



SOVIET SIBERIA

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Report of a lecture delivered to the Royal Central Asian Society on December 5, 1951, Admiral Sir Howard Kelly, G.B.E., K.C.B., in the chair.

The CHAIRMAN: We are fortunate enough today to have with us Dr. Armstrong, who is at present Research Fellow in Russian at the Scott Polar Research Institute, Cambridge. He has over the years gone through a number of Russian papers and journals dealing with North Asia and Central Asia. Although he has not been to that part of the world he probably knows as much about it as anyone, and he has written a book which is due to appear shortly on the Development of the Northern Sea Route.

I MUST confess here and now that I have never set foot in Soviet Asia. It is not for want of trying. Both in the army—where I found a knowledge of Russian was almost sufficient in itself to get one sent elsewhere—and since the war, I have tried in vain to get there. It seems that as the number of unwilling visitors to Siberia grows larger, so the number of willing ones is reduced to a minimum. My knowledge of Siberia is based, then, upon what I have read in books and newspapers—mostly Russian ones; and I have accepted the invitation to speak here because it seemed to me that at the moment there appears to be no other way of finding out anything about this vast country. It was this sort of situation which led a British war correspondent in Moscow to say, "There are no experts on Russia; there are only varying degrees of ignorance." My own degree you will be able to judge for yourselves.

There is another apology I must make in advance: I cannot even provide you with beautiful pictures to look at. For, as anyone who has ever looked at Soviet publications will know, it is quite commonly impossible to make out whether an illustration is a portrait of the author or a view of the Kremlin; and in no case is it sufficiently clear to reproduce adequately as a slide. So I am afraid there will be only one or two maps to enliven the talk.

I intend to take as my subject recent developments in Siberia. By Siberia, a term which is not used to connote any administrative district, I would like you to understand that part of the U.S.S.R. which lies to the east of the Urals and to the north of Kazakstan—an area of twelve and a half million square kilometres, or a quarter the size of the whole of Asia. I shall not therefore be discussing the Soviet Central Asian Republics. Siberia, as you will all know, has been developed most intensively along the line of the Trans-Siberian railway—along a comparatively narrow strip at the southern edge of the territory. With your permission I will put greater emphasis on the developments outside this strip, because it is the area normally best covered in English accounts of contemporary Siberia. By "recent" I mean roughly the last dozen years, and especially the post-war period. I shall not therefore be concerned with the Soviet Government's early decision to turn its face towards Asia and with the gigantic eastward



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surge of industrial development and population that took place between the wars.

