreigners. Of this number 665 delegates actually attended. The corresponding figures for the 17th Congress are not yet known, but are tentatively given as follows. Over 2000 applications for membership were made of which about 400 were from foreigners, and about 1000 delegates attended the Congress meetings. It may be of interest to give a general account of the activities of the Congress held, as it was, in the exotic environment of Soviet Russia.

The general assemblies of the Congress were held in the auditorium of the Moscow Conservatory, the hall in which the major musical events of Moscow take place. During the evening of July 20, the day prior to the opening of the Congress, an excellent exhibit of the mineral resources of the U.S.S.R., displayed in the foyer and galleries of the Conservatory, was opened for public inspection. A large new geological map of the U.S.S.R., liberally covered with tablets indicating the loci of the economic minerals and rocks, was the object of much attention.

The Congress was opened on the morning of July 21 by Dr. Philip S. Smith, leader of the American delegation, who officiated as retiring President in the place of Professor W. Lindgren who was unfortunately absent owing to illness. After his opening speech Dr. Smith gave the floor to V. I. Mezhlauk, Peoples Commissar of Heavy Industry, who delivered a speech of welcome to the Congress in the name of the Soviet Government. Mezhlauk was followed by I. M. Goubkin, Vice-President of the Academy of

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Sciences, who had been elected President of the Congress and had taken the chair, and by V. I. Komarov, President of the U.S.S.R. Academy of Sciences, who gave an address of welcome in the name of the Academy.

The perhaps not unjustified nor unnatural political references made by the Russian speakers, intent on advertising the achievements of a Socialist society, sounded oddly, however, in a scientific congress. Vehement and prolonged applause, for example, during which the whole audience rose to its feet, greeted Mezhlauk's reference to the "leadership of the Communist Party and comrade Stalin," under which the recent tremendous advances in Soviet geology had become possible; and equal applause was accorded to Goubkin's phrase: "All these successes we owe to our great Communist Party and the Soviet Government, which have created for our scientific work such conditions for which we pride ourselves before the whole world." It is but fair to say, however, that after the political ebullience of the first plenary meeting, when the Congress had settled down to its real scientific work, political allusions became extremely rare.

During the afternoon Goubkin read a paper on "The Estimation of the World's Oil Reserves," in which a somewhat optimistic method of estimation was outlined which credits the U.S.S.R. with "proved" reserves of 3877.2 million tons, with a "possible" further reserve of 2500 million tons.

The language difficulty was most efficiently overcome by the adoption of the League of Nations system of translation, for the first time, I believe, in a scientific congress. Below the speaker's rostrum stood a row of cubicles in which translators spoke into microphones, the languages used being Russian, English, French, German, Italian and Spanish. Their voices were transmitted to headphones attached to every chair in the auditorium, and listeners had only to plug in to the appropriate pair of terminals on their chairs to hear the speeches in their own language or in the language they best understood. For a purely scientific paper written translations were made beforehand and read simultaneously with its delivery, but the ordinary business of the Congress was translated extemporaneously by an extremely efficient corps of translators.

The morning of July 22 was devoted to sight-seeing, visits to museums and other cultural and educational institutions in Moscow. During the afternoon the second plenary meeting of the Congress was held in the Conservatory. The first item was a paper by M. M. Prigorovsky on "The Coal Provinces and Basins
of the U.S.S.R.”; the second was the entry of about 30 Young Pioneers of both sexes, who filed on to the platform in their picturesque black and white uniforms with red neckties. These were introduced as young naturalists and geologists in training to take their places in the investigation of Soviet natural resources. Their leader stood forward and delivered a short address of welcome to the Congress, which received great applause. Then came my turn, for I had learned only the day before that I was expected to give my paper on “Igneous Activity in Relation to Tectonics” to the general assembly, although I had prepared it only for a sectional and not a full-dress occasion. I found my speech somewhat of an ordeal under the prevailing conditions. Not only was there the confused murmur of the translators below me, but a movie camera with its attendant pair of arc-lights was perambulating the area, with the lights intermittently focussed on me as well as spot-lights from the gallery, while press photographers thrust their cameras almost under my nose. The fourth and concluding item was a paper by Professor A. D. Archangelsky on “Geological Results of General Magnetometrical and Gravity Work in the U.S.S.R.”

