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REPORT

of the

American Icor Commission

for the Study of Biro-Bidjan and Its Colonization

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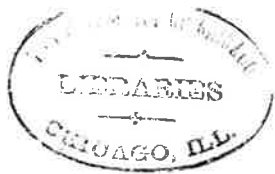
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INTRODUCTORY

ECONOMIC AND HISTORIC BACKGROUND OF JEWISH COLONIZATION IN SOVIET RUSSIA.—The Jewish colonization movement in the Soviet Union marks a culmination of an historico-economic cycle the origin of which may be lost somewhere in the gray depths of antiquity. It also, as the closing of an historic cycle, marks the beginning of a new one.

For present purposes it is not necessary to trace the past to its very beginnings. It is sufficient to bring back only a few facts which characterize the closing period of the cycle in Russia.

The characteristic features: six million people segregated from the rest of the country within what has become known as the Pale,—where they were permitted to breathe; within this Pale another Pale—economic in nature—a code of restrictions which again segregated the Jews economically in a small number of limited occupations. The bulk of the Jewish population was subjected to numerous legal disabilities; they could not own or till land nor, for that matter, live in the villages even in the gubernias of the Pale, outside of a few colonies in Ukraine; they could not hold any government position; and only a limited percentage were admitted to institutions of middle and higher education.

The results—in figures: About fifty per cent of the Jewish population in the Pale engaged in trading, mostly in the petty retail variety. Of the rest, about a half eked out a poor living as small artisans—tailors, cobblers, blacksmiths, tinsmiths, woodworkers, watchmakers, etc., and the other half was about equally divided between small factory and shop workers on the one hand, and on the other—intellectuals both mundane and servants of the faith and quite a number of those

who might be classed as people without any definite occupation and, accordingly, without any visible means of livelihood. For that matter, many of the petty trader class, though they could point to a certain occupation, were no less without any visible means of making a living. They lived on what was known in popular parlance as "air" and they made up the ranks of the numerous "people of the air"—*luftmenschen* swarming in the ghettos of the cities and towns of the Pale.

Naturally enough there was a constant surplus population in the ghettos which looked for an outlet. This outlet was found in emigration. This wave of emigration which started in the early eighties of the past century went mainly to the United States, with eddies of it branching off to Canada, Argentina, South Africa, Palestine, etc. During the decade between 1903 and 1913 hundreds of thousands of Jews emigrated from Russia annually. But notwithstanding these great numbers the situation in the Jewish communities in Russia has not changed materially. Moreover, to the economic instability was added the feeling of physical insecurity bred by the pogroms which had been encouraged by the Czar's Government as a means to divert the dissatisfaction and wrath of the people.

The World War brought some changes in the situation. But, if anything, these changes were for the worse. On the Eastern Front, the war was waged mainly in the provinces comprising the Jewish Pale. A studied effort was then made by the Czar's commanders to create an atmosphere of suspicion around the Jewish population as a means of explaining away the terrible defeats suffered by the Russian armies. Many Jews were executed as "spies" on the flimsiest pretexts. The Jewish population of entire provinces were exiled bodily into the far interior of the country.

Then came the Revolution which swept away the Czar's regime. After the brief Kerensky interlude came the Novem-

ber Revolution and on its heels bitter civil war. Again the provinces of the former Jewish Pale were converted into an arena of war operations. The various generals of the White armies and "atamans" of guerilla bands which infested the Ukraine and White Russia tried to stimulate the fight against the Soviets by exploiting the traditional distrust of the Jew and by the lure of full freedom in robbing and killing the Jews of the occupied towns.

The results were the most bloody pogroms in history—pogroms which swept over the Jewish towns and annihilated hundreds of them. The exact number of Jews killed in these pogroms will probably never be ascertained. Various estimates place the number between one hundred fifty and two hundred thousand. Over three hundred thousand orphans were left without care. The larger cities were full of refugees from the ruined and destroyed towns. The world seemed to totter beneath the feet of these hundreds of thousands of destitute people. The centuries-old economic base, unstable and bad as it was, lay shattered in ruins.

THE PERIOD OF RECONSTRUCTION.—Then, with the stabilization which followed the period of civil war in Russia, came the problem of economic reconstruction for the Jewish population. It was primarily a problem of fitting into the new economic scheme the Jews who have now found themselves to be "declassed," that is, without any useful economic function to fall back upon. With the old restrictions wiped away, many new opportunities were opened up before the Jewish population and one of these — the opportunity long denied to engage in — agriculture. This was particularly important since there were still great numbers of Jews left who could not be accommodated in the factories, government offices, or other city occupations. A movement in this direction was started and quite a number of Jews put in claims for land, and agricultural Jewish settlements sprang up in various parts of the Country, particularly in White

Russia and in the neighborhood of the old Jewish colonies in southern Ukraine.

THE KOMZET.—To organize this movement and regulate it, the Komzet, a Government Committee for the Settling of Jews on Land, was established by a special decree issued on August 29, 1924.

By this decree the task was put before the Komzet of settling 100,000 Jewish families on land during the next ten years. To assist in carrying out this task, the Ozet, a public organization for settling Jews on land, was soon organized. Additional assistance was forthcoming from a number of Jewish organizations in other countries. Chief among these was the American Jewish Joint Distribution Committee which operated in the colonization area in the Ukraine and Crimea through the Agrojoint. Another American organization which cooperated with the Ozet was the Icor.

Although the number of Jews settled on land during the first three years of the work of the Komzet fell somewhat short of the initial program, the success of the work was so marked that the question of the possibility of creating a Jewish autonomous unit in conjunction with, and as a result of, the colonization came up. The first official statement to this effect was made by the President of the All-Union Central Executive Committee of the Soviets, Michael I. Kalinin, at the congress of the Ozet in September, 1926. In his speech before the Congress he summed up the first achievements attained in settling the Jews on land and he pointed out that, since it was the national policy of the Soviet Government to accord to all nationalities of the Soviet Union all freedom and every opportunity for cultural and economic development, the landward movement of the Jews should result in the creation of a Jewish autonomous state unit which would offer the best possibilities for such cultural and economic development.

SELECTION OF BIRO-BIDJAN FOR COLONIZATION.—Such a result under Soviet conditions was the more feasible since

it had been understood from the very beginning that, both from economic and psychological considerations, the colonization should be carried on in a concentrated manner. However, the scarcity of free available good agricultural land in the Ukraine and Crimea offered an obstacle for such concentrated colonization and it became necessary to find within the Soviet Union a large continuous area of land which would be best suited for the purpose. The Komzet organized a number of expeditions to study the possibilities in various parts of the country.

One of these expeditions led by Prof. L. B. Brook investigated the region of Biro-Bidjan in the Far East and, on the basis of the report of this expedition as well as other available material, it was finally found that Biro-Bidjan was the most suitable. On the strength of the decision of the Komzet and resolutions adopted by the Ozet and by a number of conferences and meetings in various Jewish cities, the Soviet Government on March 28, 1928, issued an official decision by which the region of Biro-Bidjan was put at the disposal of the Komzet for the purpose of Jewish colonization on a large scale with a view to the creation of a Jewish administrative unit.

THE BEGINNING.—The decision was hailed with general satisfaction on the part of the Jewish population in the Soviet Union as evidenced by many resolutions adopted at mass meetings and still more by the fact that when registration was opened for the first six hundred representatives of families to go to Biro-Bidjan as the first pioneers, thousands of Jews have turned in their applications. There was such a rush that in less than six weeks after the decision of the Government the first settlers had already arrived in Biro-Bidjan. By the middle of the summer of the year 1928, 654 settlers had arrived although the colonization organizations were not sufficiently prepared to care for them and provide them with work. It happened that the summer of 1928 was particularly rainy, the rivers in the district selected for the first coloniza-

tion venture caused partial inundation making any work practically impossible. In addition an epidemic carried away more than half of the horses which had been bought for the settlers. At the same time some of the machines and plows which had been ordered in America were slow in coming.

Some of the first settlers who were not equal to the hardships of pioneering conditions were so overwhelmed by these disasters and difficulties that they hastened to return to their home towns spreading panicky information about Biro-Bidjan. However, more than half of the first settlers "stuck it out" and clung to the land in the face of the unexpected hardships.

At the time of the Commission's visit in Biro-Bidjan the Jewish population there was estimated at about 1,300. The bad reports of the previous summer have apparently not prevented many new settlers from coming. The Commission had also an opportunity to find a deep interest toward Biro-Bidjan and its possibilities among many of the Jews in the few towns and cities of the Ukraine it has visited.

ICOR

While the Jews in the Soviet Union have displayed on the whole a deep interest and favorable attitude toward the colonization of Biro-Bidjan, opinion among Jews in other countries has been divided from the very beginning. The question of Biro-Bidjan has aroused many heated discussions with some strongly supporting the idea of Jewish colonization in this region and others equally strongly opposing it.

Of the Jewish organizations outside the Soviet Union the American Icor was of the first to offer its support in the colonization of Biro-Bidjan. The Icor was organized soon after the Komzet was established and during the first three

years of its existence it cooperated with the Ozet and Komzet in furthering the settling of Jews on land in Crimea and Ukraine. When Biro-Bidjan was added to the Jewish colonization areas with definite prospects for the creation of a Jewish autonomous administrative unit in the territory and the Ozet turned its attention to this area, the Icor decided to support Ozet in this work.

The Icor concentrated its efforts on supplying the colonization of Biro-Bidjan with American machinery and equipment and during the first year of the colonization (from May, 1928 to May, 1929) it imported into Biro-Bidjan tractors, plows, harrows, excavators, automobiles, trucks, motorcycles, woodworking and other machinery and equipment valued at over \$150,000. This machinery, as the Commission found during its investigations, furnishes the basis for the mechanical equipment used at present in Biro-Bidjan.

Notwithstanding the fact that the Icor has lent its unqualified support to the colonization of Biro-Bidjan, it has decided in the face of divided opinion, to make additional investigations, both in order to determine definitely the possibilities of Biro-Bidjan and to study the ways in which the Icor, as an American organization, could be most helpful in furthering the colonization should the possibilities of the territory prove to be worth the effort.

For this purpose a special Commission of American scientists and specialists was organized by the Icor during the spring of 1929.

THE COMMISSION

PERSONNEL.—This Commission was made up of the following members:

Franklin S. Harris, Ph. D., Agronomist, President of Brigham Young University, Chairman.

Benjamin Brown, Farmer and Cooperative Marketing Specialist.

J. Brownlee Davidson, A. E. Agricultural Engineer, Professor of Agricultural Engineering, Iowa State College.

Charles Kuntz, Ph. D. Sociologist and Agriculturist.

Kiefer B. Sauls, B. S., Business Administrator, Purchasing Agent Brigham Young University.

Leon Talmy, Secretary of Icor

The Commission also received scientific and technical assistance from Mr. Noah London, B. S., Chief Highway Engineer, Ukraine Republic, who gave particular attention to the road problem; V. M. Savich, Professor of Botany, University of the Far East; and a number of other Government specialists. Dr. Elias Wattenberg, Vice-Chairman of Icor, was with the Commission during its first three weeks of work in Russia. During the last days of its work in Biro-Bidjan the Commission was joined by Prof. Wilson of the University of Montana.

PRELIMINARY WORK.—For several months before leaving the United States the members of the Commission gathered material and gave such study to the problem as circumstances would permit. Dr. Kuntz had already been on the ground making investigations and studying Government reports for more than a year. Mr. Talmy left New York May 25 to go to Russia in order to make preliminary arrangements for the work of the Commission. The other members, after a series of conferences in the East, sailed from New York on June 21. Conferences were held with prominent Jews in Paris and Berlin, after which all the members of the Commission met in Moscow to secure from the various scientific departments of the Government such information as was available and to hold conferences with those who were best

informed on the problems involved in the colonization of Biro-Bidjan.

In order to get a better knowledge of the human material involved and to study colonies of Jewish people already established in European Russia the members of the Commission made a trip through the Ukraine and Crimea and into the North Caucasus region. On this trip every facility was given the Commission to become acquainted with the Jewish people who may be candidates for colonization as well as those already colonized in the sections visited.

INVESTIGATIONS AT BIRO-BIDJAN.—On July 19 the Commission left Moscow for Biro-Bidjan. At Khabarovsk, the capital of the Far East, it found Government officials and the officers of Komzet and Ozet ready to furnish every material means necessary to pursue the investigations in the most efficient manner.

Six weeks were spent in actual field investigations. During the first part of this period a railroad car was used as a base and was moved from station to station through the district. From it trips ranging from one to three days were taken by horse back, wagon, and boat into adjacent sections.

Later a seven days' trip by saddle and pack horse was made through the Little Hingan mountains from Obloochy to Pompeivka. From here the Amur River was used as a highway of travel and from it trips through various sections were made, concluding with a trip across the district from the Amur to the railroad. The exact route of travel and sections visited are shown on the accompanying map.

Outside of Biro-Bidjan the Commission visited Blagoveschensk in the Amur District, Vladivostock, and the rice *Sovhoz* near Lake Khanka.

Throughout the expedition the Commission was favored with visits from local scientific workers with whom confer-

THE BIRO-BIDJAN PROJECT

HISTORY AND POPULATION OF BIRO-BIDJAN

EARLY SETTLEMENT.—Somewhere between the tenth and twelfth centuries the Dahurs and the Dewchers, two tribes of the Manchu-Tungus race, had left their home Manchuria and crossed the Amur in quest of a new homeland. Toward the middle of the seventeenth century these tribes are found occupying a narrow but long strip of territory extending along the Amur from the confluence of the Rivers Shilka and Argun on the west down to the mouth of the River Dondon on the east. This river is a tributary of the Amur entering it northeast of Khabarovsk. The Dahurs occupied the western portion of this extensive territory while the Dewchers settled in its eastern part. Only in the mid portion of the River, the basins of the Zea and Bureya Rivers, did the members of the two tribes live together intermingled.

About this time the Russians of north Siberia in their trading intercourse with the nomadic Tungus natives learned from them of the existence of a "bread river," meaning the Amur, and of people settled there who tilled the soil and reaped rich harvests. These stories were reported back to Moscow and in the year 1643 the Ottoman Poyarkov was ordered by the central government to organize a military expedition, its objective being to subjugate these inhabitants of the Amur "in order to supply the Czar's treasury with perpetual income accruing from the *yassak* tax and the collection of breadstuff" from the new subjects.

Poyarkov faithfully performed the task imposed upon him. His expedition not only exacted a rich *yassak* and bread levy from the Amur tribes but he dispatched a detailed description

of both the territory and its people and accompanied it with an elaborate plan of how to conquer them and annex their lands. It is noteworthy that all attempts by the Russians at producing bread in Siberia for their own needs had utterly failed. In the meantime their bread problem was becoming more and more acute. This and the desire to extend the borders of the country led to the subjugation of these tribes by the Russians. In this adventure Khabarov, a prominent merchant and capitalist, played a leading role. He most willingly subsidized and equipped a contingent of fighting volunteers, recruited from both the traders and the officials. They killed the goose, but having killed her, they lost her golden egg—the very egg they had so zealously coveted. Towards the latter part of the century, in order to escape the burdensome taxation of the Cossacks, these tribes "took to their horses," recrossed the Amur back to Manchuria, and the once prosperous bread river remained for ages abandoned.