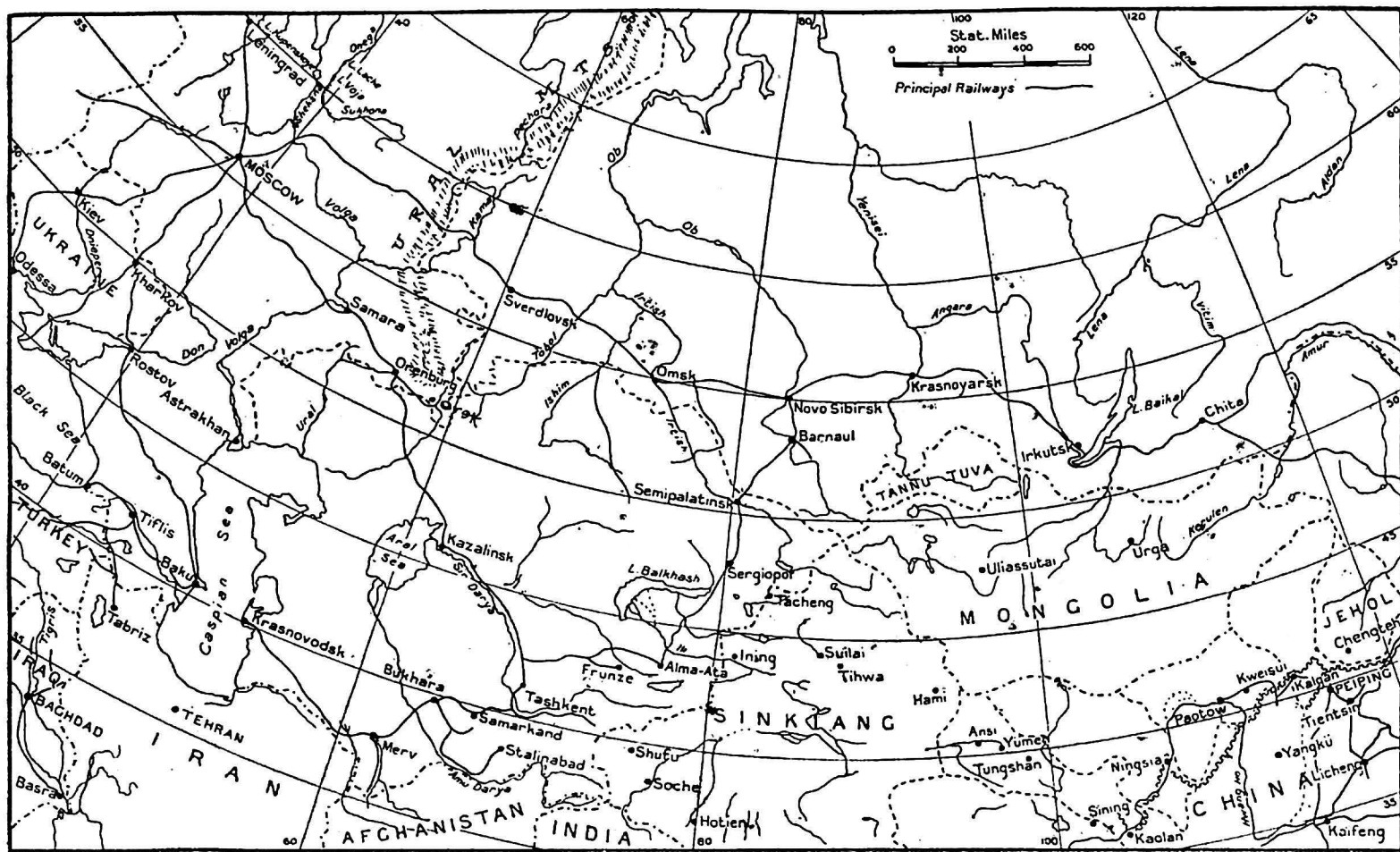
ADMINISTRATION

On the international plane there have been some territorial changes affecting Siberia. As a result of the Yalta agreement the Soviet Union acquired, in return for coming into the war against Japan, the Kuril Islands (*Ostrova Kuril' skiye*) and the southern half of Sakhalin (*Karafuto*). These acquisitions are important. The Kurils, stretching across the entrance to the Sea of Okhotsk, command that sea absolutely; and southern Sakhalin, which contains useful mineral resources, had been considerably developed by the Japanese. Both territories had in fact been claimed by Russia in the nineteenth century—southern Sakhalin had actually been a Russian possession up to 1875; but whereas their importance to the Russian Empire was not very great, the Soviet Government's development of its Pacific seaboard has made them a vital interest. There was some talk* of questioning their restoration to the Soviet Union when the Peace Treaty with Japan was being discussed a few months ago, but nothing came of it. A third territorial gain is Tannu-Tuva. This mountainous and extremely remote region, previously an independent republic recognized by its only two neighbours, the Soviet Union and Outer Mongolia, slipped quietly into the Soviet Union in 1944, allegedly at its own request. Its worth to the Soviet Union is not entirely clear, though a road crossing it which links Western Siberia and Outer Mongolia gives it some strategic significance. An American writer† has put forward the theory, based entirely on guesswork, that it may have been selected as an atomic energy centre; certainly no part of the country seems more secure from attack.

The internal administrative division of Siberia is worth considering for a moment. Siberia, as I have said, is not an administrative unit. The whole of the region we are concerned with forms part of the Russian Soviet Federative Socialist Republic (R.S.F.S.R.), the largest of the sixteen constituent republics forming the Soviet Union. Within the R.S.F.S.R. the administrative breakdown is of a dual nature. One series of sub-units is determined chiefly by considerations of economics and of administrative efficiency: *Kray* (territory) or *Oblast'* (region), and below them *Okrug* (area), *Rayon* (district), and *Selsovet* (rural or urban unit). Parallel to this series is another determined on the basis of nationality; this descends from Constituent, or Union, Republic, of which the R.S.F.S.R. is one, through Autonomous Republic (A.S.S.R.), Autonomous *Oblast'*, and National *Okrug* to National Local Soviet. This subdivision by nationality is the more important of the two, since it reflects a fundamental principle of Marx-Leninism—respect for national minorities. Both sets of subdivisions are inherently dynamic: changing economic conditions bring about alterations in the administrative districts; and national minorities may, according to their political and cultural development, climb the "nationalities ladder" and finally become Constituent Republics of the Soviet Union. I

* *Times*, April 2, 1951.

† Mansvetov, Fedor F., "Tannu-Tuva—The Soviet 'atom city'?" *Russian Review* (New York), vol. 6, No. 2, 1947, pp. 9-19.



have given this outline in order to show that comparison of successive editions of the political and administrative map of the U.S.S.R. can be quite informative. We will return to this point later.