In the evening many members of Congress attended by invitation a fine open-air theatre performance in the Central Park of Rest and Culture. A meeting of the general assembly at this centre before the performance, at which Professor O. J. Schmidt, the chief of the Soviet Arctic Scientific Service, was to speak on “Investigation of the Arctic Regions,” had to be cancelled to the general regret, owing to the unfortunate death of Madame Schmidt.

Sectional meetings had begun on the afternoon of Wednesday, the 21st of July, and were continued on Friday the 23rd, and on Monday, Wednesday and Thursday of the following week. An account of the work of the sections follows later.

During the week-end 300 members of Congress made a trip to Leningrad, where visits were paid to art galleries and museums, and to the former palace of the Czars at Peterhof on the southern shore of the Gulf of Finland, where the party was entertained to a banquet by the Leningrad Soviet. The high lights of the Leningrad excursion were the visits to the Museum of the Central Geological and Prospecting Institute, the Mining Museum where a wonderful mineral collection was exhibited, and the Zoological Museum in which we saw the famous fossil carcass of the woolly mammoth, which was extracted almost whole, with flesh and entrails preserved, from a frozen Siberian swamp.

On Tuesday, July 27, the entire Congress was taken for a day’s trip on the new Moscow-Volga Canal which had been opened by
Stalin only a fortnight previously. The Canal is an impressive piece of work, and forms the final link in a chain of interior waterways which now unites the White Sea, the Baltic, the Black Sea, the Sea of Azov, and the Caspian. In the evening we returned to a banquet and entertainment given by the Moscow Soviet in the Khimki terminal canal station.

Next evening the Congress attended a Government reception in the Kremlin which was held in the great white marble hall of St. George. Molotov, Commissar for Home Affairs, was in the chair. Molotov and Mezhlauk extended welcomes on behalf of the Soviet Government, and Dr. Philip S. Smith (U.S.A.), Dr. E. B. Bailey (U.K.), and Professor Jacob (France) replied on behalf of foreign members of Congress. At intervals during the banquet the visitors were given a magnificent entertainment by the great Moscow Orchestra of 120 performers, and by a long succession of stars from the Moscow opera, ballet, theatre and music hall.

The third and final plenary meeting of Congress was held on Thursday, July 29, at which it was decided to hold the next International Geological Congress at London in 1940.

The sectional work of the Congress was voluminous and invigorating. Even a superficial perusal of the published volume of Abstracts of Papers (English-French edition, 240 pp.) shows that Soviet geology is vigorous and flourishing. The Organisation Committee of the Congress had suggested nine main subjects for discussion. These were:

2. Geology of Coal Fields.
3. The Pre-Cambrian and the Mineral Deposits in the Regions of its Development.
5. Correlation of Tectonic Processes, Magmatic Formations and Ore Deposits.
6. Tectonics of Asia.
7. Problems of Geochemistry.
9. Geology of the Arctic Regions.