Thus was Biro-Bidjan during the historic period here touched upon, inhabited and cultivated by the people of the Dahur and Dewcher tribes. The reports of the Cossack Ottomans, Khabarov, Poyarkov, and others of that time who were in search of rich sources of revenue describe these people as successful peasants, hunters, and fishermen; the land as fertile, its forests as abounding in fur animals, and its rivers as teeming with fish of many kinds. The Dahurs of the upper Amur were cultivating cereals such as wheat, oats, and millet and had thriving vegetable gardens with potatoes, tomatoes, melons, cucumbers, and root crops. They also practiced fruit growing. The Dewchers of the middle and lower Amur, comprising also the Soungary basin were also engaged in extensive cattle herding due to the "naturally rich meadow lands of the region."

These tribes seem to have brought their agriculture up to a relatively high state of development. Beside the fruit of their own labor they reaped the fruit of the grape vine and of the other wild plants. They were quite advanced in the

use of the iron implements and utensils of their own handiwork such as the sickle, the scythe, and iron pottery. The plow, though wooden, was harnessed to the horse. Of domestic animals mention is made of cattle, the horse, the camel, the pig, the sheep, the goat, and poultry.

Not until the middle of the nineteenth century had Russia insured her possession of this region by treaties concluded with China, one at Aygou in 1857 and one at Peking in 1860.

EARLY COLONIZATION.—In the beginning the colonization bore an enforced character and was for the most part confined to the Cossacks of the Transbaikalian territory, whence came the first settlers also of present day Biro-Bidjan. The old inhabitants of Biro-Bidjan, who were still in their tender childhood when the parents were being colonized, relate in vivid terms how the colonists with their "brood" were in flat bottom boats carried down the Amur, for weeks as a stretch, then dropped in the then still extent *Taiga*, the home of the bear, the tiger, and the wild boar, with the impressive admonition to stay there for ever and anon. As time went on colonization from European Russia received ever increasing encouragement. Finally, when the Trans-Siberian railway was completed, a time coincident with the beginning of industrial development of Russia, a colonization department was already at work directing and regulating the movement of people eastward.

However, up to the time of the World War both Siberia and the Far East were still looked upon as places for exiles, as places of hard labor for the convict. The Far East in particular was still held by military force. Only during the post-war period did a marked change take place regarding the whole question. The settling of the Far East including the Amur region is no longer a political or imperialist question, it is becoming a real colonization problem.

There are a number of spots in the Soviet Union that must be pronounced as relatively overpopulated. This is true of

the Ukraine, White Russia, and some parts of central Russia. In several of these places there exists a decided land shortage. This situation, taken in conjunction with the need of exploiting the natural resources of Asiatic Russia makes it obvious that colonization is assuming state significance. Accordingly the colonization department of the Government has in recent years been reorganized along new lines, the main object being the introduction of definite planning into what might otherwise become thoroughly chaotic.

It will be observed that the national policy pursued by the Soviet Government exerts a definite influence upon the course of the colonization. A few words therefore regarding this policy will not be out of place here.

SOVIET POLICY.—The existence, as well as the intrinsic seriousness of the problem of national minorities is well known. The national policy of pre-revolutionary Russia was briefly as follows: The Great Russians formed the dominating nation with a policy of universal Russification of minorities.

The social upheaval induced by the events of the present period has radically changed the old order in Russia and with it also its policy towards national minorities. Each and every nationality, large and small alike, is free and encouraged to practice and promote culture in the language and in the ways and forms that are historically and ethnically its native possession, its most suitable and hence inalienable vehicle of self expression. In this manner every national minority within the Union is given self determination in the broad sense of the word. It is this change in policy that has in the main motivated the Biro-Bidjan project for the Jews.

NATURE OF POPULATION.—The population of present day Biro-Bidjan consists of diverse national elements and is estimated at 28,000. The ethnic distribution of the latter is somewhat as follows. The old inhabitants, about 15,000 in number, are mostly of the Great Russian stock; the non-

Jewish colonists of recent year, about 1,200 in number, are Ukrainians and White Russians; railway workers, lumbermen and other artisans, all living in settlements along the railway line and numbering about 6,800, form a mixed predominantly Slavic population; the Koreans number 4,400 and finally the aborigines about 600.

The old inhabitants of Biro-Bidjan having a long time remained far removed from industrial civilization have stagnated to a stage of peasantry; their production is still confined to articles of home consumption, and their contact with the outside world is still but casual. Having been thrown into the *taiga*, the impenetrable forest with its beasts of prey, into the neighborhoods of rivers abounding in fish, the old settlers soon adapted themselves to the new environment, borrowed from the aborigines the arts of hunting and fishing, and assimilated them as indispensable constituents of their economy. However, the exploitation by various agencies of the timber and other resources of the country has in late years given the local population an added source of earnings as well as an opportunity for closer contact with the outside world. Moreover, with the advent of the Soviet rule, education is increasing. There is already an elementary school in every village, while in larger settlements such as is Ekaterino-Nikolski, the high school too is found, usually with an agricultural slant. Generally speaking, much attention is paid to the dissemination of agricultural knowledge and its practical application. Better farm implements and better seed are being introduced.

The old inhabitants in their majority are still living on the left bank of the Amur. Some of them, however, have in the course of time migrated inland and formed villages like Babstovo, Lazarevo, and a few others.

The Koreans of Biro-Bidjan live in a few villages scattered over the country; the biggest of them is Blagoslovennoya near the Amur. Having begun to migrate into the

Russian Far East about the middle of last century the Koreans now number in the whole region about 168,000. In pursuance of its national policy it is the intention of the Soviet Government to set aside for this new nationality a special district somewhere in the northern part of the Maritime Province where its people are found in greater numbers.

The Korean appears to be a taciturn, reserved individual, especially with reference to the stranger. He is supremely industrious, always busy in his patch of land where he most intensively cultivates the Manchurian plants of which he has a great variety. The Korean, rice, soy beans, and other oil plants go together. It may be said of him that he has taught the Russian the value of these plants as well as the methods of cultivating them.

The number of indigenous population in Biro-Bidjan is as stated above relatively negligible. These people, however, present an ethnographical interest and deserve mention.

The aborigines found here are predominantly of the Tungus stock. They live in small settlements, mostly north of the railway, up along the River Urmi and its tributaries. They still gravitate toward the *taiga* and the water. Here is the picturesque Golde in his quaint attire, the somber faced Oday the man of the woods, and the seminomadic Tungus with his deer herds. The Goldes form the majority of these natives, whose mode of living is still primitive being as it is based upon hunting and fishing. Though they have mastered the use of fire arms they still wield most skillfully the home made bow and arrow in their chase even after the bear and the tiger.

In late years the Soviet administration is making an effort to introduce agriculture into the economics of these tribes. In the schools that are established in their settlements demonstration farms are cultivated by the pupils under competent direction, the object being to teach the population the advantages of land culture. The Commission visited a Tungus

village named Krasny Yar, south of the station Londoko. The gardens here were as good as those of the neighboring Russian villages, and the general mode of living of these erst-while nomads scarcely differed from that of the Russians. A Tungus youth of about seventeen whom the Commission overtook on the road to his home displayed exceptional intelligence. He was for his age well informed, spoke selfconsciously of his studies at the Khabarovsk Pedagogical Technicum and did not forget to add, not without a discernible feeling of envy, that his two senior friends from the same village are now studying in Leningrad at the "University for the Aborigines." Krasny Yar has but nine households.

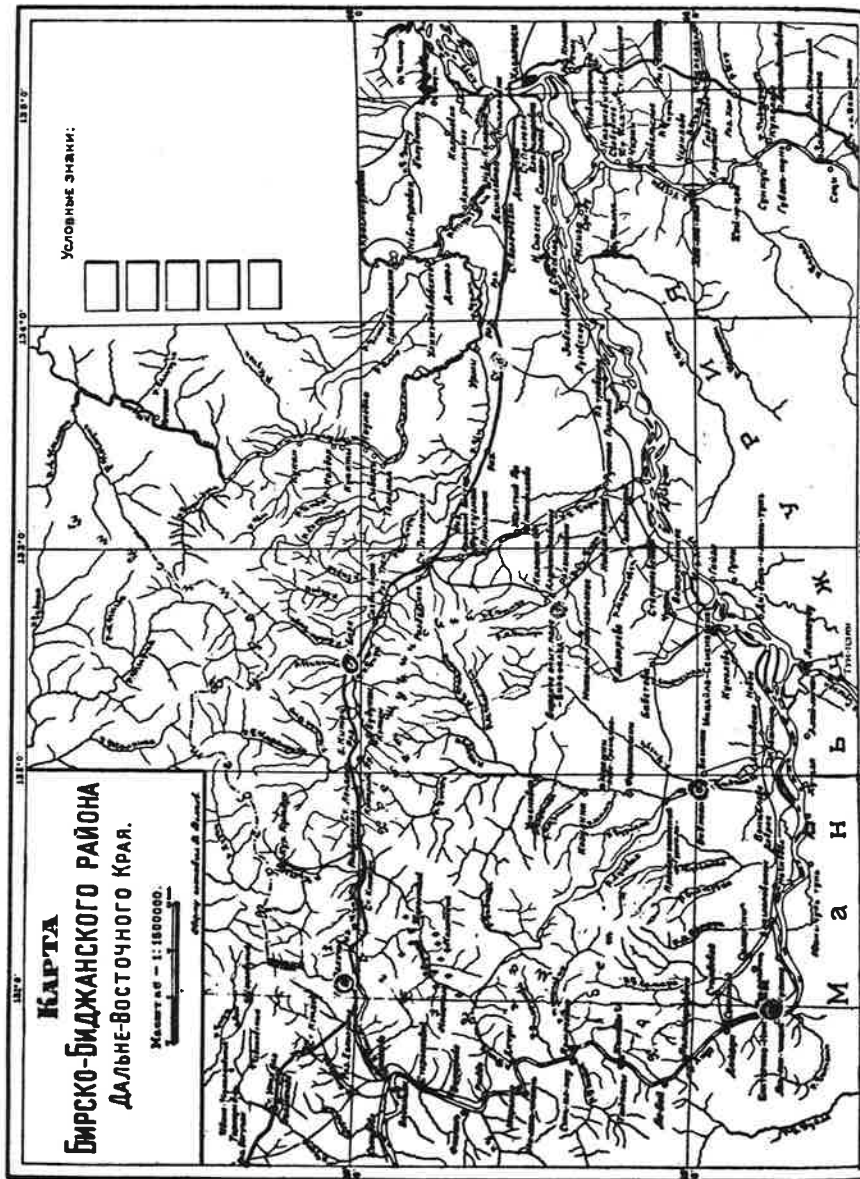
Such cultural, political, and economic institutions as the school, reading house and hospital, the village soviet, and the cooperative store, institutions that characterize the Soviet-Russian village generally, seem to be adopted by these tribes with appreciation. There are indications that this policy is likely to arrest the high mortality hitherto observed among the aborigines.

During the year 1928-29 about 1,300 Jews have been settled in Biro-Bidjan. History teaches that colonization of new lands has invariably had agriculture for its broad basis. Viewed from this angle the Jew presents untried material as a colonist. Unlike the migrating peasant, the Jew does not come from the land. To him the tilling of the soil is a long forgotten art. A child of the city he was always looking down upon peasantry as upon a low stage of culture. In a country where the underlying population was by Czarism kept in a state of illiteracy the Jew has always shown more than 80 per cent literacy. He is avowedly alert, and in the choice of an occupation for a livelihood, is calculating. In the eighties of the last century hundreds of thousands of Jews escaping Czarist oppression had migrated to the United States. The overwhelming majority of these immigrants went into the factory, into business, into the liberal professions. They have thus largely contributed to the develop-

ment of American industry and urban culture; but curiously enough very few of these Jews and their descendants have gone into agriculture.

In view of these facts it is no wonder that when the colonization of the Jews began to unfold in the Ukraine and Crimea some thought it to be a still born venture. The Jews, it was asserted, are physically incapable and psychically unwilling to go back to the land. Experience has fully overthrown this assertion. The Jewish people are demonstrating their ability to become tillers of the soil and to meet the complex problems that arise on the farm.

The Commission is in a position to state, on the basis of its observations, that not only in the Crimea but in Biro-Bidjan as well the Jewish settlers are showing their ability to cope with the pioneering conditions of the country.



GEOGRAPHY AND GEOLOGY

Biro-Bidjan is located in that part of the Soviet Union known as The Far Eastern Region. Within the vast stretches of the Soviet Far East, extending from the Arctic on the north to Manchuria and Mongolia on the south and from Lake Baikal on the west to the Pacific Ocean on the east, Biro-Bidjan is particularly favorably situated. It occupies an area of 10,000,000 acres (about 18,000 square miles.) It is west of the Maritime Province and east of the Amur District. It occupies that part of the Amur River basin extending from Pashkova on the west to Khabarovsk on the east. This great river bounds the district on the south and likewise forms part of the western and eastern boundaries. The northeastern boundary is the Urmie River which flows into the Amur through the Tunguska River north of Khabarovsk. The boundary of the northwest part of the district is the Hingan River and to the north it is the divide which separates the waters flowing into the Amur from those which flow northward.

The district all comes between 47 and 50 degrees north latitude although the greater part of it is between the 48th and 49th degrees. This means that it occupies about the same latitude as southern Russia, southern Germany and northern Switzerland. All of it is farther south than southern England and most of it is farther south than Paris.

Its longitude is between 130 and 134 degrees east of Greenwich with most of the tract between 131 and 133 degrees. It makes quite a dent into Manchuria with only the Amur River between.

The eastern portion of the district is low, being only

a few feet above the level of the river. The land gradually rises to the westward where irregular hills are found. In the western third the Little Hingan mountains rise and out from these to the north are timbered mountains which cover most of the area north of the railroad which crosses the district from east to west.

All of these mountains are relatively low, most of the ridges having less than 1,700 feet elevation. The highest point is less than 4,000 feet. Even the Little Hingan mountains are little more than large hills covered with soil and heavily wooded. Rarely does one encounter an outcropping of rock and there is sufficient soil almost anywhere for crop production although other features make most of these hilly sections better suited to timber growth than to cultivated crops.

The best parts of the tract agriculturally are in the valleys of the Bira and the Bidjan Rivers and areas adjacent to them, although there are many other sections which give promise, such as tracts adjacent to other streams flowing into the Amur and slopes and plateaus of hilly areas.

More than half of the district is covered with forest and all of it supports a dense growth of vegetation. Nowhere are there any extensive areas in which plants do not thrive.

The surface of the land is irregular throughout most of the district and wet zones called *mahrty* alternate with better drained sections called *rielkie*. The latter are sandy ridges which were left as banks of changing streams. These better drained sections are the areas of settlement. The wet *mahrty* require drainage before they are suitable for the ordinary farm crops.

The chief ground rock from which most of the soils of Biro-Bidjan were formed might be classed under the general name of granite, with porphyry and basalt as variations. In a number of places limestone ledges are encountered. Some

of these have been metamorphosed into an excellent grade of marble.

The great low stretches and the river valleys, according to the theories of Russian geologists, were formed in the arm of an ancient sea which covered this area during geologic time. This original material has been subjected to re-sorting by the Amur River and its tributaries during their overflows and meanderings so that the present soil of the lowlands is sedimentary whereas that of the hills is residual.