MEANS OF TRANSPORT

Let us now pass on to the economic life of the country. Because of the vast size of Siberia the most important feature of its economy is transport. Nothing can be done with the country's resources until some sort of transport system has been made to function. Nature has provided one such system: the rivers. The Ob', the Yenisey, the Lena and the Amur are all among the dozen longest rivers in the world. The first three flow from south to north, but their branching tributaries reach out towards each other and thus provide the elements of an east-west waterway. The Cossacks, the earliest Russian settlers of Siberia, used the rivers in their advance across the continent, and they have been used ever since. They have disadvantages: for between five and eight months of the year, depending on latitude, they are icebound; for another month in the autumn the water is often dangerously low for shipping. Nevertheless large fleets of tugs, barges and passenger vessels are maintained on all of them. Every year new stretches of river are brought into use. Just before the war some of the smaller northward-flowing rivers—Yana, Indigirka, Khatanga, Olenek and others—were being exploited for the first time; and this year it was reported* that the Podkamennaya Tunguska, a tributary of the Yenisey, had been navigated to a higher point upstream than ever before. The river system is still a vital part of Siberian transport (as it is in European Russia) and is likely to remain so. By itself, however, it is clearly insufficient.

Next in importance comes the railway. It was the building of the Trans-Siberian railway in the nineties of the last century that really started the opening up of the country, and brought the Far East closer to St. Petersburg by years. The most important piece of Siberian railway history since then was the completion during the first five-year plan of 1928-32 of the Turkestan-Siberia, or Turksib, line, linking the agriculture and industry of Central Siberia with the cotton of Central Asia. A number of branch lines feeding the Trans-Siberian were built between the wars and the main line itself was double-tracked. It was decided some time in the 1930s to relieve the strain on the always overburdened main line by building another line roughly parallel to it, running south of it in western Siberia, crossing the older line between Krasnoyarsk and Irkutsk, and from that point eastwards running some two to three hundred miles north of it. The tenuous link with the Far East—one line passing close to the frontier in many places—would thus be made more secure. Bits of the first section are now known to be complete; priority was naturally given to this half, since it links important centres in the southern part of the industrial belt. The eastern section, however, is still surrounded by secrecy. It is believed that work started in about 1937. There have been no Soviet reports on progress. Some† believe it was finished during the war; in support of this

* *Ogonek* (Moscow), No. 32, 1951, p. 12.

† E.g., *L'Asie soviétique. Études et Documents Série D3*, Paris, 1949, p. 147.

view one may argue that the Soviet Union would not have attacked Japan in 1945 without the security of the Baikal-Amur line, as it is called. On the other hand, the terrain which the line must cross is formidable, and, apart from the gold-mining area on the Vitim, no industrial regions lying on the route provide additional incentive. The truth is anybody's guess. It is, however, known that the most easterly section has been finished. For several years Soviet maps have shown the Khabarovsk-Komsomol'sk-Sovetskaya Gavan' line. We may note as corroborative evidence the adjustment, made some time between 1945 and 1948, to the provincial frontier in this area: the district of Sovetskaya Gavan' was taken from Primorskiy *Kray* and came under the control of Khabarovsk, the town for which it became the closest seaport. There are many other projected lines in north-eastern Siberia: one up to Yakutsk, another even to Anadyr'; but it seems most unlikely that anything will be done about these for many years. There have also been rumours of plans for southern branches of the Trans-Siberian, crossing Mongolia and the Gobi desert and linking with the Chinese network. The line to Ulan Bator, capital of Outer Mongolia, has in fact been completed,* and this would no doubt be the first lap of such a branch. Two existing lines in the far north should be mentioned, since they are interesting both economically and as pieces of engineering: the Dudinka-Noril'sk line, which carries the output of the Noril'sk mines to the Yenisey; and the Vorkuta-Salekhard line, marked for the first time on Soviet maps in 1950,† links the Pechora coalfields with the lower Ob'.

Sea transport off the Siberian coast seems at first to be a rather hopeless proposition. The north coast is icebound for at least eight months in the year, the Bering Sea and the Sea of Okhotsk for six, even Vladivostok, the Soviet Union's most southerly Pacific port, for about three. Nevertheless an enormous amount of energy and money have been put into the job of trying to make a workable sea route round the Siberian coast. A Government department was created for the purpose in 1932—the Chief Administration of the Northern Sea Route. Annual freight turnover along the north coast had reached about half a million tons before the war.‡ During the war a total of 452,000 tons of lease-lend supplies, carried in 120 ships, was sent to ports along the Northern Sea Route.§ The overhead expenses of keeping this route running are very great: a network of some seventy meteorological stations, a fleet of at least fifteen icebreakers, aircraft for ice reconnaissance, a large staff of scientists, and so forth. But the advantages that may be gained from successful working of the route are commensurately large: vast areas of northern Siberia become accessible for the first time; and on the strategic side the Soviet Union acquires a sea route linking both ends of the country, Atlantic and Pacific, a route which never leaves friendly waters and which would be difficult to attack because the Russians could deny the attacker the vital ice and weather reports, without which ships are liable to get into great difficulties. Of the recent functioning of this route we know very little, except that it undoubtedly does still

* Clews, John, article in *Manchester Guardian Weekly*, July 12, 1951.