From the volume Abstracts of Papers which was published in a Russian as well as in an English-French edition, we find that "The Petroleum Problem and the Petroleum Resources of the World" attracted 48 papers, of which no less than 43 were by Russian authors, who gave collectively a very complete conspectus of the oilfields, old and new, of the U.S.S.R., and of new methods.
of prospecting and of estimating oil reserves. The discussion on the “Geology of Coal Fields” produced 42 papers, of which all but six were by Russian authors, and dealt with the geology, tectonics, palaeontology, petrology and resources of the vast Soviet coal regions. Thirty-three papers were contributed to the section on “The Pre-Cambrian,” of which 25 were by Russian authors, and 24 dealt with the stratigraphy, tectonics, petrology and ore-deposits of the Pre-Cambrian of the U.S.S.R., the remaining paper dealing with a nomenclatorial question. The “Permian System and its Stratigraphic Position” was dealt with in 50 papers, of which 41 were by Russian investigators, giving a complete summary of the Permian system throughout the U.S.S.R., with notes on palaeontology, conditions of sedimentation and economic materials. A valuable series of 55 papers on the “Correlation of Tectonic Processes, Magmatic Formations and Ore Deposits” was given, of which 33 were by Russian authors. This subject, with its wide general appeal, naturally attracted a large proportion of foreign authors. Not the least valuable feature of this series was a number of papers on the distributional relations of igneous rocks and ore deposits in various parts of the U.S.S.R. Of the 49 papers presented to the section on “Tectonics of Asia,” only 29 were Russian, and some of these dealt with European Russia. Several of the remainder treated general tectonic problems; others described the tectonics of China, Japan, Java, the Himalayas, Iran, Arabia, Anatolia, N.W. Africa, and the West Indies. Twenty papers were given in the section on “Problems of Geochemistry,” 16 of which dealt with Russian ore deposits and petrographical fields. Some of these papers could have been placed with equal propriety in the section on Tectonic Processes, Magmatic Formations and Ore Deposits. To the section on “Geophysical Methods in Geology” 26 papers were presented, of which 21 were by Russian authors, but only eight dealing with specifically Russian topics. Papers on radioactivity and geology, and on the determination by radioactivity methods of the ages of minerals and of the earth, were included in this section. The “Geology of Arctic Regions” produced 17 papers, of which all but one were by Russian authors and dealt with the Arctic regions of the U.S.S.R.

In addition to the above a symposium on “Paleozoic and Pre-Cambrian Climates” was held, to which 25 papers were contributed. This produced, among others, a most interesting series of papers on Palaeozoic and Pre-Cambrian glacial deposits of world-wide distribution, but only three papers were specifically Russian. There were also 30 papers in a concluding section headed “Miscellaneous,”
some of which might have found places in preceding sections. Probably these papers arrived too late for classification, as certainly did a series of 22 papers published in an "Additional Abstracts of Papers" of 16 pages. Thus, in all, 422 papers were presented to the Congress, of which 304, or 72 per cent., were by Russian authors. These dealt chiefly with Russian geological subjects, the remainder being on more general topics.

From a perusal of Abstracts of Papers it seems clear that, while some of the new Russian material is of purely local interest, much of it is of more than local importance, and is worthy of incorporation in the general body of geological science. It is to be hoped, therefore, that when the papers come to be published in full in the Proceedings of the Congress, they will be written in English, French or German; or if, as will no doubt be necessary, there is a Russian edition for internal consumption, there should also be a non-Russian edition for the benefit of those foreign members—the great majority—to whom Russian is a sealed book.

The Congress excursions had been in preparation for two years and were, from all reports, and from my own experiences, very efficiently conducted. They varied in length from 19 to 35 days; the shorter came mainly before, the longer after the Congress at Moscow. The excursions were as follows:

Before the Congress:

A 1. The Northern Excursion to Russian Karelia and the Kola Peninsula. 19 days.
A 2. The Southern Excursion, visiting the Kursk Magnetic Anomaly District, the Donetz Coal Basin, the Crimea and the Ukraine. 19 days.
A 3. The Volga Excursion (cancelled).
A 4. The Caucasus Excursion. 19 days.
A 5. The Permian Excursion, visiting the Volga Region in the neighbourhood of the Samara bend, the southern Urals, and the classic Perm Region. 19 days.