CLIMATE

The significant characteristics of the climate of Biro-Bidjan are the short, warm, and wet summers and the dry, clear, and severe winters. The climate is generally influenced by the surrounding mountain ranges and the prevailing winds. The Little Hingan mountains which lie to the west and northwest along the borders of the territory have a very important influence upon the climate. In the winter the prevailing winds are from the west and, coming from over the northern plains of Siberia, are cold and dry. In the summer, however, the prevailing winds are from the Pacific Ocean to the southwest and being heavily laden with moisture, the mountains cause the clouds to deposit their moisture, giving the territory a warm summer of heavy rainfall. The section favored with the mildest climate is the southwestern section lying between the mountains and the Amur River.

The Commission is able to report quite definitely concerning the climate of Biro-Bidjan since meteorological observation stations have been maintained at various points within the territory for periods up to 19 years. The data obtained at these stations are included in a comprehensive report prepared by Professor M. M. Spartansky and which has been supplied to the Commission.

The location, altitude, and duration of observations of six of the meteorological stations are given in Table I.

Summaries of the temperature records for five stations are given in the accompanying tables. Table II. gives the mean temperature by months. Table III. gives the average maximum monthly temperatures observed daily at one hour past noon. Table IV. gives the average minimum monthly temperatures recorded by minimum thermometer. Table V. gives the absolute maximum monthly temperatures observed daily at one hour past noon and Table VI. gives the absolute minimum monthly temperatures recorded by minimum thermometer.

Biro-Bidjan has very decided wet and dry seasons. The rains, which begin in April, become particularly heavy and frequent in July and August but usually cease early in September. The other months of the year constitute a period of very limited precipitation. The average precipitation by month together with the total for the year at six meteorological observation stations is given in Table VII. The heaviest annual precipitation is reported at the station Een in the northeast with 641.5 millimeters and the lowest at Bidjan in the southwestern part with 493 millimeters.

The variation in monthly precipitation is very marked. This is particularly true of May and September indicating quite a wide variation in the time of the beginning and close of the rainy season.

The frequency and direction of winds in per cent of total time is given in Table IX.

The winters, although cold, are pleasant on account of the bright sunshine which prevails almost without interruption through the winter months. It has been suggested that the

sunshine could be utilized in connection with hot houses and cold frames in the growing of plants.

A summary of the climatic data is given by Professor Partansky. This summary includes the mean annual temperature, the average rainfall, the sum of the temperatures for the growing period and the duration of the growing period and is reproduced in Table X.

TABLE III.—AVERAGE MAXIMUM MONTHLY TEMPERATURE OF AIR (Fahrenheit)

Place	(Observed at one hour past noon)												Av. for Year
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
Obloochy	-7.2	-5.4	20.0	40.5	57.6	68.0	74.7	72.7	59.5	42.3	15.7	-2.7	26.8
Birakan	-1.3	12.6	25.3	42.4	57.9	68.9	76.1	74.3	61.2	45.0	18.7	4.5	40.7
Bira	0.0	9.7	24.3	44.8	58.8	69.6	75.7	74.3	61.9	45.7	20.7	1.6	40.5
Ekaterino-													
Nikolsk	1.7	10.6	22.5	42.6	58.6	68.7	74.8	74.1	63.5	46.8	23.0	4.5	40.7
Birafeld	-2.2	9.1	22.5	43.5	59.5	70.3	74.6	73.9	62.4	46.4	21.2	1.9	40.3
Een	-2.7	5.4	21.8	42.3	58.6	69.8	75.2	73.9	62.6	46.2	21.0	0.7	39.6

TABLE IV.—AVERAGE MINIMUM MONTHLY TEMPERATURE OF AIR (Fahrenheit)

Place	(Obtained by Minimum Thermometer)												Av. for Year
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
Obloochy	-26.9	-16.1	-7.6	21.9	35.8	48.6	55.6	54.0	40.5	21.2	-2.9	-20.2	17.1
Bidjan						(Not Given)							
Bira	-21.5	-9.6	1.2	24.4	37.4	52.5	57.9	56.1	42.4	29.1	3.4	-16.6	21.4
Ekaterino-													
Nikolsk	-15.5	-8.7	5.9	27.3	41.2	53.4	60.8	59.7	46.2	29.8	6.8	-12.1	25.9
Birafeld	-17.5	-9.6	3.2	26.1	39.6	53.1	57.4	56.5	43.5	30.8	4.1	-12.3	22.8
Een	-24.7	17.0	-1.7	27.0	39.0	52.2	59.6	57.7	44.4	27.1	1.8	-16.6	20.7

TABLE I.—METEOROLOGICAL OBSERVATION STATIONS

Observation Station	Location	Altitude (Meters)	No. of Years of Observation
Obloochy	On R. R. in Northwest Section	291.8	8 years 5 months
Bidjan	On Bidjan River South Central Section	90.0	12 years 7 months
Bira	On R. R. in North Central Section	157.4	13 years 6 months
Ekaterino-			
Nikolsk	On Amur River Southwest Section	68.7	19 years 5 months
Birafeld	Central Section	95.0	10 years 1 month
Een	On R. R. in Northeast Section	51.4	7 years 10 months

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TABLE II.—MEAN MONTHLY TEMPERATURE (FAHRENHEIT) (ADJUSTED)

Place	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Yearly
Obloochy	-16.8	-5.1	11.1	33.0	48.7	60.8	67.3	63.5	50.4	32.4	8.8	-13.5	28.4
Bira	-8.3	-0.2*	16.3	36.7	50.2	61.9	68.9	65.5	53.6	36.5	13.6	-2.6	32.7
Ekaterino-													
Nikolsk	-7.6	1.9	21.2	37.9	52.0	63.1	69.4	67.6	55.2	38.7	20.4	-2.2	33.2
Birafeld	-10.1	0.7	15.1	37.8	50.7	63.3	68.7	66.4	54.0	36.5	13.6	-5.1	32.7
Een	-13.9	-3.2	13.3	35.8	50.7	63.1	69.8	66.7	54.5	36.5	14.4	-7.4	31.6

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TABLE VII—PRECIPITATION BY MONTHS (Millimeters)

Place	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Obloochy	7.7	12.5	20.9	44.5	38.6	105.9	129.2	131.7	92.3	17.2	15.9	16.3	627.7
Bidjan	3.3	9.1	8.8	23.8	41.5	93.2	95.2	89.9	89.0	20.0	11.9	7.3	493.0
Bira	1.8	13.4	10.1	31.0	54.8	130.6	124.9	107.9	105.7	18.0	23.8	15.0	639.8
Ekaterino-													
Nikolsk	1.2	5.4	6.1	20.4	69.6	97.5	99.8	121.0	74.5	17.4	5.8	2.2	520.9
Birafeld	3.8	7.7	8.7	32.7	49.8	107.8	115.0	129.8	100.7	19.8	14.6	9.3	613.0
Een	7.8	7.0	12.5	34.4	61.0	104.5	149.0	106.6	104.4	25.0	22.6	6.7	641.5

TABLE VIII—VARIATION OF RAINFALL DURING SPRING AND SUMMER

(Millimeters)

Place	No. Years of Observa- tion	May		June		July		August		September	
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Obloochy	7	76.1	2.0	167.6	28.8	219.0	48.0	259.9	48.0	159.9	49.9
Bidjan	11	92.0	20.9	149.6	16.7	235.1	39.3	162.1	15.6	172.2	23.9
Bira	13	156.7	14.1	194.0	51.8	224.9	50.5	247.8	9.5	191.1	31.0
Ekaterino-											
Nikolsk	19	253.7	25.0	145.4	15.0	235.1	12.1	228.2	26.9	216.1	16.4
Birafeld	9	97.2	10.4	152.8	74.8	263.1	60.0	217.5	28.6	193.7	28.8
Een	9	113.2	31.2	156.0	74.3	293.3	102.5	229.3	42.4	173.7	48.1

TABLE V—ABSOLUTE MAXIMUM MONTHLY TEMPERATURE (Fahrenheit)

(Observed at one hour past noon)

Place	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	For Year
Obloochy	21.2	32.0	50.9	63.7	86.4	88.0	93.2	89.1	82.8	77.0	48.2	34.5	93.2
Bidjan						(Not Given)							
Bira	21.2	33.8	54.0	77.0	84.9	88.7	91.4	91.8	82.4	77.0	55.4	31.1	91.8
Ekaterino-													
Nikolsk	24.8	37.4	56.7	75.2	88.3	92.5	95.7	91.6	81.0	74.7	51.4	34.9	95.7
Birafeld	20.8	32.5	49.5	74.3	83.7	87.8	89.1	89.6	86.4	71.2	48.7	31.3	89.6
Een	20.7	26.2	47.1	72.0	84.9	85.3	91.8	89.6	79.2	74.8	48.2	31.8	91.8

TABLE VI—ABSOLUTE MINIMUM TEMPERATURE (Fahrenheit)

(Obtained by Minimum Thermometer)

Place	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	For Year
Obloochy	-47.7	-38.6	-29.9	-4.2	20.3	32.7	39.9	35.8	19.4	-4.2	-33.7	-51.7	-51.7
Bidjan						(Not Given)							
Bira	-38.9	-33.7	-21.3	2.3	21.2	32.7	37.9	36.7	24.6	5.7	-24.5	-46.1	-46.1
Ekaterino-													
Nikolsk	-39.6	-35.0	-29.4	-3.6	25.2	36.7	48.7	39.8	25.7	3.9	-24.9	-39.5	-39.6
Birafeld	-36.9	-36.4	-26.7	0.3	21.6	35.2	42.4	36.5	23.0	2.3	-26.1	-41.8	-41.8
Een	-50.6	-47.4	-26.5	-9.4	24.8	32.4	43.9	38.8	26.2	3.7	-25.8	-45.4	-50.6

NATURAL RESOURCES

TIMBER AND OTHER PLANT RESOURCES

(Extracted from Statement Prepared by Prof. V. M. Savich,
University of Far East.)

Biro Bidjian is wedged in between three physico-geographical regions:

(1) East Siberia, which is characterized by forests of the deciduous larch (*Larix Dahurica*) as well as by considerable peat formations; (2) Manchuria, a more southern region with soils relatively warmer and forests of deciduous broad-leaved trees; and (3) the Okhotsky region which, although its soils closely resemble those of Manchuria, is distinguished by its highly developed coniferous forests.

Contemporary Biro-Bidjan exhibits elements of all these three types, much like those observed in both southern Canada and northern United States of which Ontario and Michigan are typical. The habitat of each of these types in Biro-Bidjan follows somewhat this scheme: The valleys, still cold and swampy as well as the higher poorly drained plateaus, are occupied by the forest of the first type; the warmer slopes, the better drained plateaus, and the steep mountain inclines are covered with plants of the Manchuria type, reminding one of the flora of the Atlantic states; and the more elevated portions of the shady slopes form the home of the Okhotsky type. All this Biro-Bidjan flora reveals the influence of man's action. Particularly evident are the results of the forest fires. The fires have in some places annihilated all trees, reducing the areas to sheer meadows. In others they have caused a change

TABLE IX—DIRECTION OF THE WIND AND CALM IN PER CENT OF TOTAL TIME FOR THE SUMMER AND WINTER SEASONS

Place	Summer				Winter				CALM
	N	NE	E	SE	S	SW	W	NW	
Obloochy	4	2	5	3	4	6	11	5	60
Bira	2	0	2	2	1	4	32	23	34
Birafeld	5	6	4	1	5	46	22	2	9
Ekaterino-Nikolsk	33	4	3	1	2	4	7	21	25
Ben	6	5	3	2	7	23	16	6	32
Obloochy	4	2	8	9	6	5	8	6	52
Bira	3	4	11	7	2	3	13	8	49
Birafeld	12	12	18	9	9	17	13	2	8
Ekaterino-Nikolsk	11	11	14	6	6	8	4	9	31
Ben	5	16	11	7	12	13	8	3	25

TABLE X—SUMMARY OF CLIMATIC DATA

Place	Mean Average Temperature	Average Precipitation (Millimeters)	Sum of Daily Mean Vegetation Growing Period Temperature	Period Duration
Obloochy	-2.0	627.7	2,315	156
Birakan	-0.9	796.0	2,335	162
Ekaterino-Nikolsk	1.2	520.9	2,625	176
Birafeld	0.4	599.7	2,545	171

in the type of vegetation, thus producing derivative growth complexes. The three types of forests are described as follows:

1.—The wood of the larch is decay resistant and contains much tar. It is widely used in construction. Since the valleys are, as a rule, first colonized its importance for colonization is obvious. In consequence of fires the white birch (*Betula Japonica*) intrudes itself into the semi-devastated larch areas. This fire resistant, quickly self renewing birch will prove of use in the chemical industries. The forests of this type, although much reduced by the fire ravages, still have, by virtue of their immense areas, a practical significance as timber.

The larch is about 30 centimeters in diameter and up to 20 meters in height. The birch measures about 25 centimeters in diameter and is between 10 and 15 meters high. These forests have hardly any underbrush.

Among the shrubs which occur are the *Ledum Palustre*, an important nectar plant; the blueberry (*Vaccinium uliginosum*); the cranberry (*Vaccinium vitis*); and *Lonicera edulis*, an easily and profitably cultivated berry. In the swampy larch woods occurs the *Salix repens*, a nectar bearing shrub.

In the Laricetum (grass cover) antecedent to fires, sphagnum moss prevails causing the accumulation of peat and swampiness. After the fires sedge (*Carex*) appears, particularly the *Calamagrostis langsdorffia* which plays an important role in the Far East as a hay crop, producing in the Ussuri-region about 3,000 kilograms to the hectare. In later stages other varieties such as the wild vetch appear.

2.—The Manchurian type has a considerable sprinkling of the Korean pine (*Pinus Koreanis*). The latter is accompanied by the oak on the south slopes and by the linden on the shady slopes. The Korean pine is valued as an export timber. The trees which are being cut are about 200 years of age though many are found 500 to 600 years old. The average

Korean pine is about 30 meters high and from 60 to 90 centimeters in diameter. Due to its value as building material the pine has been removed from places adjacent to transportation lines. Furthermore its rich tar content has made it an easy prey to the fire ravages. In the more remote northern regions of Biro-Bidjan these pine forests have remained more or less intact. The pine bears a large nut rich in oil. In the Far East the gleaning of this nut is a source of income to the population.

Besides the oak (*Quercus Mongolica*) and the linden (*Tilia Amurensis*) the pine is surrounded by the birch (*Betula Dahurica*), the cork tree (*Phellodendron*), the ash (*Fraxinus Manchurica*), the maple (*Acer Mono*), and the Manchurian nut tree. The oak forests are of no great commercial value. Though the oak reaches the age of 100 years it is uneven, crooked, and does not give first quality material save for parquet flooring, railroad ties, and tannin. The underbrush of these oak complexes is more important. It includes many fine nectar bearing plants such as the *Lespediza bicolor*, *Atractylis ovata*, *Cinifugo simplex*, and others. Thus the hilly oak forests afford a background for large scale honey production. Moreover, *Lespediza* is a splendid feed for the spotted deer whose breeding in the Ussuri is very profitable. The plains occupied by the oak, as a rule, develop a *podzol* soil overlaid with humus 10 to 15 centimeters thick and are best suited to the production of corn, tobacco, tomatoes, beans, and other Manchurian plants.