† *Geograficheskiy atlas S.S.S.R. dlya sredney shkol'y*, Moscow, 1950.

‡ Armstrong, Terence, *The Northern Sea Route*, Cambridge, 1952, p. 122.

§ *Ibid.*, p. 123.

function. It is likely that improvement in the technique of forecasting movements of sea ice—a study pioneered by the Soviet Union—and improved design of icebreakers is leading to a lengthening of the navigation period. Analysis of turnover figures before the war shows that by far the biggest single item was timber exported from the Yenisey, across the Kara Sea to the west. Probably this tendency—to use the route as a way of getting at local resources in the Arctic—will continue to be the most important feature. Use of the whole length of the sea route as a relief to the Trans-Siberian railway seems less likely to be a success, except in the carriage of goods to the north-eastern corner of Siberia, which is a long way from the railway's Pacific terminus.

Air transport has of course assumed the same importance in Siberia as it has in the rest of the world; greater, perhaps, since there are fewer alternative means of transport in Siberia. There have been since before the war regularly running air routes across the main east-west axis, and down the valleys of the Ob', Yenisey and Lena. Occasional flights were made along the Arctic coast. The northern network increased in importance during the war, when the Alaska-Siberia (Al-Sib) air route was pioneered and used for ferrying planes from America to the Red Air Force. Thus ground facilities—largely supplied by lease-lend—are available for a route running up through Yakutsk, Oymyakon, Markovo and Anadyr' to the extreme north-east.

A fairly efficient transport network has therefore been established and is being continually extended. There are still enormous gaps, as a glance at the map shows. But the existing network has permitted industrial development to take huge strides.

INDUSTRIAL RESOURCES

It would be lengthy and very tedious to enumerate the industrial resources of Siberia. I shall touch extremely briefly on the most important. The backbone of the industrial region of western Siberia is the Ural-Kuznetsk combine, in which iron ore from the Urals is smelted with coal from the Kuznetsk basin. These coal and iron deposits are some 1,200 miles apart, and it is a striking testimony to Soviet purposefulness that the combine was planned and made to work, and very successfully, in spite of this. More recently closer sources of raw materials have been found. Another combine is now being developed farther east—the Angara-Yenisey combine, an industrial complex to be based on hydro-electric power from the Angara and Yenisey rivers. Coal is also mined in the vicinity, at Cheremkhovo. There are many mineral deposits in Siberia. One has to be careful when assessing their importance to make allowance for the enthusiastic Soviet method of reporting them: there is not always a clear distinction between deposits actually being mined and deposits known to exist; or between deposits known to exist and deposits thought to exist. One comes across such remarks as "These reserves are inexhaustible and as yet unexplored." It is clear however that there is, for instance, a very great deal of gold in Siberia. It was mined before the revolution at a number of points. In the 1930s the organization known as Dal'stroy was

formed to get gold in the remote upper Kolyma area. Reports from those who have been there* make it clear that Dal'stroy achieves its end by the utterly ruthless employment of forced labour, but it is also clear that a large quantity of gold is obtained. The output is secret. But a Pole who spent some time in forced labour camps and later collated reports of similarly placed compatriots estimates an average of 250 tons a year from the Kolyma area during the period 1932-46.† Deposits of minerals hitherto lacking in the country have been found in Siberia; one may mention particularly tin, of which at least three important deposits—Ege-Khaya, the Chaun region and one near the Manchurian frontier—have been found since the late 1930s and are now being worked. I will catalogue no more. I can only say that there would seem to be no doubt that Siberia as a whole has vast mineral resources, even when Soviet enthusiasm has been discounted; and the main limiting factor in their development is inaccessibility. Industrial development, which is of course largely conditioned by availability of raw materials, received a very considerable impetus during the war by the evacuation to Siberia of plants from the western territories, and is undoubtedly spreading. One may infer as much from changes‡ in the administrative map. Since 1939 three new *Oblasts* have been created in western Siberia. Kemerovo *Oblast'* and Tomsk *Oblast'* have been carved out of Novosibirsk *Oblast'*, and Tyumen *Oblast'* has been created to relieve Omsk *Oblast'* of the responsibility of its vast northern sector on the lower Ob'. Clearly this argues increased population in this district.