After the Congress:

C 1. The Petroleum Excursion, visiting the new Volga and western Ural oil-fields, Azerbaijan, Daghestan, North Caucasus, Maikop, Baku and the Taman Peninsula. 35 days.
C 2. The Siberian Excursion, visiting the Urals in the triangular area between Sverdlovsk, Cheliabinsk and Ufa, the Novosibirsk region and the Kuznetzk Coal Basin in West Siberia, the gorge of the Yenesei between Krasnoyarsk and Minussinsk, and the Mongolian autonomous district.
of Khakassk in south central Siberia. 35 days. (This excursion was originally planned for 50 days, and was intended to visit Lake Baikal and Vladivostok, but the latter part was cancelled owing to the political troubles in the Far East.)

C 3. Excursion to Novaya Zemlya in the Arctic Ocean. 23 days.

C 4. The Urals Excursion, visiting the metalliferous belts of the central and southern Urals. 22 days.

C 5. Short excursion to localities near Moscow. 3 days.

The enormous distances of the U.S.S.R. made necessary the employment of special trains on which the excursionists lived and slept. Foot, riding, motor and steamer excursions were made at selected points from the train. Henceforward I am writing of my own experiences. Wherever possible the train was halted for the night on sidings, and at every such halt two armed policemen unobtrusively patrolled the train, probably to protect us from unauthorised intrusion. At every important town there was a municipal reception, and at provincial capitals we were usually entertained to a banquet by the local authorities. At Krasnoyarsk in Siberia a new siding adjacent to the building in which the reception was held had been built for the Congress train, and the whole enclosed by a high wooden paling. The purely geological outings were interspersed with visits to museums, state and collective farms, and various social institutions. At every main halt on the railway, and over the entrances to mines, quarries, industrial plants, collective farms, or institutions that we visited, was a strip of red bunting with the inscription: “Welcome to the 17th International Geological Congress” in English, French and Russian. This was sometimes supplemented by a quotation from a speech by Stalin: “Science is called science just because it recognises no fetishes, and does not fear to raise its hand against everything that is obsolete and antiquated, and listens attentively to the voices of experience and practice,” also in the above three languages.

Everywhere the most elaborate preparations had been made for our comfort, and for easy and rapid inspection of outcrops, quarries, railway cuttings and mines. New plankways made the rough places smooth; new wooden stairways and bridges facilitated the ascent and descent of railway embankments and quarry faces; sections were newly cut in mines or cleaned of accumulated mine dust and mud, and powerful arc lamps were installed at critical points. At Stalinsk thousands of tons of rock had been excavated from the side of a hill to expose a clear section of the coal measures of the Kuznetzk Basin. At most points of geological interest boards had
been erected on which were displayed plans, sections and maps, and an abundant supply of museum specimens of minerals and rocks had been already prepared for our acceptance. Twenty-four well-printed and well-illustrated guide books in a Russian, and in a French and English edition, were provided to elucidate the geology of the regions visited. A manager, courier, and a number of interpreters accompanied each excursion. While the quality of the leadership naturally varied, it was, on the whole, excellent.

The organisation that sustains and directs the greater part of the vast and varied geological activity in the U.S.S.R. is the Central Institute of Geology and Prospecting which has its headquarters in Moscow, and is included under the Peoples' Commissariat of Heavy Industries. It is said that no less than 6000 geologists (one account said 12,000) were in the field during 1937. The Central Geological Research Museum (the Tchernychev Museum) at Leningrad is perhaps the most important institution under the aegis of the Central Institute; but there is a large number of provincial museums and provincial “Geological and Prospecting Trusts” which are quasi-independent, and whose relations to the Central Institute are hard to define or, at any rate, difficult to make out. Guide books describing the functions and work up to date of both the Central Institute and the Tchernychev Museum were issued to members of Congress.