The Amur grape which is also found here can be cultivated for the production of red wine. The linden besides being one of the finest honey plants furnishes a wood good for veneer and other mill work.

The wood of the *Phellodendron*, a first rate honey plant, is good material for cabinet making while its thick corky bark has value for insulation. The wood of the Manchurian nut tree is valuable to the cabinet maker and goes to Japan

in large quantities as material for airplane propellers. Manchurian ash is good veneer material. The wood of *Maackia amurensis*, dark brown in color, is hard and decay proof. The maple, a fine honey plant, furnishes good straight wood for cabinet making. Manifestly these forests ought to be preserved and restored in the interests of both bee culture and their commercial lumber value.

3.—The Okhotsky forests are found on the shady side of mountain tops, on high dry plateaus, and in narrow dry portions of mountain valleys from four to six hundred meters in elevation. These forests have the greatest commercial value as they now furnish the major portion of the timber for the lumber industry of the Far East. Lying as they do high up in the mountains they have least suffered from fires. They are found in their virgin state in the upper parts of the rivers Starikova and Pompeyevka.

The most valuable species is *Picea ajanensis* (spruce) reaching 40 to 60 centimeters in diameter and 20 to 25 meters in height. The second growth of these forests is occupied by the white barked balsam fir (*Abies nephrolepis*), about 50 centimeters in diameter and 15 to 16 meters high. Here too we find the tall Kamchatka stone birch (*Betula Ernanii*), diameter 70 to 80 centimeters, and height 20 to 22 meters. The wood of the spruce (*Picea*) is valuable building material; it now forms the main article of export to Japan.

Likewise the fir is of importance, its wood giving cellulose and its derivatives. The fir is closely related to the American *Abies balsamea* and like it has on its bark tar warts from which Canadian balsam is extracted. The needles of the fir and particularly of the spruce, yield aromatic substances and oils.

Finally the Kamchatka birch, too, is sure to furnish products similar to those of the white birch.

The underbrush of the Okhotsky forests contains the green barked maple (*Acer tegmentosum*) and *Actinidia Kalomicta*,

with its sweet grapelike berry, which suggests that these forests occupy places sufficiently warm for southern Manchurian plants of this kind to thrive in great numbers.

Thus the flora of Biro-Bidjan, though partly depleted of both the coniferous and deciduous complexes characteristic of the Far East, and partly damaged by fires, still possesses ample plant and timber resources not only for home use but also for export. Besides, it exhibits a whole series of plants adaptable to cultivation.

ANIMAL RESOURCES

The first Europeans to settle in what is now Biro-Bidjan depended, to a very large extent upon the wild life of the region for their livelihood. Farming has gradually increased, however, until at the present time it probably plays a more important economic role in the life of the people than does hunting, though many of the residents still depend upon the wild animal life of the country for winter employment although the hunters all seem to agree that hunting is becoming less remunerative from year to year due to the gradual decrease of the wild animal life. They think, however, that the recent adoption of hunting seasons and other regulations will help to maintain a somewhat dependable supply of the more important animals. The animals which enter into the economic life of the people at the present time are:

FUR-BEARING.—The squirrel, the skunk, the ermine, and the fox are of importance as fur bearing animals in the order named. The squirrel, a large species, is placed first in the list because it is so much more common than the other animals. The squirrel pelt brings the hunter about a rouble and a half.

The skunk and ermine pelts take an important place in the fur trade but the hunter is able to secure these furs less frequently than the squirrel.

The fox is placed last on the list because it is reported to be almost extinct in the region.

HIDES.—The wild boar, the moose, the bear, and a small deer found in this territory are hunted primarily for their hides, for which there is a good market. The meat of all these animals is used as a food by the hunters, but it has little if any market value.

BIRDS.—Birds in Biro-Bidjan are not particularly numerous. The important game birds found are the partridge, the hazel hen, the pheasant, and ducks. In addition to their value as food for the hunters, there is reported to be a market for some of these birds.

MARKET FOR ANIMAL PRODUCTS.—The marketable wild animal products are disposed of through the Hunter's Union, a cooperative organization, with offices and warehouses in various places. It also handles the special supplies connected with the hunter's trade.

FISH.—The large number of rivers and streams by which Biro-Bidjan is crossed and crisscrossed in all directions, besides the great River Amur which runs, in its middle course, a distance of 540 kilometers along the western and southern borders of Biro-Bidjan, are, according to both official scientific and the testimony of the local population, well stocked with various kinds of fish. The following species are named in scientific reports as characteristic of the Middle Amur (that part of the river which is adjacent to Biro-Bidjan).

The Family Acipenseridae: *Kaluga* (*Huso dauricus* Georgi); Amur osetr, sturgeon (*Acipenser schrencki* Brandt).

The Family Salmonidae: *Taimen* (*Hucho taimen* Pallas); *lenok* (*Brachymista lenok* Pallas); (*Coregonus chadary* Dybowski); (*Thymallus arcticus grubei* Dybowski).

The Family Osmeridae: *Koriushka* (*Mesopus olidus* Pallas).

The Family Cyprinidae: *Yaz* or *Chebak* (*Leuciscus waldeckii* Dybowski); *amur* (*Ctenopharyngodon idella valenci-en*); *krasnoperka* (*Pseudaspius leptocephalus* Pallas); *kon* (*Hemibarbus labeo* Pallas); *peskar* (*Hemibarbus labeo* var. *maculatus* Bleeker); *lesh* (*Parabramis pekinensis* Basilewski); (*Parabramis terminalis* Richardson), *white fish* (*Cutler erythropterus* Basilewski); *krasnoper* or *white fish* (*Cutler mongolicus* Basilewski); *karas* (*Carassius carassius* Linne); *carp* or *sazan* (*Cyphinus carpis* Linne); *sych* (*Elopychthys bambusa*); *tolstolobik* or *moksum* (*Hypophthalmichthys molitrix*).

The Family Siluridae: *Amur som* (*Parasilurus asotus*).

The Family Bagridae: *Kosatka* or *skripun* (*Pseudobagrus fulvidraco* Richardson).

The Family Esocidae: *Pike* (*Esax reicherti* Dybowski).

The Family Serranidae: *Okun* (*Siniperka cha-tsi* Basilewski).

The Family Gadidae: *Nalim* (*Iota Iota* Linne).

The fish resources of the inland rivers, the Bira, Bidjan and their tributaries and the tributaries of the Amur have been investigated but very little, if at all. Among the local population the following fish are most frequently mentioned as being caught in the local rivers: *lenok*, *amur*, *krasnoperka*, *peskar*, *karass*, *carp* or *sazan*, *som*, *pike*, etc.

The greatest fishing event of the year is the "movement of the keta." It is the period when the keta fish, a variety of salmon (*Onesynchus keta*), or chum salmon is coming up from the sea to spawn in the tributaries of the Amur. On its way to the hatcheries the *keta* is being caught in enormous quantities all along the Amur from its mouth up and it furnishes the basis for a rather extended canning and red caviar industry. In the rivers of Biro-Bidjan the chum salmon appears during the early autumn. Besides the natural hatcheries, a fish pond and hatchery is maintained on the Bira River in the vicinity of Londoko.

MINERAL RESOURCES

The presence of abundant mineral resources in a territory to be colonized greatly enhances its value as a country in the making. Minerals furnish the raw materials out of which useful commodities are manufactured; their presence thus stimulates the development of larger industries, multiplies the opportunities for labor to find employment, and forms a link by means of which the new country is through its production of wealth joined to the general economies of its surrounding regions.

It will be observed that all geological investigations bearing upon Biro-Bidjan have up to recent times borne the stamp of the Far East. The geologist would set down the results of his endeavors in a very general way, viz: in this or that spot of the Far East there are found such and such minerals. The disadvantage of this situation is obvious. The findings of the investigator were likely to be lost in the immensity of the Far East, to remain a dead letter in face of the fact that the region is practically devoid of people and their enterprising initiative and labor.

With the placing of Biro-Bidjan upon the map, making it a well circumscribed spot forming a perfectly definite objective, the work of the geologist is understood. Where productive labor is to settle with the purpose of building a cultural life, where human initiative is to enter in full strength upon the arena of creative production the presence of mineral resources is highly significant, it characterizes the territory in question, it makes it more desirable because it is so much more promising.

In what follows some of the better explored mineral deposits are briefly described.

1. IRON.—According to such authorities as Ahnert and Polevoy the haematite or red iron ore of Biro-Bidjan deserves, both as to quantity and quality, the most careful consideration. The ore deposits occur in two zones. They extend

from the Amur on the south up to the railway on the north over a stretch of 96 kilometers, running meridianally and almost parallel to one another along the eastern ridges of the Little Hingan mountains. The southern zone of deposits begins near the Amur (not far from the village Soyuzny) goes northward up to the Pompeyvka River and turns north-east by the Samara River. The northern less explored zone extends southward of the railway station Londoko.

The geologic structure of the two zones has been found in the main fairly uniform. Moving along from west to east we at first meet quartz porphyries; they are followed by massive granites and gneisses alternating with crystalline slates and developed limestones. Here among and above metamorphic schists and dolomite limestones runs the ore bearing area where hornstone and haematite are imbedded. The average width of these deposit zones is about 16 kilometers.

Polevoy estimates the probable deposits of ore in the southern zone in round figures five million tons. The ferric content varies between 37 and 53 per cent, reaching in the better grades 50 and even 70 per cent.

In discussing both the industrial and commercial value of the Biro-Bidjan iron deposits Ahnert arrives at the following conclusions: (1) The Little Hingan haematite deposits occupy as to quantity a first place in the Far East. (2) As to their character they most closely resemble the Krivoy Rog deposits in south Ukraine. (3) Their industrial exploitation is contingent upon the availability of the agencies needful to concentrate the ore. As to the last point the following may be said. The northern deposits are still surrounded by forests affording sufficient smelting material. This cannot be said of the southern group which lies in a zone long since denuded of its timber. However, as Ahnert points out, coke carried along the Amur from Sakhalin (though there can be found nearer supply places) will solve this problem.

It goes without saying that the Far East, including Biro-

Bidjan, as a growing colonizing country is an unlimited market for iron and its products. Besides, Japan which has very little iron ore of its own, while it needs much of it, is a sure prospective customer.

2. GRAPHITE.—Graphite is found in a number of places in Biro-Bidjan. From the River Kamenushka a belt of graphite slates (discovered by Ahnert) extends in a south-west direction towards the Bira River. To the south of the coal Sopka Turnk there are graphite deposits of which the mining engineer Constantinov who has investigated them says that they have an industrial future. Best explored are the deposits on the Biely River, a tributary of the Amur running between the villages Soyuzny and Polykarpovka. The graphite slates here have quartz as one of their main ingredients. In this zone are found nests of pure graphite. Analysis by Yahontov shows the graphite content of these deposits to be 30 per cent. The probable output of graphite on this area of 20 square kilometers is estimated to be 6,600,000 tons.

3. GOLD.—The ranges of the Little Hingan are included as a respectable member in the auriferous region of the Far East. A whole series of placer mines are scattered in the basins of the Sootar River (origin of the Bira), and the rivers Bidjan, Dichun, Pompeyvka, and others. Thus far gold has been mined in this region to the amount of six tons. There are no data as to the probable stores of this metal in Biro-Bidjan. During the past three years several placers have been exploited by various agencies; eight in the system of the Sootar river; five in the system of the rivers falling into the Amur; and one in the Bidjan basin.

While on its travels through the Little Hingan mountains the Commission visited two of the Sootar placers. One of them at Ashikan is busy reorganizing its work looking forward to better methods of operation. Here the gold bearing veins are plainly visible, outcropping as they do through the sands overlaid with alluvial deposits. The application of

more effective devices will doubtless increase the output of these avowedly rich gold bearing sands.

4. OTHER MINERALS.—The presence of such other minerals as asbestos, ochre, and mica is known but none of them has been sufficiently investigated.

5. MINERAL BUILDING MATERIALS.—The presence of building materials in Biro-Bidjan is known because such enterprises as the building of the railroad, fortifications, ports, and military structures led to the discovery of such rock deposits. Recently M. Alexeyevsky, Director of the Geological Commission at Vladivostock, has endeavored to compile and systematize all the available data regarding these minerals.

The *Sopkas* in the proximity of the railway station Teehonkaya consist largely of granite and gneisses. The fine granular texture of these rocks endows them with extraordinary strength and hardness. Moreover their protrusion to the very surface renders the exploitation of these stone deposits fully accessible, while their nearness to both rail and waterways (river Bira leading down to the Amur) assures them an industrial importance. Further west along the railway line the nearby *Sopkas* abound in porphyries of great density, immune to the action of disintegration. On the southern slopes of the Choorki ridges there is found the grey granite in monoliths of high density. It is fine material for the production of millstones and the like. Near the village Babstovo there are rich deposits of the blue-grey quartzites, a material that, due to both its ingenious nature and high density, is good for the erection of blast furnaces for the development of high temperatures such as is needed in metallurgical works.

The ranges of the Little Hingan yield an abundance of porphyries, basalts, and other rock formations affording splendid material for both dwellings and roads. Many of these minerals are along the railway line within easy reach.

Among the rock deposits are found various kinds of sand-

stones and clays suitable for the manufacture of brick, tile, ceramic works, etc. Deposits of high quality of white as well as light blue marble of crystalline limestone lie close to the railroad line and also along the rivers Kuldur, Bira, and Samara. Likewise limestones are found in a number of places. In addition to its value in connection with agriculture, lime is an important building material. Khabarovsk in its building program at the present time is subject to chronic crises due to the scarcity of lime on the market.

In the light of the foregoing sketch and bearing in mind that the extent to which Biro-Bidjan has been investigated hardly covers fifteen per cent, the conclusion seems justified that Biro-Bidjan has in store mineral resources of considerable industrial and commercial importance.

COAL AND PEAT

1. COAL.—The coals of Biro-Bidjan are of the Jurassic period. Thus far three places are known where coal occurs. The Turuk Hill coal deposits are most familiar. They are found on the left shore of the Bira River between its two tributaries, the Nikita and the Sagda River. The deposits on the right shore of the Bira form the second place; and third, coal is present along the shore of the River Kamenushka. Concerning the latter two places no definite information beyond the fact of their existence is as yet available. Mining Engineer Constantinov is of the opinion that the two places in question deserve closer investigation as the coal strata here opened up might prove to be a continuation of the Turuk deposits. The Turuk mine itself (known as the "Coal Sopka") has been the object of repeated investigation and up to recent times was intermittently subjected to exploitation by various concerns. The coal has been pronounced to be of high quality, but on the question of probable quantities authorities differ. The opinion prevails, however, that these deposits are not at present of commercial value.

2. PEAT.—Some of the river valleys along the eastern slopes of the Little Hingan mountains are known to contain peat formations. Likewise the valleys of the rivers Bira and especially Bidjan have more or less extensive peat bogs. However, the peat areas of the Far East, and hence of Biro-Bidjan, have but little been studied in general and not at all as regards their possible value as fuel. In 1895 Ahnert by drilling in a series of places along the Amur valley between Khabarovsk and the Bira River found a number of peaty soils of which those in the lowlands of the River Ikura (left tributary of the Bira) were from 1.75 to 2 meters thick, but this is all that is at present known about this subject.