AGRICULTURE

One of the objects of Soviet internal policy is regional self-sufficiency in food. The industrial development of Siberia has therefore been accompanied by a drive to promote agriculture. Great advances have been made both before and during the second World War. The west Siberian lowland has long been a very rich agricultural area: the black soil belt which crosses European Russia continues to the east of the Urals. Grain and dairy products from here help to supply deficiencies in Central Asia, the Far East and the urban regions of central and northern Russia in Europe. Neither eastern Siberia nor the Soviet Far East are self-supporting, however. In an effort to make them so, various steps are being taken; new crops have been introduced—such as sugar beet, which is having considerable success—and stock raising has been increased.§ Particularly interesting is the battle being carried on in the northern settlements between the agriculturists and the rigorous climatic conditions. The latter include not only a short summer and a long and very cold winter, but also, more unexpectedly, frequent shortage of water. Soviet claims to have overcome

* Dallin, D. J., and Nicolaevsky, Boris, *Forced Labour in the U.S.S.R.*, London, 1948. Lipper, Elinor, *Onze ans dans les bagnes soviétiques*, Paris, 1950.

† Mora, Silvester, *Kolyma: Gold and Forced Labour in the U.S.S.R.*, Washington, 1949, p. 50.

‡ Morrison, J. A., "The evolution of the territorial administrative system of the U.S.S.R.," *American Quarterly of the Soviet Union*, vol. 1, No. 3, 1938, pp. 25-46. *Geograficheskiy atlas S.S.S.R. dlya sredney shkoly*, Moscow, 1949; *ibid.*, 1950.

§ Baranskiy, N. N., *Ekonomicheskaya geografiya*, 8th edition, Moscow, 1947, p. 223.

these difficulties are often heard, and undoubtedly some remarkable results have been obtained. On the other hand, it seems clear that yields are considerably lower than normal—from half to three-quarters—fertiliser requirements are very heavy and self-sufficiency is still far distant.* A word may be said here about the reindeer industry. The reindeer performs a vital function in the Asiatic Arctic and sub-Arctic, both as a transport medium, by no means yet replaced by anything mechanical, and as a source of food and clothing to the local inhabitants. Every encouragement has been given to the industry. It is indicative of the official attention paid to it that a complete reindeer farmer's handbook of some 130,000 words, dealing with all aspects of tending reindeer, was published in 1948.† This is now being translated into English.

POPULATION

The population of Siberia is now somewhere in the region of 20 million. Since the turn of the century, when the Tsarist Government started to encourage emigration to Siberia, the population rapidly increased. The large-scale industrialization which took place between the wars played a big part. The most recent census of the country was in 1939, and this showed a population of 16.6 million.‡ The figure of 20 million given by post-war Soviet geography books§ is no doubt partly accounted for by wartime evacuation from the overrun areas.

About 90 per cent. of the population of Siberia is Russian or Ukrainian in origin. What of the natives of the region? The Communist policy of self-determination for minority peoples results, as I have mentioned, in the "nationalities ladder" of administrative subdivisions. In Siberia there are two Autonomous Republics—those of the Yakuts and the Buryat Mongols; Jewish, Khakass, Tuva and Oyrot (now called Gorno-Altay) Autonomous *Oblasts*; and National *Okrugs* for the Koryaki, Chukchi, Evenki (formerly Tungus), Dolgany, Nentsy (formerly Samoyed), Khanti (formerly Ostyaks) and Mansi (formerly Voguls). There has been almost no change in these since before the war. No one has climbed the ladder. This is perhaps to be expected, for the Yakuts and the Buryat-Mongols number only about a quarter of a million each, and the northern peoples only a few thousands. Equally, no one has moved down the ladder—or, as in the case of the Volga Germans and some other national minorities in European Russia, been pushed off the ladder altogether. This is possibly because the loyalty of the Asiatic peoples has not been recently put to such a severe test. But while this autonomy for native peoples exists in the pattern of local government, does it, one may well ask, in fact preserve the identity of those peoples in face of the great tide of Slav immigration? This is of course precisely the sort of question that can only be properly

* Richens, R. H., "Crop Production in the Soviet Arctic," *Polar Record* (Cambridge), vol. 6, No. 42, 1951, pp. 227-36.

† Zhigunov, P. S., and Terent' Yev, F. A. (eds.), *Severnoye olenovodstvo*, Moscow, 1948.

‡ Lorimer, F., *The Population of the Soviet Union: History and Prospects*, Geneva, 1946, p. 243.