The old Geological Committee, founded in 1882, was entrusted with the task of preparing the geological map of European Russia, but the money and personnel allotted to it were totally insufficient to achieve this aim. Nevertheless it served the purpose of bringing into European prominence a galaxy of brilliant Russian geologists of whom A. Karpinsky, Th. Tchernychev, F. Loewinson-Lessing and V. Obruchev achieved world-wide fame. In 1918 only 10-25 per cent. of the country was geologically known; only 0-25 per cent. was covered by geological maps on the scale of 1 : 200,000 and only 0-45 per cent. on the scale of 1 : 10,000. After the Revolution the Geological Committee took on a new lease of life and played a great part in the economic reconstruction of the country. In 1929 the Geological Committee was completely reorganised into a series of institutes that dealt respectively with geological surveys, metallic ores, coal, non-metalliferous deposits, hydrogeology, geophysics and borings. Two years later the Central Institute of Geology and Prospecting was organised and took over the whole of this work. Enormous sums of money have been allocated to geological work by the Soviet Government. It is stated that in 1936 alone more than one milliard of roubles was allotted in the
U.S.S.R. for geological and prospecting work. The budget of the Central Institute has increased from 2,886,000 roubles in 1931 to more than 12,000,000 roubles in 1936. The scientific personnel of the Institute numbers 500.

The organisation of the Institute is based on the principle of division into regional and specialised groups which, between them, undertake geological work of all kinds over the whole territory of the U.S.S.R. There are 20 of these groups distributed as follows:

Regional groups: European Russia; Crimea and Caucasia; Urals and Bashkiria; Siberia; Kazakstan; Central Asia; the Soviet Far East; and Yakutia.

Specialised groups: Geology and tectonics; petrology and mineralogy; palaeontology and stratigraphy; ores of tin and the rare metals; non-metalliferous deposits; fuels (with section on the petrography of coal); metallic ores (with a minerographical laboratory); lithology (building stones and road metals); geochemistry; hydrogeology; geophysical methods of prospecting; boring and mining; statistics of mineral resources and maps.

The above-mentioned pamphlet goes on to describe in some detail the enormous amount of geological work that has been accomplished in each of these branches. It is impossible to give details here, and it may be sufficient to say that a new general colour-printed geological map of the U.S.S.R. in eight sheets on the scale of 1:5,000,000, based on the recent work of the Institute, was presented to every member of the Congress. It is beautifully executed and excited general admiration.

The work of the Central Geological and Prospecting Scientific Research Museum (Tchernychev Museum), to give it its full title, at Leningrad, is described in a General Guide to the Museum (English edition, 77 pp.), which was issued to members of Congress. The inception of this museum dates from the formation of the old Geological Committee, but the fine building in which the collections are now housed was only completed in 1914. Its staff now numbers 62, and its budget for the years 1931–36 amounted to between 300,000 and 400,000 roubles per annum. The general aim of the museum is to illustrate the geological structure of the U.S.S.R. and its mineral resources. In more detail it is intended (1) to acquaint the trained geologist and prospector with what has already been done in regard to the geology and mineral resources of the

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1 This is hard to credit, and there is probably some mistake. A milliard (1,000,000,000) of roubles is £40,000,000 at the tourist rate of exchange, and over £10,000,000 at the real rate. The statement appears in the pamphlet L’Institut de Géologie et du Prospection (1937, p. 2), issued to the Congress.
U.S.S.R.; (2) to assist in the training of new cadres of geologists and prospectors; and (3) to promote wide popularisation of geological knowledge among the Soviet workers, and help them to understand the basic importance of the science in the fulfilment of the successive Five-Year Plans. The last-mentioned aim is regarded as one of the most important functions of the museum, and is carried out by means of numerous simplified headings, legends, labels and explanatory notes on the exhibits, the organisation of popular exhibitions in the museum and of circulating exhibitions, ordinary lectures and cinema lectures, and of geological excursions for the general public in the environs of Leningrad. Furthermore, the museum sends out special parties and larger expeditions with the objects of securing new collections, as well as completing and duplicating existing collections.