3. BITUMINOUS SLATES.—This fuel variety has remained altogether uninvestigated in the Far East. Judging however from the fragmentary reports obtained in connection with the materials concerning the search for coal in Biro-Bidjan it would appear that near the village Radde, on the left bank of the Amur, there are bituminous deposits mistakenly reported as stone coal.

WATER RESOURCES

A special study was made by the Commission of the water resources of Biro-Bidjan with a view of their utilization for irrigation, power, and domestic uses.

IRRIGATION.—After reaching the plains the rivers traversing Biro-Bidjan, notably the Bira and Bidjan Rivers and their tributaries, are meandering streams with low banks. Likewise the great Amur River which flows along the borders of Biro-Bidjan has low banks along most of its length from Ekaterino-Nikolsk to Khabarovsk. It would appear to the Commission that water for irrigation, particularly in connection with the growing of rice, could be secured in abundance and with comparative ease. For large areas water for irrigation may be had by the diversion of streams through canals

without pumping. In other locations an abundance of water may be produced by pumping through a low lift.

POWER.—The rivers of Biro-Bidjan have their origin in the mountains at some distance from the settled areas and flow out over the flat river plains. The utilization of the streams in the mountains where the streams have sufficient fall is surrounded with many difficulties. The construction of dams or canals would be expensive on account of the lack of natural favorable conditions, and the variation in stream flow throughout the year and the cost of power transmission lines represent economic obstacles. It may, however, be expected that with a larger population and developed industries the more rapid flowing streams of Biro-Bidjan will ultimately be utilized for power.

DOMESTIC WATER SUPPLY.—In the plains section of Biro-Bidjan where immediate colonization is contemplated wells must be depended upon as a source of water for domestic use because of the character of the streams and absence of springs. The Commission made a study of the wells in the communities visited. In general water is available at reasonable depths, varying from 6 to 30 feet, and of good quality for domestic or culinary uses. However, at the colonization centers of Birafeld and Alexandrovka, the wells were deep—120 feet and more—and furnishing only a limited supply. These centers appear to be located on areas of geological formation representing old reduced hills or mountains with all the water bearing strata of sand or gravel much below the usual depth. The wells of Biro-Bidjan are being made the object of a special investigation by specialists employed for the purpose.

Some of the wells in the northern sections contained ice on their walls when examined during the early part of August. This ice is formed during the winter by the freezing of water seeping into the wells through the walls a few feet below the surface of the ground and freezing when coming in contact with the cold air of the open well. One well protected by a carefully built well house did not contain such ice on the

walls. The wells examined which were used for domestic supply were, without exception, equipped with buckets and ropes for drawing water. Such equipment seemed to meet fully the immediate requirements. If pumps are used during the winter they must be carefully protected against freezing. The use of a distribution system of pipes from a common source will necessarily be very expensive on account of the depth at which such pipes must be placed in the ground for protection against frost. Such information as was available would indicate a depth of eight feet to be necessary. As the communities develop, domestic water supply systems will need to be installed in the most compact villages. The Commission, however, does not consider this an immediate problem and it believes the present source of water from wells for domestic purposes to be in general adequate and satisfactory. For sanitary purposes it would seem advisable to protect the wells from contamination from surface flow better than is done at present.

The temperature of water in all wells examined was decidedly low, varying from 40° to 48° F.

In this connection a few words will be in place regarding the question of perpetual freezing. This phrase is used to describe two facts. One is the internal freezing of the earth observed at depths varying between 10 and upward of 100 meters below the surface. M. Sumgin has recently studied this phenomenon which is characteristic of a great portion of the northern hemisphere, particularly Siberia. Since however this fact, according to Sumgin, touches but slightly, in one or two points, the western boundary of Biro-Bidjan it need not be dwelt upon here beyond this mention.

The second fact is the perpetual freezing of the surface of the earth at the normal depth of one or two meters. The Commission has in its extensive travels never chanced upon spots so frozen. However, observations to this effect have been recorded by other investigators. The explanation of

this fact is simple. Allow any bit of matter to get frozen, then insulate it against the penetration into it of all heat and it will remain frozen "forever." The storing of ice, i. e. the perpetuation of the frozen state of water, is based upon this principle of insulation. Now, earth spots ill drained, situated on northern slopes get in the long run covered over with sphagnum (a thick moss) which is an excellent insulator, that is, a poor conductor of heat. Such spots being as they thus are inaccessible to the action of the sun rays remain "perpetually" frozen until the plow and the cultivator guided by human intelligence tear away this insulation and expose their face to the energizing sun. The soil is then warmed up, becomes pregnant with the germ of life, and proves this "perpetual freezing" to be a misnomer.

HEALTH RESORT

In connection with the discussion of the water resources, the health resort, Kuldur, may be mentioned.

The resort takes its name from the stream Kuldur on which it is situated. It is located in an inclosed valley 35 kilometers north of the railway station Birakan. In early times the hot springs which flow from an island about one square kilometer in area formed by the branching of the stream, enjoyed great popularity among the native Tunguss tribes who jealously guarded the secret of its location. Only in 1912 the place was discovered by white men and it soon became rather famous, although still enveloped in legendary mists. The springs were looked upon as a cure-all and were used in a primitive way. Some enterprising men came into this mountain wilderness, dug for wells which they surrounded by wooden enclosures and collected fees for the right to bathe in the dugouts.

The real development of the resort on a modern basis was started in 1926. The flow of the springs was concentrated in a few basins, bath houses were erected and an ex-

tensive building program was carried out to accommodate the increasing number of patients flocking to the resort from all over the Soviet Far East. The buildings include three hotels with separate rooms and dormitories, a "Kursaal" or dining room with a capacity of 240 at one sitting, a hospital with 50 beds for serious ailments, a polyclinic, bath houses and accommodations for steam baths. Besides these there are a number of buildings for administrative purposes, storage rooms, a steam laundry, a bakery, etc. An electric power installation with 22 KW capacity generated by steam furnishes power and light for the resort. The drug department and laboratory are housed in old shacks which are to be replaced by new buildings in the near future.

The temperature of the water in the springs varies between 50° and 70° C. According to the physician in charge the waters have proven to be particularly helpful in cases of skin diseases and partly so for rheumatic ills.

The present capacity of the resort is about 400 baths a day. However, with the existing wells the capacity can be increased to 1,000 baths a day and with the further development of the springs it may reach a capacity of 3,000 baths a day.

The resort may in time also be expected to furnish an increasing market for the output and labor of a settlement which might be organized nearby. The main occupation in such a settlement would be gardening and dairying for which there are satisfactory natural conditions within a distance of seven kilometers from the resort.

The road from Birakan to the resort is in a very neglected state although there is sufficient good road material at hand. As a result the distance, which could easily be covered in an hour and a half by autobus, takes from seven to eight hours in old primitive rigs.

A telegraph line was being built at the time of the visit of the Commission.

AGRICULTURE

Biro-Bidjan is under consideration for colonization almost entirely because of its agricultural possibilities. Other industries will of course in time find a place. There will be manufacturing, mining, and fisheries, but the possibility of agriculture is the consideration that brings the region forward as a place to build homes for those who may be colonized from other sections.

Agriculture is largely an industry producing crops and marketing them either directly or through livestock. It is evident therefore that in considering an area for agriculture it is necessary to know what crops can be raised and the profits that might be expected from their production. These profits will depend not only upon diversity and yield but also upon marketing conditions. It is not enough that potatoes and cucumbers can be raised but profitable markets for them must be found.

Biro-Bidjan comes in the northern division of the great agricultural areas of the world. As has already been pointed out, its winters are severe but its summer climate is favorable to the luxuriant growth of a great variety of crops. The days are long and warm and the summer rains insure sufficient moisture to keep plants growing almost at their best provided the soil environment can be kept favorable.

As yet the various phases of the livestock industry have not been developed in Biro-Bidjan but the suitability of the country for the production of feed gives promise that livestock, particularly dairying, will find an important place in the agriculture of the area. This is treated more fully in a following section.

SOILS

The basis of all profitable agriculture is the soil. If it is productive the farmer can carry on his operations without the handicap to which he is subjected if the land he is cultivating is poor.

The soils of Biro-Bidjan have been the subject of study for a number of years. Prof. Prohorov made a preliminary study and founded an experiment station at Birafeld in 1912. Prof. Brook and the expedition he led made investigations and samples of soil were turned over to Prof. Williams of the Timiriachev Academy of Agriculture in Moscow, who made analysis and reported the soils to be fertile.

The rocks from which these soils are derived are the kinds that give a soil high in total plant food. The luxuriant vegetation that has grown all over the district throughout the ages has left vast stores of organic matter in the soil. This is a reserve asset of very great importance. However, in some of the sections the process which in itself is good has been somewhat overdone.

In the poorly drained sections, or *mahrry*, the land is covered with hummocks which are in reality piles of organic matter on which coarse grasses and sedges grow because of their more favorable situation above the water. One theory of the growth of these hummocks is that they result from ice action when the water in the lower places between them freezes during the winter and by its expansion tends to make the hummocks rise.

The greater growth of vegetation on them as compared to the spaces between certainly adds to the rapidity of their accumulation. These hummocks which make the surface of the *mahrry* land rough offer considerable difficulty in putting the land in good condition for cultivation, but once this difficulty is overcome the organic matter which they have accumulated will furnish a useful reserve.

In some sections it is advisable to burn the excess organic matter to hasten the warming in the spring when it is desirable that the frozen soil should be thawed as early as possible. This is particularly true in marshy sections where the soil is almost a peat. During the rainy season the surface soil becomes very wet not because the water table is near the surface but because of the relatively slow percolation through the compact subsoil. The great soil problem of Biro-Bidjan is not a chemical one as is the case in many sections. It is rather the physical problem of controlling the soil moisture so that the high rainfall during the summer may not accumulate as free water which is injurious to most cultivated crops. This important question is considered at length under the topic of drainage.

The breaking up of the soil and its subsequent tillage promotes a warming, so that in effect the growing season is lengthened over what it is when the soil is in its virgin state.

Tillage is important in this district since there are so many native plants to occupy every available inch of land and these plants make a very distinct weed problem. In planning methods of soil management, therefore, tillage must be provided for and suitable rotations must be introduced to help keep the native growth in check.

Briefly we may say that the soils of Biro-Bidjan are in general fertile, but there are some very difficult problems to be met before the land as we find it now can be converted into fruitful fields. The chief problems are drainage, clearing, and tillage, including the elimination of numerous surface irregularities and provision for keeping the native vegetation in check.

DRAINAGE

There is no more important factor in successful crop production than the proper amount of water in the soil. An excess of water is particularly detrimental and demands ex-

treme effort in its removal by effective drainage. Even a cursory survey of Biro-Bidjan would indicate that a problem of first importance is land drainage. Parts of the territory composed largely of low flat plains traversed with meandering rivers restrained only by low banks of sedimentary soil, are subject to periodic floods. The natural drainage courses in the plains are not so well developed as in areas of older geologic formation. The soil, consisting as it does of a black surface layer, very rich in humus, overlaying a compact, rather impervious clay sub-soil, makes the application of drainage over large areas prerequisite to cultivation. In many places the more level land of the valleys and plains, representing often the most valuable agricultural lands, are made extremely wet by the surface flow from adjacent hills or mountains.

In order that the relation of adequate land drainage to the development of Biro-Bidjan may be fully appreciated, it is well to emphasize in a systematic way the benefits and effects of drainage on the condition of the soil and their relation to crop production. The benefits and improvements to be derived from the control of ground water through drainage may be enumerated as follows:

- 1.—Perhaps the most important benefit is the deepening of the feeding zone of plants, thus resulting in increased yields. The root systems of most cultivated crops will not penetrate below the level of ground or hydrostatic water which fills the space between the soil particles and which is free to flow under the action of gravity. Effective drainage or the lowering of the level of free ground water immediately make available a much greater store of plant food for the plants to feed upon.

- 2.—The lowering of the level of hydrostatic water provides aeration of the soil, a condition necessary for the growth of the root system of plants, and promotes favorable bacterial action necessary in making plant food available.

- 3.—A notable advantage of drainage is the increased effectiveness of the sun in warming the soil freed from excess

water, thus virtually lengthening the growing season. With adequate drainage crops may be planted earlier and the period of growth thereby extended.

4.—The drainage of soil extends the range of crops which may be profitably grown. Many crops requiring a deep root system cannot be economically grown where the hydrostatic water is near the surface.

5.—The efficiency of mechanical equipment and field operations in general is greatly improved with drainage. The hazard of becoming mired in soft places is reduced and the loss of time required to pass around undrained areas in the fields is lessened. For instance, tractors and heavy machines which cannot be used successfully in undrained fields are entirely successful in the same fields after drainage.

6.—The removal of hydrostatic water from the surface soil has an immediate effect upon the soil tilth produced by cultivation. Instead of a puddling action which is produced in the presence of free water, an open granular condition of the soil is obtained which is highly desirable for plant feeding.

7.—Often excessive and detrimental salts are removed by drainage, leaving the soil sweeter and in a condition more favorable to plant growth and bacterial action.

8.—With inadequate drainage the entire area of fields cannot be cultivated successfully, resulting in serious loss in production from waste land. With proper drainage all of the field may be made uniform and productive.

9.—The lowering of the level of hydrostatic water in the soil provides a temporary storage reservoir which enables the soil to receive a larger volume of water following rains and, by giving it up more slowly, reduces the immediate run off and the volume of flood waters and thereby greatly lessens soil erosion.

10.—The drainage of land, particularly the removal of

water from ponds, improves the sanitary condition of the area and reduces the insect nuisance by eliminating breeding places.

11.—Many of the diseases of cultivated crops—notably rusts—are promoted by lack of drainage. In a territory having a wet growing and harvest season the benefit of drainage in combating such a difficulty is very important.

DRAINAGE PRACTICE WITH SPECIAL REFERENCE TO BIRO-BIDJAN.—Drainage practice comprises the utilization of various means of protecting, controlling, and removing excess water from the land. At best the methods and practices introduced can only supplement natural drainage. The more common practices used are (a) straightening and improving natural streams to increase rate of flow and to prevent flooding of adjacent lands during periods of heavy rainfall or the rapid melting of snow; (b) protection of land from floods by levees or dikes; (c) the use of new channels, canals or ditches for carrying off quickly excess water; (d) carefully graded under drains of conduits or tile which permit the water to enter and carry it away beneath the surface; and (e) the removal of excess water from areas by means of pumps.

The latter two methods represent the more advanced and expensive phases of drainage and in the judgment of the Commission are not immediately applicable, in a general way at least, to Biro-Bidjan conditions. Although levees are desirable to protect certain areas from the flood waters of the rivers, main dependence must be made upon the cheaply constructed and the more generally applicable open ditches or canals. These are easily built, to a large extent with machinery, and are useful in removing water from the surface, draining water from low spots and swails and intercepting the surface flow of water from hillsides upon the adjacent flat lands. Only a demonstration of the effectiveness of such drains can indicate fully their merit and value. As the country becomes more completely developed, the more expensive

means of providing drainage may be introduced with economic advantage.

In addition to improving the fields for crops and cultivation, improved drainage will have a most beneficial influence upon living conditions. In many of the villages visited ponds were noticed in the streets which only needed a small trench or the improvement of the gutter to be completely drained. Such ponds or mud holes not only reduce the value of the streets for communication but are unsightly and the source of foul odors and furnish breeding places for mosquitoes and other insects which are a decided pest in Biro-Bidjan as in other new countries with a heavy summer rainfall.