§ Baranskiy, N. N., *op. cit.*, p. 215.

answered by a visit to the place. All I can produce is circumstantial evidence. An American mining engineer, John D. Littlepage, was working in Soviet Asia in 1932, and he found that in his mine "the Communist authorities insisted that the tribesmen should be given 50 per cent. of the responsible positions."* Littlepage found this a considerable drag on efficiency. The Government, he knew, realized this too, but was nevertheless determined to adhere to the principle. There are signs that the general policy is unchanged. One can find plenty of recent references in the Soviet press† to current good treatment of the small northern peoples. Two books by Tikhon Semushkin,‡ published in large editions, deal with life among the Chukchi. Various recent novels have a northern setting.§ Even in the Kolyma gold-mining districts, where one might expect the native peoples to be quite elbowed out, it appears from a casual reference that a Yukagir collective farm was functioning in the neighbourhood of Zyr-yanka in about 1942.|| One feels that if there were not some truth in all this too many people would recognize its falsity and there would be no propaganda value. It is a fact, however, that the 1939 census figures for the northern peoples have never been published; and one cannot help feeling that possibly this is because the results were not a good advertisement for the policy which boasted about saving small peoples from extinction.

WATERWAYS AND IRRIGATION

A very grandiose scheme has been put forward for the future development of Siberia. Many of you will have seen an outline of this in *The Times* a month or two ago. The scheme centres round the waterways, which, as we have already noted, constitute one of Siberia's greatest natural assets. The object is fourfold: to obtain hydro-electric power, to extend the inland waterways system, to irrigate Central Asia, and to stabilize the level of the Caspian, where present fluctuations make difficulties for fishing and shipping, and which will in any case soon be receiving much less water when the hydro-electric and irrigation projects on the Volga, at present under construction, are functioning. The basic feature is to divert southwards the water of the northward-flowing Ob', and use it to irrigate the Turanian plain and the Aral-Caspian depression. The scheme is not new; projects for diverting Ob' water southwards were put forward by a Russian named Demchenko in 1900, 1922 and 1924. The present plan has been worked out in some detail by M. M. Davydov,¶ a Soviet engineer, and the earlier ideas have been welded together. Davydov's method is to build a dam at Belogor'ye, at the confluence of the Ob' and Irtysh. This would create a reservoir of 250,000 square kilometres—

* Littlepage, John D., and Bess, Demaree, *In Search of Soviet Gold*, London, 1939, p. 110.

† *Pravda*, Feb. 16, 1948, Mar. 5, 1948, May 30, 1949, July 13, 1951, Aug. 24, 1951.

‡ Semushkin, Tikhon, *Chukotka*, Moscow, 1939; *Alitet ukhodit v gory*, Moscow, 1947-48.

§ Azhaye, Vasiliy, *Daleko ot Moskvy*, Moscow, Leningrad, 1950. Koptyayeva, Antonina, *Ivan Ivanovich*, Moscow, ? 1951.

¶ Boldyrev, S., *V. Kolymo-Indigirskoy tayge*, Moscow, Leningrad, 1947, p. 45.

|| Davydov, M.M., "Ob'-Aralo-Kaspiyskoye vodnoye soyedineniye," *Gidrotekhnicheskoye Stroitel'stvo* (Moscow), No. 3, 1949, pp. 6-11.

nearly two-thirds the size of the Caspian. The land inundated would be only 10 per cent. farmland, the remaining 90 per cent. being swamp. The river Tobol' would rise to the level of the base of the watershed between the west Siberian and Turgay lowlands. Here a canal would be built. This would allow the water to flow into the Sea of Aral along the course followed by a river in Tertiary times. The level of the Sea of Aral would then rise and allow water to flow along the course of another ancient river, the Uzboy, to the Caspian. All the surrounding areas would be irrigated from these revived rivers.

For the scheme to work properly, Davydov estimates that from 300 to 350 cubic kilometres of water a year are needed. This represents just about the total flow of the Ob'. The plan is therefore to deflect water into the Ob' system from the Yenisey by building a dam on the latter which will form a reservoir from Yeniseysk nearly to the mouth of the Kan. Water will then flow into a tributary of the Ob' by way of a new Ob'-Yenisey canal 90 kilometres long (there has been such a canal since the end of the last century, but it is so narrow and shallow that it has seldom been used).

The result of all this is expected to be an increase in the amount of irrigated land in Soviet Central Asia by five times; 12.9 million kilowatts of electric power, which will be sufficient to supply the Urals region, western Siberia, and the Kazak, Uzbek and Turkmen Republics; an optimum level for the Caspian; a deep-water shipping route from the Caspian to Lake Baikal, 5,000 miles long, of which about 750 miles would be in canals and 600 miles in old waterways; and changes for the better in the climates of Kazakhstan, Central Asia and western Siberia. The estimated length of time required to get the scheme working is twenty years.