The great Museum of Mines at Leningrad was also the subject of a special guide-book (in French) which was issued to the Congress. This museum was initiated soon after the establishment of the St. Petersburg Institute of Mines in 1773. It was visited by the Congress and its magnificent exhibits were greatly admired. The exhibits are grouped in four main sections: mineralogy; mining technique; geology; and petrography. The mineralogical section comprises the sub-sections of geochemistry, crystal structure and chemistry, systematic mineralogy, genetic mineralogy, and artificial minerals (slags, cements, etc.); the geological section is divided into sub-sections dealing with the Quaternary, Tertiary to Pre-Cambrian, vertebrate palaeontology, invertebrate palaeontology with paleobotany, and physical geology; the petrographical section has two sub-sections on ore deposits in general, and the mineral deposits of the Leningrad Province (which includes the Kola Peninsula) and Karelia.

Many excellent provincial museums were visited during the Congress excursions, but there is only space enough to mention two of these which were seen by the author, namely, the local museum of Kirovsk, the new phosphate town in the Kola Peninsula, which contains one of the finest collections of rare minerals and rare-earth minerals in the world; and the brand-new Urals Geological Museum at Sverdlovsk which was completed just in time for the visits of the Uralian and Siberian excursions. The exhibits in this great museum completely cover the geology, tectonics, petrology, mineralogy and ore deposits of the whole vast length of the Urals from the Arctic to the Caspian.

The U.S.S.R. Academy of Sciences carries on a very considerable amount of geological research, but the relations of its geological
sections with the Central Institute of Geology and Prospecting are obscure, and it was gathered that there was a certain amount of rivalry between the two institutions. From an article in *Nature* (Jan. 16, 1937) on “The U.S.S.R. Academy of Sciences and the Third Five-Year Plan” we learn that one function of the Academy is to study the natural resources and productive forces of the country, and to promote their rational utilisation. Geology and ore deposits would naturally come within this field of activity. Expeditions are sent out and branches of the Academy have been established in various regions to direct the work of prospecting and surveying. The first preliminary general survey of the geological, chemical and economic resources of the country has already been completed. With regard to the Third Five-Year Plan, the activities of the Academy are to be directed to ten main problems, of which the first is to develop geological, geochemical and geophysical methods of prospecting for useful minerals, particularly tin, rare metals and oil. The Academy sustains a number of great museums and research institutions, such as the Lomonossov Institute, the Petrographical Institute directed by Loewinson-Lessing, the famous doyen of Russian petrology, the Soil Institute, and the Geological Institute with its museums, the Karpinsky Museum and the Palaeontological Museum.

The great monograph on the *Minerals of the Khibina and Lovozero Tundras* (Russian), published by the Lomonossov Institute of the Academy of Sciences, illustrates extremely well the degree of cooperation that obtains between various Soviet research institutions in attacking a specific problem. This work has also been published in an abridged English edition (1937, 152 pp.), which gives a brief account of the petrography of this wonderful region of alkaline igneous rocks, and a detailed account of the crystallography and optical properties of its numerous rare minerals.

The preface to the English edition recounts the history of research in this region, and from it we gather that in 1920 the U.S.S.R. Academy of Sciences, in collaboration with the Institute for Northern Exploration († the Arctic Institute), began a systematic study of the petrology and mineralogy of the great ring-shaped massifs of Khibina and Lovozero under the general direction of A. E. Fersmann. The abundance of apatite-rich rocks in the Khibina mass was established in 1925, and their first sampling on a commercial scale took place in 1928. In 1929 a comprehensive economic development of the Khibina region was inaugurated. The Scientific Institute of Fertilisers began commercial prospecting for apatite and nepheline rocks, and the Apatite Trust began the
technical and industrial development. They built new villages and the new town of Kirovsk, now approaching a population of 40,000. Hundreds of miles of electric railways were constructed, linking Kandalaksha at the head of the White Sea with Murmansk and Kirovsk. Three other organisations, the Central Geological and Prospecting Institute, the Rare Metals Trust, and the Leningrad Geological Trust, have joined in the work.