There is a very definite relation between land drainage and road maintenance for it is recognized that drainage is one of the first steps in road building.

It is believed by the Commission that it will be impossible to apply extensive drainage works to Biro-Bidjan during the early stages of colonization but it wishes to point out that such works as are constructed should be done systematically and methodically and with forethought in making all construction work form the early and preliminary steps in the progress of development and not represent inadvised effort and expense for work not capable of becoming a part of an expanding plan.

The first step to be taken in development of a drainage system is accurate information concerning the topography any hydrology of the areas involved. With such specific information at hand, not only may the more favorable areas be utilized in the beginning but the works constructed may be the most economical, most effective and at the same time capable of development and expansion. Although the Commission has been furnished some topographical maps it was advised that the necessary accuracy was lacking to make such information a sound basis for expensive construction. Hydro-

graphic information concerning the rivers and smaller streams is entirely lacking.

In brief the Commission wishes to emphasize that the drainage of the land to be colonized is a matter of first consideration and for that reason the importance of drainage has been dwelt upon in this report at considerable length. The construction of ditches to drain the surface and to intercept surface flow and improve the cultivated areas is a matter of great economic importance and sanitary value. Successful methods of land drainage as developed by experience and practiced in other localities should be utilized but it should be recognized that the drainage problems of Biro-Bidjan, like those for any other country will require special consideration and study. It is possible that the opening of the tight subsoil with deep subsoiling might prove profitable and its trial in a limited way is recommended. The results of experiments in the use of ditches at the Birafeld experiment station and observations support the views of the Commission in this connection in every way.

LAND CLEARING

The work of clearing and bringing into cultivation the lands being colonized in Biro-Bidjan varies considerably with the condition of the land in its wild state. Much of the prairie lands in the plains is covered with grass, a few dwarf trees, and a limited amount of brush. Little work needs to be done on such land before plowing. The roots, however, are very tough and are the cause of excessive repairs to standard plows when used for breaking.

Other sections, particularly the *rieltie* lands are covered with either standing trees of considerable size or old stumps in an undecayed condition and a heavy growth of brush. The present practice is to cut away the brush by hand and remove the stumps by grubbing and the use of stump pullers. Such practice is similar to that used generally elsewhere under like

conditions. Since some heavy tractors are available it would appear that these could be used in removing and piling the stumps for burning.

If horse labor is used the amount of hand labor may be greatly reduced by the use of horse operated stump pullers. If large tractors are not available the use of derricks and tackles for collecting and piling stumps for burning is very desirable. The construction and use of such development is described in the literature on stump removal.

Where standing trees are to be cleared it may be a matter of economy to remove the stumps with the trees, providing heavy tractors are available. By cutting the brace roots and hitching the tractor to the trees at a considerable height above the ground with a long cable, large trees may be removed with their stumps with much economy of labor. The success of this method varies with the soil and the character of the tree, being best suited for removing trees with a shallow root system and loose soils.

The plowing of new land containing large hard roots represents a very severe service for a plow and results in excessive breakage and bending of the plow parts. It is usually a matter of economy to use special land clearing plows made extra strong and heavy for such work, although the rate of plowing may be materially reduced. Such plows make it possible to spend less time and expense in the work of clearing, as large roots and the stumps of small trees may be plowed out and the work of grubbing reduced.

In many instances explosives may be used with economy in removing large stumps but with the cost of explosives and the rate of compensation for labor such methods do not seem applicable to the conditions in Biro-Bidjan at present.

The contract plan for carrying out the hand work of clearing the land as now practiced in the colonies should make for efficiency and economy.

CROPS

The geographical position of Biro-Bidjan, its geologic evolution, and its meteorological and soil conditions as described in preceding sections indicate that all crops possible of cultivation in the temperate zone could be successfully grown in Biro-Bidjan. The Commission, therefore, made careful observations to determine to what extent and with what success such crops were being grown on the 75,000 acres now estimated to be under cultivation in the area. Its findings are summarized as follows:

CEREALS.—Wheat, rye, barley, oats, and buckwheat are grown throughout the area. There are records of wheat yields running as high as 42 bushels an acre. The Commission's observations of the 1929 wheat crop would indicate an average yield of about 18 bushels an acre.

The difficulty attending the production of cereals in Biro-Bidjan centers around the high rainfall during the growing season and particularly at the time of harvest. This moisture which promotes a rank growth, provides a very favorable condition for the growth of rust diseases.

There is considerable difficulty in harvesting the cereals during the wet weather and frequently after the grain is cut off its quality is impaired by the rain which falls on it before it is threshed. Government investigations are under way to devise methods of overcoming these difficulties. Varieties of wheat which are rust resistant and which will fit into the general climatic condition are being studied and developed and everything possible is being done to overcome the difficulties of cereal production in Biro-Bidjan. In the Amur District, which has a similar climate, but where the settlement is older, there is already extensive grain production.

The Soviet State Grain Trust (*Zerno*) has carried on some investigations in Biro-Bidjan which resulted in the selection of two or three places of about 50,000 hectares each, as State

farms (Sovhoz) for the production of wheat. One of these farms in the vicinity of Ekaterino-Nikolsk will commence operations in the spring of 1930. This farm will provide labor for a number of Jewish colonists.

OTHER CROPS.—In the gardens and fields of the old settlers the Commission observed a luxuriant growth of the root crops, cucurbits, legumes, and miscellaneous crops, viz., beets, mangels, carrots, turnips, rutabagas, potatoes, cucumbers, tomatoes, watermelons, muskmelons, squash, pumpkins, peas, beans, peppers, egg plants, sunflowers, onions, pepper, tobacco, corn, sorghum, medicinal plants, cabbage, lettuce, and radishes. The fibrous crops, hemp and flax were also observed growing in a number of sections.

In common with agricultural regions of similar latitude Biro-Bidjan seems to be well adapted to the growth of the root crops and certainly there will be no difficulty in supplying any market that may develop with these crops. At the present time these crops are used principally for human consumption but with the introduction of more livestock their use can be very greatly extended for succulent foods of all stock.

Such legumes as peas and beans do well and while the present market for these crops is local, there is no physical reason why sufficient of these crops could not be raised to make possible their canning for outside market.

Wherever the members of the Commission have been in Biro-Bidjan they have seen excellent gardens growing and the settlers and colonists have their living greatly enriched by the numerous garden crops which thrive. However many settlers do not take advantage of the garden possibilities as much as they could.

SPECIAL CROPS.—The climate of Biro-Bidjan is favorable to the growth of such sub-tropical plants as rice and the castor bean. Rice is now profitably grown by the Koreans of Blagoslovennoya and the old settlers of Michailo Semenovskaya.

The Jewish colonists at Birushka have started the raising of rice this year and Ozet expects to complete an irrigation system near Amurzet in time for the colonists to plant about 1,000 acres of rice in 1930. There are many areas in Biro-Bidjan which can be irrigated at reasonable cost. Doubtless upland rice can become an important crop since it thrives under similar conditions near Lake Khanka at the Government rice Sovhoz.

The Commission wishes to call particular attention to the value of soy beans as a special crop suited to Biro-Bidjan. It has already been found that the soy bean makes an excellent rotation with rice. This has been demonstrated in the rice fields of Khanka Lake. On the land mentioned above which is being prepared by Ozet for rice growing by the colonists it is planned to have soy beans as a rotating crop. The Commission has been favorably impressed by the excellent growth of soy beans which have been found in every section of Biro-Bidjan. This plant with its soil building, oil producing, and concentrated food properties make of it a very desirable crop. The value of this crop has been demonstrated in Manchuria during recent years and the Commission believes it offers one of the best opportunities as a crop that can be cultivated for export. The fact that soy beans can be harvested after the rainy season makes it particularly desirable for Biro-Bidjan.

PASTURE AND HAY GRASSES.—The entire area of Biro-Bidjan is covered with a luxuriant growth, but good hay grasses are not so plentiful. *Carex Schmidti* and *Calomnagrostis langsdorfia* are the chief forages now used by old settlers, who often go a long distance from the villages to find suitable areas of these plants for hay. The introduction of forage plants which are more nutritious and palatable is very much needed. Experiments are being conducted near Khabarovsk with clover, alfalfa, and timothy. The last named crop was also observed at the Birafeld Experiment Station, where it looked promising.

In countries such as Holland and Denmark where there is

a high rainfall during the summer, grasses are the basis of national wealth since they furnish food for dairy cows. While the cultivated grasses are not found extensively in Biro-Bidjan, the Commission is of the opinion that there are vast areas which can produce the more desirable grasses and that this pasturage should make the foundation of a dairy industry for the region.

FRUITS.—The Commission observed, in their wild state, the strawberry, raspberry, cranberry, gooseberry, blueberry, grape, actinido, hazel nut, plum, apple, pear, and apricot. The Khabarovsk experiment nurseries have already succeeded by grafting and selection in producing cultivated fruits of fair quality both of bush and tree of the enumerated kinds. The Commission believes that a good quality of the bush fruits mentioned could be produced in Biro-Bidjan.

POSSIBLE CROPS.—The Chinese Jute, the Galwin, the sugar beet, suza, an oil plant, and many other crops are thought by many to be possible crops in Biro-Bidjan. Experiments are being conducted with the crops mentioned at Birafeld and definite data on the subject will later be available.

LIVESTOCK

The experience of many centuries of farming in Europe and America has demonstrated the value of livestock in maintaining a well balanced agriculture. The following are some of the reasons for this:

1.—Livestock give additional employment to the farm operator during the season when he is not occupied with crop production.

2.—More permanent soil fertility may be obtained with the aid of stock.

3.—Livestock make possible the conversion of such crops as hay and grain into more concentrated products such as

butter, cheese, eggs, and meat and they also make possible the utilization of by-products such as the residues from soy beans and flax which are raised primarily for their oil. For a country, such as Biro-Bidjan, which is situated a long distance from centers of population and markets, the cost of transportation makes imperative the conversion of the more bulky farm crops into more concentrated products.

The experience of the old settlers of this part of the Far East shows the possibility of raising in this section the ordinary kinds of stock and poultry found in Europe and the United States. In most of the old villages the Commission observed cattle, horses, sheep, goats, swine, chickens, ducks, and geese and all of them seemed to be in good shape and to be thriving under the conditions.

The absence of the well known European breeds of stock was noted. The cattle, for example, seemed to be just a mixture of animals of all colors and types, mostly of dual purpose, since the old settlers have needed both milk and meat and they have not specialized in producing cattle of any one type.

At the Icor colony the Commission found a production of two gallons a day for each cow, which is too low for a first-class dairy herd. It is probable that the cows of the old settlers produce even less. Before a first-class dairy industry can be established it will be necessary to develop strains of milk stock. This can probably be done best by using sires of some of the well-known dairy breeds and gradually building up from them and local cows strains that have been acclimated in this region.

The horses are little more than ponies and while they seem to be adapted to the rough type of work which they are called on to do under pioneer conditions, they are far too small to meet the needs of a modern farm.

Sheep, goats, and swine, as well as poultry, are all of inferior and mixed breeds but there will be no difficulty in im-

proving all of these by the introduction of desirable strains. With the rigorous climate found in this section it will, of course, be necessary to provide proper housing, particularly as the specialized and more delicate breeds are introduced.

While Biro-Bidjan has up to the present not gone very far in the development of livestock, the Commission sees no reason why all branches of the livestock industry could not be developed in this section. It looks with particular favor to the building of a dairy industry, the products of which are in great demand throughout the Far East.

Hogs, sheep, and poultry can be developed on the individual farms and it may be that later on some of these may be extended into large scale commercial production, although this is something that only the future can tell.

BEE KEEPING

The Biro-Bidjan territory seems to be specially favorable for bee keeping and the production of an excellent quality of honey. There are quite a number of well kept apiaries owned by the old settlers. The Jewish settlers, although in the territory only since the spring of 1928, have succeeded in establishing two apiaries of considerable size. At the present time one apiary has 150 hives and the other 100. The larger one, situated 22 kilometers from Teehonkaya, was visited by the Commission and found to be producing a high yield of superior honey.

The more elevated sections of Biro-Bidjan, according to Professor Savich, abound in flowering plants which produce excellent honey nectar. The linden tree of two species (*Tilia amurensis* and *Tilia manchurica*) is outstanding in this connection. Other important honey plants are listed by Prof. Savich as follows in order of importance:

Lespedeza bicolor, *Phellodendron amurense*, *Acer Mono*, *Atractylis ovata*, *Salix* sp. *Cacalia hastata*, *Cimicifuga simplex*, *Chamaenerium angustifolium*, etc.

In addition to the above native or wild plants, such cultivated crops as sunflowers and buckwheat can be depended on to give much honey material. It is believed, therefore, that bee keeping may be made one of the important industries for the colonists of Biro-Bidjan.

MACHINERY

Mechanical farm equipment is an important factor in modern farm operations because it represents the principal means of increasing the productive capacity of the farm worker. The Commission feels called upon, however, to point out that machinery is not an end in itself but only a means to an end. In a well managed or organized program of production, the application of power through machinery to modify, reduce and increase the effectiveness of labor fills an important role. Machines, however, not properly related to a well planned or engineered program of production may easily become a burden.

In the selection of mechanical farm equipment it is very important that each machine shall give as much service every year as possible and that all the machines used for the various operations can be operated economically by the same power unit or tractor. For instance, if the most advanced equipment is used for plowing and seeding, while the harvesting is carried out by hand methods, much of the advantages obtained by the former will be greatly reduced on account of the limited acreage which can be harvested by each worker. In a well planned program of crop production the equipment is selected with a view of carrying out all operations as efficiently as possible.

Much equipment was observed by the Commission in the various colonies but a part of the field machinery was not suitable for operation with the tractors. Much of the harvesting was carried out by hand because machines suitable for operation on wet soil were not available.

It is recommended that, in selecting new machines, a schedule of operation for the growing of each crop, be prepared giving the equipment to be used with its capacity per day. Such a schedule when combined with the period in days available for each operation will indicate whether or not the entire program can be carried out successfully.

It was observed that the field machines were not in a good state of repair. This situation may be accounted for in part by the heavy service imposed on the machines by the breaking of new land but systematic methods of machine repairs would greatly overcome this difficulty. The repair of all machines before another crop season is particularly important.

The training of tractor operators appears to be carried out with considerable success and the equipment available for instructions was good and well selected. Experience has shown however, that the common use of equipment for instruction and production does not make for efficiency in production as the machines are sure to suffer when cared for by the inexperienced and not be in the best condition at critical times. It would therefore seem desirable to the Commission that a certain amount of equipment should be reserved especially for the productive work of farming. This segregation of equipment will be very important if more extensive farm operations are to be carried out by the colonization administration.

Owing to the soft field conditions which prevail throughout the crop growing season it is desirable to select equipment which will operate under such conditions. Extension rims and lugs are necessary for the tractors and power driven harvesting machinery will prove to be especially desirable.

MANUFACTURING

There is a great economic advantage to any community to have manufacturing industries developed coordinately with agriculture. The workers in the factories consume food stuffs

produced on the farms, the factories produce goods contributory to the well being of all the residents of the community and there may be an exchange of labor between the factories and the farms insuring continuous employment throughout the year.