The difficulties that will have to be overcome are, I think you will agree, considerable. The canal over the Turgay watershed, it is stated, will be 575 miles long. The dam on the Ob' is to be 78 metres high—and I calculate that it will have to be not less than 60 kilometres long; it will also have to withstand the incredible force of the spring break-up of the ice. But the project was reviewed by Vladimir Obruchev,* an Academician and the senior and perhaps most distinguished living Soviet geologist, and he dismissed the question of whether the whole thing was possible or not by simply stating that the plan was "entirely feasible" and recommending that detailed planning should now be started. The scheme has been debated, Davydov tells us, by numerous research institutions and technical societies, and has now been approved by the Science and Technology Council of the U.S.S.R. Ministry of Power Stations.† In 1950, the year after Davydov put forward his project, the so-called "great construction works of Communism" were announced. These were the building of several major canals and hydro-electric stations, and one of them was the construction of the "Main Turkmen Canal" from the Amu-Darya to the Caspian. This canal forms the last link in Davydov's Caspian-Baikal

* Obruchev, V. A., Inzh. M. M. Davydov, "Ob' budet vpadat' v Kaspiyskoye more," *Izvestiya Akademii Nauk S.S.S.R. Seriya Geologicheskaya* (Moscow, Leninograd), No. 6, 1949, pp. 230-33.

† Davydov, M. M., "Siberian Rivers change their Course," *News* (Moscow), No. 6, 1951, pp. 17-20.

waterway. Although I have never seen a reference, in the large literature that has recently come out about the Turkmen canal, to the fact that it can form part of a much bigger scheme, yet it seems hard to believe that choice of this particular canal had nothing to do with Davydov's plan.

The effect of the Ob'-Aral scheme on the economy of Siberia would be immense. The waterway and the electricity production would give a tremendous impetus to the industrialization of the area, and may be expected to extend northwards the present industrial area of central Siberia. The existing water communications on the Ob' and Yenisey are not to be squeezed out; the plan makes it clear that sufficient water is to be left in both rivers to ensure their continued usefulness in this respect (the flow of the Ob' at the dam is to be reduced by only one-seventh, the Yenisey at its dam by nine-tenths). The other advantages are more difficult to assess. The moderating effect of a large lake on the climate of western Siberia may perhaps not be so marked as was expected, with the result that there may be no spectacular northward movement of agriculture. There are some possible disadvantages. For instance, the diminished flow of the Yenisey and Ob' may be expected to retard materially the rate of melting of the ice in parts of the Kara Sea in the early summer, though possibly the resulting higher salinity of the coastal waters will delay the freezing in autumn. The diminishing salinity of the Sea of Aral and to a lesser extent the Caspian is likely to affect the fisheries. But it is a waste of time to speculate on the by-products before we know whether the plan is really going to be carried out. And in assessing the ability of the Soviet Union to carry it out, we must bear in mind that the country is now so organized as to ensure for such purposes as this a very large if unwilling supply of labour.

Now that it is time to finish I feel that I cannot properly draw detailed conclusions from what I have said, since the information I have collected has inevitably been come by in a somewhat haphazard fashion and it would therefore be misleading to try and piece it together into a complete picture. I should simply like to echo a sentiment expressed by my teacher, Professor Elizabeth Hill, when she addressed your Society nine years ago: Northern Asia is surely the land of the future, because it is capable of tremendous development for the next few centuries. And, I would add, the Soviet Government shows no sign of losing its conviction that this is true.

The CHAIRMAN: I would like to ask Dr. Armstrong if he could tell us what information he has at his disposal as to the depth of water and the size of the ships that could be run on the north coast trips and as to the navigation of the rivers: whether vessels are sea-going vessels and how far they go up those rivers; any information he can give us as to the navigability of the north coast, the rivers and their tributaries will be of interest.

Dr. ARMSTRONG: It was thought by the early Soviet pioneers of the northern sea route that it would be only good for vessels drawing no more than about 18 feet. That is largely due to the fact that the waters off parts of the coast are extremely shallow for a long way off-shore. However, during the war when Lend-Lease supplies came round Liberty ships were used. They were very much the largest freighters that had ever been used

in those waters and apparently they were used with success. It may be that they were not able to get into all the small ports in the north-east, but they were able to make the trip along to Archangel.

As regards the rivers, I can only say that the Yenisey is navigable to ships drawing up to 24 feet to a point some 500 miles up from the mouth, which is the main point at which timber leaves the country. The Ob is not good, because it has an 8-foot bar; the Lena is not so good as the Yenisey. I have not seen any figures for the depths of the canal system—the shipping route from the Caspian to Baykal—but the Russians say it is to be a deep-water canal.

Mr. C. G. HANCOCK: Arising out of what the lecturer said about gold, can he tell us how much gold has been produced lately and what the Russians do with it? Do they spend it on imports? Also, did Dr. Armstrong get any evidence as to uranium being found there; if so, how much do the Russians think they have?