Thus, at the present time, owing to the close collaboration of the seven above-mentioned scientific, industrial and technical organisations, apatite (phosphate ore) is being mined at the rate of 2,000,000 tons per annum, and a reserve of 2,000,000,000 tons has been established. I regard the Kukisvumchorr Apatite Mine, developed in eight years, as one of the industrial wonders of the world. There are over 20 miles of underground galleries seven feet in height, electrically lit, and with electric haulage. A tunnel which admits the ordinary freight train has been excavated to the heart of the ore mountain to facilitate loading. The mineral nepheline is also mined for use in the ceramic industry, and for its content of potash as fertiliser. The new mineral lovchorrite, a massive form of rincolite, chemically a fluorine-bearing titaosilicate of calcium, strontium and sodium, with up to 20 per cent. of rare earths, is mined from pegmatites at the rate of several hundred tons per annum. The new mineral loparite (titanoniobate of cerium, calcium and sodium) also occurs in deposits of economic importance. Sphene is mined at the new Yukspor mine, but for what reason is unknown. The social and industrial development of the region which, nine years ago, was a desolate Arctic waste peopled by a few Lapp families, has kept pace with its technical and scientific development.

In conclusion, we may remark on the means of publication, old and new, whereby the enormous volume of new Soviet geological work is transmitted to the general and scientific public. All Soviet newspapers and magazines publish popular accounts of new scientific developments, and geological articles are very frequently encountered in the popular press. As regards scientific publication the Central Institute has its own Transactions of the United Geological and Prospecting Service of the U.S.S.R. published in fascicules. Provincial geological trusts have their own publications, such as the Bulletin of the Geological and Prospecting Trust of West Siberia, published in Tomsk. Problems of Soviet Geology is a publication of short general and special articles which has appeared in annual volumes consisting of several parts since 1931, under the auspices of the Central Institute of Geology and Prospecting. It resembles the supplementary volumes of the Summary of Progress published...
by the Geological Survey of Great Britain. The U.S.S.R. Academy of Sciences publishes many geological papers in its Bulletin and Comptes Rendus, and its various institutes publish memoirs such as that above-mentioned on the "Minerals of the Khibina and Lovozoero Tundras" which appeared under the auspices of the Lomonosov Institute. A Bulletin of the Kamchatka Volcanological Station has recently been started under the auspices of the Loewinson-Lessing Petrographical Institute, the first number of which has been published in an English translation. The Institute of Geology of the Academy of Sciences of the Ukrainian S.S.R. publishes a Journal of Geology on the same lines as Problems of Soviet Geology, which has reached its third annual volume.

A number of publications appear to be independent of the two main organisations of geological research, but they may be subject to supervision by them, and are almost certainly subsidised by the State. Among these are the Memoirs of the Russian Mineralogical Society, of which a special volume was published for the 17th International Geological Congress, containing a number of reviews of progress in various branches of mineralogy and crystallography in the U.S.S.R. during recent years. V. Sobolev's paper "Progress of Petrography in the U.S.S.R. for the last 20 Years (1917-37)" is translated in extenso into English; and D. S. Korjinsky's important paper on "Dependence of Mineral Stability on Depth" is similarly treated. A series of Transactions of the All-Union Scientific Research Institute of Economic Mineralogy (octavo) is published; and I find among the literature acquired during the Congress a paper in small quarto size by N. Fedorovsky on "Progrès des Instituts scientifiques de l'U.R.S.S. dans le domaine de la minéralogie appliquée" (pp. 983-1002), which has obviously come from a large volume, but there is no indication of the publication in which it appears. Geological papers are published in the Bulletin of the Society of Naturalists of Moscow, Geological Section; and many of the Transactions of the Arctic Institute are devoted to geology. This survey of Russian geological literature and publications is necessarily incomplete, for numerous technical and industrial organisations also publish geological work. The great majority of the papers are published with short summaries in English, French or German.