In general the manufacturing industries in a territory like Biro-Bidjan have two sources of raw materials, the natural raw materials like those obtained from the forests or the mines and the raw materials produced in the agricultural industries. The most inviting source of natural raw materials to the colonies in Biro-Bidjan is the forests in which there is a great wealth of forest materials immediately available. The Commission has been advised that wood working equipment will be available in the near future and desires to encourage the colonization management to develop manufacturing of lumber and wood products as early as practicable. The production of standardized sash, doors, window and door frames, and dressed lumber would facilitate and reduce the cost of house construction and at the same time the factory product will be of superior quality. The manufacturing of these standard materials is particularly inviting owing to the great increase in the productivity of labor when aided with wood working machines. The quality and condition of the materials may be better controlled, which together with the possibility of improving the finish and appearance will insure a much higher grade of product.

There is a need for furniture in the colonies and the manufacture of wood products should be arranged to include its production. The supply of woods suitable for furniture making is abundant. Box and crating materials could be produced to advantage.

In addition to the needs of the colonies there is no reason why the products of a wood working factory could not be sold generally throughout the Far East.

The production of charcoal, tar, and other products de-

pendent on the forests as a source of raw material should be investigated and these articles should be produced in such quantities as demand and selling price shall warrant.

In certain parts limestone and marble are readily available. The production of lime for building and other purposes would no doubt be profitable where suitable raw materials and fuel for burning are readily available.

With the development of agriculture many of the manufacturing industries using farm crops and products as raw materials will need to be developed. Among these may be mentioned the manufacture of dairy products such as butter and cheese, the milling of grains like wheat and rice, and the pressing of seeds for oil and cake like flax seed, soy beans, and sunflower seeds.

COMMERCE AND MARKETING

Commerce and marketing usually bring up some very complex problems. In some countries these problems are associated with over-production. Russia, as is well known, is passing through a period of reconstruction. New industries of all kinds are being built, agriculture is being industrialized, and commerce and marketing are being fitted into the general cooperative scheme of the country. These conditions must be taken into consideration in connection with the marketing of the products of Biro-Bidjan.

The Far East in particular finds itself in great need of most of the commodities which might be produced in Biro-Bidjan. Khabarovsk, a young growing city, Vladivostock, and the many mining and fishing settlements in Kamchatka and Sakhalin are importers of such food stuffs as cereals, butter, cheese, vegetable oils, meats, poultry products, canned fruits, and vegetables. These articles bring comparatively high prices and most of them can be produced to advantage in Biro-Bidjan. Dairy products and timber find a ready market in Japan. Such products as flax fiber and soy beans may be marketed in the United States. For rice there is a great demand at relatively high prices in the Soviet Union.

The findings of a market is the least problem of all in the colonization of Biro-Bidjan. The main thing is to produce these commodities; then the channels of marketing can easily be opened up.

TRANSPORTATION AND COMMUNICATION

At the present time colonization is not practicable without adequate facilities for transportation and communication. Self-contained and self-sustained communities do not satisfy the demand of a civilized group for cultural contact and exchange of commodities with the world at large. If the well being of new settlers is to be cared for, facilities for easy and economical communication and transportation should be provided as early as practicable.

ROADS.—The roads in Biro-Bidjan, owing to the limited population and the great distances between the early settlements, represent a difficult economic problem of construction and maintenance. The mail route road built over twenty-five years ago from the east to the west, owing to limited use, has been allowed to pass into a very bad state of repair with most of the bridges out. This road was built with much care and expense and if it could be put to practical use could be repaired.

A road from Teehonkaya southeast to Hoodzinovka, a distance of about 12 kilometers, has received much attention during the last year and several miles have been carefully graded and were found in good condition. The unimproved sections, however, were in such bad condition that it limited traffic over the entire distance.

A graded earth road extends from Teehonkaya southwest through Alexandrovka, Stepnoy, and Birafield on toward the Amur River. At the time of the visit of the Commission this road from Teehonkaya to Alexandrovka and Birafield, a distance of 40 miles, was nearly impassable. It would appear desirable to have regular motorbus and truck service between colonies as early as possible. Although materials for sur-

facing, such as stone or gravel, may be secured at various points along its length, it would appear to be economically unsound to surface the entire length of this road in the immediate future. The road problem here is similar to the early road problem in the middle western states of the United States. It was learned there that a fair road made of earth could be maintained by drainage and the experience so gained should be utilized as far as practicable. It is the common practice in these states, after removing the water from the soil by side ditches accurately graded and with under drainage of tile where needed, to provide surface drainage by maintaining a road crown by frequent smoothing with a road drag, thus insuring a quick run off of the water falling on the road. This process of dragging must be performed regularly to prevent the formation of ruts or pockets to hold the water and thus soften the surface. The dragging is most effective after rains when the soil is beginning to dry and when the drag will have a puddling action on the soil. The maintenance of the road will be expedited if the vehicles passing over the road are not equipped with lugs or narrow-tired wheels which unduly loosen or rut the surface.

The early road problem in Biro-Bidjan is made more difficult on account of the high humus content of the surface soil which has the capacity to absorb a large quantity of water and is quickly softened thereby. It would appear to the Commission to be desirable to conduct experiments in removing the surface soil and using only the sub-soil for building the road surface.

The construction of a good earth road does not in any way represent a loss in case of further improvement as the first step in the construction of a surfaced road is a good foundation in the nature of an earth road.

Considerable modern road building equipment consisting of scrapers, graders, drags, and rock crushers is available for road building.

As new colonies are established a road system should be developed coordinately, making it possible to establish regular motor service for passengers and freight.

RIVER TRANSPORTATION.—River transportation on the Amur gives regular service during the summer when the river is open. This service is available to the Amurzet colony. The Bira and Bidjan Rivers are navigable for small steamers for distances extending beyond many of the sections open to colonization. As products become available for export these rivers may be expected to be utilized.

RAILROADS.—A section of the general Trans-Siberian railroad extends through the northern part of Biro-Bidjan giving easy access to the west and east. As the country develops a branch railroad extending southward toward the Amur and through the Bira River valley will no doubt be needed. Until more people are settled in these sections the expense of a railroad could not be justified.

COMMUNICATION.—At the present time the only communication available to the colonies are the mails. The construction of telephone and telegraph lines would be of great assistance in the development and management of the colonies and in the judgment of the Commission should be fully justified on such basis.

HOUSING

The housing of new settlers in a colonization program is one of the most urgent phases of the work and it is proper that it should be, since home making is one of the primary objects of colonization.

The Commission was early advised that housing was a matter of particular concern to the authorities and for that reason was given special study. Experiments with different types of houses were being made but in general the houses were of the hewed-log type with sash, doors, and frames

made by hand at the point of construction. Much of the sawing of boards was also performed by hand. At the Amurzet colony, a variety of types and sizes of houses were found including houses of mud brick walls, half log walls, and double board walls stuffed with shavings. In many instances it was impossible to build the houses with the allowance provided. The Commission was advised that the cost varied from 650 roubles for the smaller, perhaps inadequate houses, to over 1,500 roubles for those of the heavier construction, with average costs of approximately 1,200 roubles out of an average of 2,000 roubles advanced to a settler's family. The large amount of labor and material used in the construction of the houses offers an inviting opportunity of study to secure greater economy. From the standing trees in the forest to the completed house, the equivalent of the entire time of one man for a year has in some instances been required.

The production of standardized material at a central point to which the logs could be delivered cheaply would appear to be one of the first steps in bringing about economy. If the half-log type of house should prove to be satisfactory it would be possible to saw such logs to standard uniform widths, match the edges with a tongue and groove to secure a water tight joint, and dress the inside surface with power machinery. This standard material could be easily delivered and built into walls by using a simple corner lock with a great reduction of labor. The splitting of the logs would greatly reduce the amount of material required.

The production of standard sash, doors, and frames at a properly equipped mill would not only greatly reduce the labor but hasten the construction of houses.

The Commission is well aware that the houses now being constructed represent a type known by experience to be adapted to the climatic conditions of the country. The departure from a type of construction with which the local tradesmen are familiar is fraught with some difficulties and problems of

adjustment, but it would appear that a frame construction with inner and outer walls nailed to vertical studding and with the hollow walls so formed stuffed with cheap insulating, would well be worth investigation and trial. The transportation of boards from a saw mill is easily carried out, the amount of material used would be greatly reduced, and the labor and time of construction reduced to a fraction of the amount used in hewed log houses. Saw dust, sphagnum moss, or even straw could be used to stuff the walls. Building paper to make the walls air tight would be desirable. The fact that such a house has been built and is giving apparent satisfaction encourages the Commission to suggest its trial. Milled roofing boards or shingles would likewise make a saving in labor.

While it is realized that it will not be practicable to increase in any considerable way the cost of the houses for the colonists it is believed that some additional furniture of simple design and small cost would greatly add to the comfort of the colonists. The addition of partitions to provide segregation and hominess would seem to be justified. Screened doors and windows are almost as essential for sanitary reasons and to exclude the mosquitoes.

The masonry stove seems to be well established in the country. A box stove with sides of iron, all of which become heating surface, would in the judgment of the Commission be worth a trial in spite of the fact it is realized that such a stove does not have so great a capacity for storing heat.

SANITATION

Where large groups are gathered in camps or in newly made villages, a grave responsibility falls upon those in charge to enforce the sanitary regulations necessary to protect the health of those concerned. Experience has fully demonstrated that due to carelessness or ignorance of those gathered together the necessary sanitation precautions will not be taken and

regulation of conditions must be imposed from administrative sources.

With the modern knowledge of how diseases, especially those of the digestive tract, are spread by flies, the exposure of human excreta to these insects which have ready access to nearby kitchens and mess halls cannot be too severely condemned. Double protection should be provided. The latrines should be so constructed that all excreta shall be inclosed with provision for cleaning and lime or dust used to dry the night soil. The rooms used for preparing and serving food should in turn be protected from flies by screens.

As far as practicable the breeding of flies should be prevented. It is realized, however, that it is a very difficult matter to accomplish this in rural sections. In modern cities, with control of the storage of manure and garbage, the breeding of flies has been almost eliminated.

The new wells in the colonies were well protected from surface water by grading, but this was not the case in some of the older settlements.

SPECIAL DIFFICULTIES

All pioneering is associated with some difficulties and obstacles to overcome. People who move from warm climate into cold have a special grievance against cold winters. Likewise those who move from cooler climates into hotter ones complain at the hot summers.

It is necessary for those making a change in localities with a different climate to provide themselves with the essentials of comfort in the way of housing and clothing. With these provisions the effect of the change may be largely overcome.

It must be borne in mind that Biro-Bidjan in common with all new countries has some difficulties probably not encountered in all of the places from which settlers come. One

of these difficulties which has received prominence is the presence of mosquitoes and other troublesome insects which abound throughout the Far East as they do in all countries having a high summer rainfall which provides an abundance of moisture and luxuriant vegetation during the period when these insects breed.

The Commission has personal information on the presence of mosquitoes, gnats, and various kinds of flies which trouble men and livestock. However, it found here nothing that has not previously been encountered in many other places and, while the settlers must reckon with these pests, drainage and cultivation of the land will lessen them and their attacks can be minimized by the use of screens on the houses and other methods of protection.

SUMMARY AND RECOMMENDATIONS

During the course of its studies the Commission has been impressed by the earnestness and diligence of all officials and departments of the Government of the Soviet Union in connection with the colonization of Biro-Bidjan. Wherever it has gone it has been shown the greatest consideration and given every facility for conducting a thorough and impartial investigation of the natural conditions and resources of the land.

Growing out of its study of the physical situation the Commission makes the following specific suggestions:

1.—DRAINAGE.—The Commission recognizes drainage as the most fundamental requirement for successful agriculture in Biro-Bidjan. This problem should be attacked in a systematic and aggressive manner with adequate plans covering large areas. Detailed suggestions are given in the text of the report.

2.—TRANSPORTATION AND COMMUNICATION.—In common with all pioneer countries Biro-Bidjan is very deficient in

transportation facilities in the way of roads and other means of transportation and communication. The making of roads should be done in a modern way largely from materials near at hand. The surface soil which is high in humus should be removed whenever practicable before the better road material is put in place. Side drainage, proper surface contour, and constant dragging are suggested as the best means of providing good earth roads.

It would be highly desirable for each settlement to have telephone communication with a central office.

3.—LAND CLEARING.—The clearing of stump or forest land for cultivation involves much hand labor owing to the wide variety of conditions encountered, but it would appear to the Commission that some of the heavy tractors could well be used in removing and piling the heavier stumps. The use of a special land clearing plow for the first breaking would not only reduce the amount of hand labor required for grubbing out the roots of the smaller trees but would greatly reduce the breakage of the standard plows when used for breaking such land. Often in clearing land covered with standard trees the stumps can be more easily removed with the trees by cutting off the brace roots and pulling the trees over with tractors, and such practice is recommended for trial.

4.—HOUSING.—The large amount of labor and materials used in the construction of the houses built for and by the colonists in Biro-Bidjan offers a particularly inviting field for the introduction of more economical methods and types of buildings. The following three suggestions are offered with the knowledge that wood-sawing and milling equipment has been arranged for and will be available in the immediate future.

a) Material for the half-log, or split-log, type of construction now used to some extent, could be milled at some central point and delivered and built into houses with a great saving of time. By milling the logs to uniform widths and

using a simplified corner lock the logs could be placed with little labor. The edges of the wall logs could be milled with a tongue and groove insuring a water tight wall and the inner surfaces planed to provide a smooth surface if the walls are not to be plastered.

(b) Standard sash, doors, and window and door frames should be milled at a central point and transported to the colonies. With proper equipment the labor required to produce such mill work can be reduced to a small fraction of that required for hand production and at the same time the quality of the product greatly improved. The use of milled lumber with planed and matched edges will greatly improve the quality of the houses, particularly the floors and ceilings. Roofing boards or shingles can be milled and put in place with a great saving of labor.

(c) Because walls made of studding and boards can be built of much less material and with a great saving of labor, the Commission recommends that experiments be conducted in the use of such construction for houses. The walls may be insulated with cheap and effective materials such as sawdust, shavings, or even Sphagnum moss or straw to give the necessary protection against the rigorous climate.

(d) The plan of the colonist's house should be studied with a view of introducing additional comfort, sanitation, and hominess. While it is fully realized that there are definite limitations to the expenditure for homes, certain auxiliaries become almost essentials when viewed from the standpoint of the main objectives sought in colonization. For this reason the Commission recommends screens for doors and windows, partition walls for segregation, more simple inexpensive furniture, and additional well protected, easily cleaned toilets.

(e) At the present time almost the entire emphasis is being placed upon the house for the colonists. If the colonist is to succeed, attention must be given to the housing of such animals, poultry, and equipment as he may be expected to have.

5.—SANITATION.—The handling of groups of people like prospective and newly accepted colonists in camps involves a grave responsibility upon those in charge to safeguard the health of all concerned. Experience has fully demonstrated that a certain amount of regulation of sanitary conditions must be imposed from executive sources. With the present knowledge of the transmission of diseases, particularly those of the digestive tract, the exposure of human excreta to flies which have free access to the kitchens and dining rooms is inexcusable. Food and water must be carefully protected from contamination. Sleeping quarters must be arranged to provide frequent and thorough disinfection.

It is recommended that regulation and inspection of sanitary conditions be placed in the hands of agencies directly responsible to the executive management and clothed with authority necessary to enforce sanitary measures effectively and quickly.