Dr. ARMSTRONG: In the matter of gold I am afraid I do not know anything about production figures since 1946. The figures I gave for the period 1932 to 1946 were not Soviet official figures, but based on the calculations of prisoners who have been in the country. What the Russians do with the gold is anybody's guess. It is suspected that when they have sufficient they will make some dramatic announcement such as that they are going on to the gold standard, or something of that nature. Everyone assumes that they must by now be getting a very large quantity of gold.

I do not know where the Soviet sources of uranium are, but it is quite possible and even easy to find out. There has been a good deal published in Soviet technical literature on the subject of uranium deposits and someone has written about the subject. I do not myself know the answer.

Group-Captain H. St. C. SMALLWOOD: I would like to ask as to the state of development of industry in the very far eastern side of Siberia. One knows that Russia could not fight a war on two fronts unless there was tremendous development in the far eastern corner. Could Dr. Armstrong throw a little light on that?

Dr. ARMSTRONG: As far as I know, there has not been very much development in the far north-east; very little is done except the gold-mining, and there is also tin up farther north. There has been considerable development particularly at Khabarovsk and Komsomolsk, the first of which has grown enormously during the last twenty-five years; the second did not exist twenty-five years ago. There is also shipbuilding on the Amur.

Dr. E. LINDGREN: Before asking questions I would like to say how grateful I think we should feel to the Scott Polar Research Institute for allowing Dr. Armstrong to take time off from experimenting with skis and sleeping bags, which is, I suppose, their proper work, in order to indulge his morbid interest in these barren wastes. We are grateful for that. We are also grateful to Dr. Armstrong for the information he has given us, and for the fact that when he can only infer, he says "infer."

My two main questions are, I fear, rather widespread. The first is the question of the comparison with development in Canada, not so much as to what is planned but as to what has actually been achieved, and again,

not as to the means by which it has been done but how much the development really amounts to. I feel that is a matter to which Dr. Armstrong must have devoted thought.

With regard to minorities, I am thinking of the ethnographic map which the Russians produced in 1927, and wondering whether any subsequent similar map has been produced which would enable comparisons to be made. As to minorities, I had thought the Jewish Republic was in Birobidjan, east of Mongolia, but now I hear of a whole Oblast to the west.

Dr. ARMSTRONG: On the question of comparison between the development in the Soviet Arctic and Canada, I think it is clear that the Soviet side is a long way ahead of Canada. They have been trying to do things in their piece of the Arctic in a more intensive way over a longer period than the Canadians. Of course, the Canadians would argue that their population is very much smaller and they have not the man-power to do all those things which they would otherwise do; but the fact remains that on various technical questions, such as building in the far north on permanently frozen soil, laying railways, sinking oil wells and so on, the Soviet side is considerably farther ahead. There is also an interesting comparison of shipping routes, because the Canadians have a shipping route which goes from the North Atlantic into the Hudson's Bay and picks up grain at Churchill, and it is roughly similar to the Soviet route into the Kara Sea to pick up timber. And certainly the Soviet route flourishes to a much greater extent than the Canadian has up to now.

On the question of ethnographic maps, I do not know any map which one can compare with the map published by the Soviet in 1927, which was on quite a large scale; all one can get now are things like sheets in Soviet school atlases, where little blobs of colour are alleged to represent various nationalities. One has to draw whatever inference one can from that sort of material. I know of nothing more reliable than that that has yet come out of Russia.

As to the matter of the Jewish autonomous area, as far as I know there is still one near the Mongolian border, which is still marked on most maps, and I believe it does function. There were rumours to the effect that it was not going on at all well, but I believe it still exists as an administrative area.

Miss M. WENTWORTH KELLY: The lecturer obviously has a wonderful knowledge of the area. He did say that the majority of the labour employed on the various projects—presumably a great advantage to the Soviet Union as against Canada—is forced labour?

Dr. ARMSTRONG: Yes, I believe that to be so. Certainly the Dal'stroy gold mine in the far north-east is largely run by forced labour, as also are various other large projects. At the same time, it would be wrong to suppose that all labour is forced labour. In the far north, the shipping route and its allied industries are not, as far as one knows, run by forced labour. There is still sufficient glamour in working in the Arctic to attract free labour in sufficient numbers.

The DUCHESS OF ATHOLL: Has the development of gold in the far north-east benefited very much from the British Lena Goldfields which were taken over by the Soviet?

Dr. ARMSTRONG : The Lena Goldfields are, as far as I know, still being worked, but they are dwarfed in importance now by those on the Kolyma, which is the next big river to the east. It is about the Kolyma that one hears most, because the Polish prisoners who worked there are those who have returned and tell about it.

The meeting closed with a vote of thanks.