6.—MANUFACTURE.—The development of manufacturing in Biro-Bidjan must be based upon the available natural supply of raw materials and such raw materials as may be produced in the agricultural industry. The raw materials immediately available are forest products and it appears that the first development in manufacturing should be mill work. Some equipment for such a factory will be immediately available. There is an urgent need for mill work in the colonies, and manufactured mill work and furniture could doubtless be disposed of in large quantities throughout the Far East. Such an industry could be used to supply work to agricultural laborers during the winter and other periods when it is not possible to work on the land.

The manufacture of products from forest materials should be investigated and carried out as far as practicable, among which may be suggested tar, charcoal, and other products of distillation.

The production of lime for plaster and other uses could well be considered in those sections where limestone or marble

are found in close proximity to wood or any other available fuel.

With the development of agriculture many related industries will be needed and should be planned. Among these may be mentioned (a) dairy manufacturing of butter and cheese; (b) milling of wheat and rice; and (c) manufacturing of soy bean products, oil from sunflower seed, linseed cake and fibre products from flax.

7.—MACHINERY.—It is very much desired by the Commission to emphasize that machinery as such does not supply a solution to any problem of production. Although of vital importance, machinery as a means of applying power to productive operations is only effective when properly related to an engineered, or scientifically managed program of production.

It is recommended that in the selection of machinery the following principles be adhered to:

(a) That those machines be selected that are best adapted to the kind and amount of work to be accomplished. In other words, let the work be the objective rather than the machine.

(b) That there be a complete correlation between the power plant and the driven machines for every operation of the crop cycle under consideration. For instance, a tractor that may be used advantageously for plowing may not be the best if not suitable for seeding and harvesting.

In general, the practice of using machines jointly for the training of tractor operators and mechanics and for productive operations has not been successful. Although it would appear that the training of tractorists has been carried out with considerable success, the general condition of the equipment indicates that it has suffered from the miscellaneous use. Stated in another way, the success of intricate and expensive machinery depends upon its care by highly trained and experienced mechanics. On the other hand, the training of tractorists can

be equally successful by having machines set aside especially for instruction.

It should be recognized that certain equipment, especially tractors, may be used to advantage for other purposes in addition to agricultural work, thus extending the annual service and calling for a correlation of the requirements of each kind of work. Field work, logging, hauling, and road construction may all be considered in selecting heavy tractors.

8.—CROPS.—There is no lack of garden crops that can be grown to furnish the settlers with what vegetables they need but many settlers fail to take advantage of the situation and are without good gardens. The Commission is impressed by the fact that crops which can be sold outside of the settlements in commercial quantities have not yet been produced. It is believed that such commercial production should be undertaken as soon as possible.

The wet weather at harvest time interferes with extensive wheat production but probably sufficient grain can be raised for local needs. The Commission recommends that next year a program of wheat production be carried out that will care for the broad requirements of all the settlers. Oats which mature later are more successful. Buckwheat grows well but the demand for it is not great.

Root crops and potatoes thrive, but only local demands can be depended on for market.

Legumes such as peas, beans, and soy beans do well and will probably develop into important crops. It seems to the Commission that soy beans is one of the most promising crops for the entire district.

Rice gives promise of being a very important crop where proper irrigation facilities can be found, and the upland variety will doubtless find a place where irrigation water is not available.

Special attention is called to the need for more pasture and forage crops to form a basis of a livestock industry.

9.—LIVESTOCK.—The Commission is of the opinion that the successful colonization of Biro-Bidjan will be greatly aided by an increase of livestock production. Dairy cows, beef cattle, sheep, hogs, and poultry should all be developed as rapidly as possible in order that crops which cannot be hauled long distances may through them be converted into more concentrated and marketable products. The dietary of the settlers is also much enriched by livestock.

Bees have already shown themselves to be highly profitable in the region and honey production is capable of great expansion.

ORGANIZATION

The tremendous advantage of centralized management in securing efficiency in the conduct of large business and industrial enterprises has been repeatedly demonstrated during recent years. In one sense colonization might be considered as a mammoth business enterprise. Indeed it is one of the most difficult undertakings that can be imagined, since it involves not only the transaction of all of the ordinary types of business but also the dealing with a great variety of individuals in something that is absolutely vital to them—the establishing of homes and the developing of means of earning a livelihood.

The problem is complicated by the fact that a number of agencies in addition to the settler are involved in the work. All of these must be protected in their respective spheres and the rights of none can be neglected. The attempt to do this frequently leads to so much complexity of organization that the efficiency of the work is greatly impaired and frequently dissatisfaction results.

In order to promote efficiency on the one hand and to protect all parties concerned on the other, the Commission believes that the best results would be accomplished by placing the colonization of Biro-Bidjan under a centralized management which would in turn be responsible directly to the Government and such other agencies as it would enlist to assist in the work of colonization.

STEPS IN SETTLEMENT

As a result of its studies of the conditions in Biro-Bidjan and the human material involved in colonization, the Commission makes the following suggestions regarding steps in settlement:

1.—That the management of colonization as suggested above makes the general plans for the colonization of Biro-Bidjan and for the individual colonies and carry out the details of colonization.

2.—That before land is set aside for settlement a thorough investigation should be made of the soil, the water supply, the possibility of flooding, ease of clearing, practicability of drainage, and such other physical features as may determine the success or failure of a colony. Too hasty settlement on a tract not suited to agriculture may cause very great suffering to those who are settled there and great waste on the part of the colonizing agency. Accessibility and concentration must also be given special consideration.

3.—That the colonization management carry on preliminary work of clearing and draining land, building houses, making roads, and actually farming and that as far as practicable the prospective settlers who are in a stage of probation and training be used as workers. As fast as these workers demonstrate that they have the necessary experience and skill they be assigned the farms that have been developed in a preliminary way.

4.—That individuals without previous farming experience should not be settled on farms which they manage until after they have served as workers on the land long enough to acquire the necessary farm experience. The time they should

serve as workers to determine fitness and provide training will vary with the individual, but in most cases it should be at least one crop season.

5.—That the greatest care should be used in selecting prospective settlers so that only those likely to succeed will be transported the great distance to Biro-Bidjan.

6.—That funds sufficient for transportation be given as a loan to be paid back from the wages received as a worker and that no further credit be extended till after the period of probation and training is over and the individual is given a definite land assignment, and he becomes a bonafide settler.

7.—That at the time the settler is assigned to his land and provided with necessary equipment, a statement of cost to date which he is to assume, be given to him and that additional credit be extended to enable him to begin definite production.

8.—That after the settler takes responsibility for his farm, he be given regular supervisory service in farming from a farm specialist.

9.—That the plan of colonization should be so extended that some individuals other than those who expect to be farmers shall be aided in colonizing in Biro-Bidjan. In the settlements builders and skilled tradesmen of various kinds are needed to carry on the activities of the communities. It is believed that as many of these as are needed in the colonization should be extended credit for travel and for erecting houses in much the same way that is extended to farmers.

COOPERATION

The Commission wishes to emphasize the value of cooperative effort in settling new land. Most of the settlers come largely without the means of carrying on their operations. They do not have the necessary capital to purchase the equipment they need; but if a number unite the equipment which will serve all can be secured by the combined resources of all.

There are many operations on the farm such as plowing and threshing which can be carried on better with large units than with small ones. This points to joint ownership of the large pieces which can serve a number of cooperative owners, or to the custom operation of the large machinery by their owners.

In the matter of pure-bred sires of the various kinds of livestock there is an excellent opportunity for cooperative ownership.

In the purchasing of supplies and equipment and in the marketing of products cooperation has long been known to be effective.

A number of groups in various colonies find it advantageous to carry on all of their operations in a cooperative manner. It may be that this can be extended more generally particularly during the early years of settlement. The Commission believes that cooperation should be encouraged wherever it can be practiced to the advantage of those who cooperate. Doubtless new methods of doing this will be developed from year to year.

THE OUTLOOK

In closing this report the Commission wishes to restate its confidence in the possibilities of Biro-Bidjan and the Russian Far East. It is a vast empire in the making. It has many natural resources which can be made to give great agricultural and industrial wealth to sustain large numbers of homes. There seems to be no reason why this region should not develop into a well-populated area and its settlers into a prosperous people. The Commission states this with a confidence which comes as a result of earnest open-minded investigation.

Of course, in Biro-Bidjan as in all pioneer countries, there are difficult problems to be solved. The physical conditions of this particular area are not exactly like those found anywhere else, and accordingly, they must be given the most careful study so that they can be made to serve the settlers in the best possible manner. The Commission has considered it a duty to draw attention to these difficulties in its report and to emphasize them. At the same time the Commission feels justified in stating that it found no difficulties in Biro-Bidjan which may not be overcome by diligent work and the intelligent application of modern technical organizational methods.

With the country as it is, notwithstanding the difficulties of pioneering conditions, with intelligent and sympathetic guidance, and with the necessary material assistance forthcoming, the prospective Jewish settlers may be expected to turn Biro-Bidjan into a well-developed, thriving country and thus realize the hopes and aspirations connected with the success of the project.

TO A. I. RYKOV
ON THE PROSPECTS OF BIRO-BIDJAN.

*Chairman of the Council of Peoples Commissars
of the Union of Socialist Soviet Republics*

Taking advantage of your kind consent to answer in writing some questions, in which the Commission of the ICOR is interested, we take the privilege of submitting to you the following questions:

1. The investigation of Biro-Bidjan convinced our Expedition that the territory assigned by the Government for the settlement of toiling Jews offers great opportunities both for agricultural and industrial colonizations. Is it the intention of the Government, in connection with the conclusions of the Expedition, to accelerate the rate of colonization of Biro-Bidjan, and to give that colonization a certain industrial slant?

2. Is it the intention of the Government in agreement with the general national policy of the Soviet Power and with a view to the general economic situation of the Jewish masses in the Soviet Union, which situation was kindly described by you during the interview we had with you—to consider the task of settling Biro-Bidjan with Jews as of an urgent nature and include it in the Five-Year Plan?

3. Does not the Government consider it advisable to form a single managing and planning body for Biro-Bidjan; such body to be charged with the task of directing all the economic activities of the region? In the opinion of the Commission, such a body is necessitated by the peculiarities of the region and the tasks connected with the settlement of a virgin land.

4. What would be the prospect from a *national* point of view for the toiling Jews in Biro-Bidjan in case of the successful and rapid colonization of this region? This question is of particularly great interest to the public in general, and the American public in particular.

(Signed) F. S. HARRIS,
Chairman of the Icor Commission.

Moscow,
October, 1929.

Answer by A. I. Rykov

In reply to your questions which you submitted to me in writing in connection with our interview concerning the prospects of settling Biro-Bidjan, I am in a position to inform you that the settlement of Biro-Bidjan is included in the Five-Year Plan, which provides for the settling of 12,000 Jewish families, i.e., 60,000 people in Biro-Bidjan. In addition to this territory there have also been assigned other regions (Crimea) for the toiling Jewish nationality, for which purpose the necessary agricultural lands and funds have been allotted by the state. The aspiration of the Soviet Government to help the poverty stricken Jews to improve their economic condition by furnishing them the opportunity to engage in labor, and particularly in agriculture, induced the Government to make substantial appropriations for such aid. The extension of the plan for the settlement of Biro-Bidjan, inasmuch as it is assured by natural conditions, is certainly desirable. But it is equally necessary to bear in mind that the Government of the U. S. S. R. is at this time deprived of the opportunity to appropriate new additional means for this purpose. Therefore I am unable at this time to make any definite answer to the question as to whether it will prove possible for the Government of the Union to make substantial additional appropriations for that purpose in the future; it will depend entirely upon whether there will be left available funds after the more urgent needs of the state and our economic life have been met.

It is equally hard to say anything definite at this time with regard to the amount of state aid for the development of industry in Biro-Bidjan.

The interests of our economic life as a whole demand that the Government spend its funds in the first place for the development of industry in those regions which, because of their

natural resources as well as because of the available means of communication, present the most favorable conditions. This principle will, of course, be applied to the Biro-Bidjan territory with its rich natural resources.

I think that there will be no objections to the formation of a single body for the purpose of planning the economic life of this district, since the organization of such a Body would help to overcome the difficulties connected with the conquest of this new virgin land.

As to the prospects for the Jewish population to develop their national culture in case of the rapid and successful settlement of Biro-Bidjan, there is no doubt that the fundamental principle of the Soviet regime—liberty of national development for all nationalities of the U. S. S. R.—will be fully applied also to Biro-Bidjan. The safeguarding of the national interests of the Jewish population of Biro-Bidjan has already beforehand been assured by the respective act of the Government.

In general, the national policy of the Soviet Government is such that there are no obstacles whatsoever in the way of creating national autonomous regions, inasmuch as there exist sufficiently realistic reasons for that. Thus we already have tens of Jewish village Soviets; there has already been formed the first Jewish national Raion (County) (Kalinindorf in the Province of Kherson); it has been decided to form two additional Jewish Raions in the Provinces of Rivoy Rog and Zaporozhye—Mariupol).* The question of the formation of an autonomous territory in Biro-Bidjan, therefore, depends entirely on the success of the settlement of this territory by Jews.

(Signed) *Chairman of the Council of Peoples Commissars of the U. S. S. R.*

October 14th, 1929

A. I. RYKOV.

*This decision had already been carried out.—ED.

RESOLUTION

Adopted by the Komzet on the Report of the American Icor Expert Commission for the Study of Biro-Bidjan and Its Colonization

(Adopted at the session of the Komzet held October 1 at Moscow)

- A. The Komzet notes with satisfaction the following basic conclusions of the Icor Expedition:
- a. Biro-Bidjan is fully adapted to large scale colonization work. The soil of the district is fertile. There are large areas of land which, after certain difficulties have been overcome, offer possibilities for the successful cultivation of valuable crops. Similarly the possibilities for intensive stock raising are assured.
 - b. The large quantities of valuable timber in the district have been little used before and they offer the possibility for the development of new industries. The colonization capacity of the district is greatly enhanced by the presence of iron ore, minerals, building materials, etc.
 - c. A number of difficulties are a result of the fact that Biro-Bidjan is virgin country. Here it is necessary to create all that the settlers had found in their former homes: roads, bridges, houses, necessary products, etc. While pointing out the difficulties, the Expedition noted a certain success attained in the work of settling due to the efforts both of the administration and the settlers who are encouraged by the possibilities of the country. At the same time it is also necessary to note the insufficient preparedness and lack of experience on the part of the administration as well as the insufficient care in selecting the settlers, some of whom have admittedly proven unequal to the tasks accompanying the settling of a new primitive land.
- B. On the basis of the valuable suggestions of the Expedition touching upon the questions of the general plan of work

in Biro-Bidjan (particularly the questions of drainage, transportation, land clearing, housing, etc.) and also the suggestions and conclusions on the questions of organization, the Komzet instructs its Secretariat to organize two committees: one on the question of the general plan of work, and the other on the question of organization. These committees are to consider the suggestions of the Expedition in working out these problems, and report on them not later than January 1, 1930.

The Komzet agrees in principle with the view of the Expedition concerning the establishment of a unified centralized management and strict division of labor in directing the operative work. The plan of the work must be well studied and elaborately prepared. The scale of the work should be considerably increased and its rate accelerated. The situation demands the mechanization of the work processes and the organization of the labor of the settlers in collective units from the beginning.