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Family *Papilionidae:*
Papilio demoleus, Linn.
Papilio polytes, Linn.
Papilio polymnestor, Cram.
Family *Lycaenidae:*
Chilades laius, Cram.
Family *Oecophoridae:*
Tonica zizyphi, St.
Family *Phyllocnistidae:*
Phyllocnistis citrella, Stn.
Family *Psychidae.*
Family *Arbelidae.*

ORDER COLEOPTERA

Family *Melolonthidae:*
Aserica nilgirensis, Shp.
Family *Curculionidae:*
Myllocerus evasus, Mshl.
Myllocerus dentifer, F.
Amblyrrhinus poricollis, Boh.

ORDER HYMENOPTERA

Family *Formicidae.*
Oecophylla smaragdina, Fb.

ORDER RHYNCHOTA

Family *Coreidae:*
Dasynus antennatus,
Family *Pentatomidae:*
Antestia cruciata, Fb.
Family *Coccidae:*
Aspidiotus aurantii, G.
Pseudococcus corymbatus, Mask.
Family *Aphidae:*
Family *Aleurodidae:*
Aleurocanthus spiniferus, Quaint.

ORDER ACARINA

Species of mites.

AGRICULTURE IN RUSSIA

BY A. MUIR, B. Sc.

Russia is a country of almost immeasurable agricultural possibilities. Its enormous area covers one-sixth of the earth's surface, and its climate ranges from Arctic Siberia in the North to the almost tropical Caucusus in the South. Between these extremes lie the vast forest regions and the great steppe zone, with its large expanse of fertile black soils, ideally suited for crop production. A further variety of climate and soils is found in the mountainous southern regions—the Crimea, the Caucusus and Turkestan.

The revolution in Russia in 1917 brought about an abrupt transition in practically every phase of national activity; in agriculture the complete change over from little more than primitive systems to large scale productions by modern methods presented problems of special difficulty. In order to appreciate the magnitude and the complexity of this task, it is necessary to review very briefly the conditions of work and life on the land prior to the date of the revolution.

Under the primitive conditions obtaining almost up to the time of the revolution, the two main classes in agriculture were the land-owning class and the peasant. Until 1861, the lot of the peasant in Russia was exactly comparable with that of the bondman under the feudal system in Britain. In that year the peasants gained a certain amount of freedom, but the conditions of life and work changed but slightly. Only to a very small extent was the peasant master of his own destiny. The land-owners in some cases were genuinely interested in the welfare of their small tenants and peasants, but the large majority was interested only in the revenue which could be obtained from the land. The peasant had to do a certain amount of work for his master, and he generally managed to farm a small patch which would keep him and his family during the year. In some places, the village owned or rented a large area, which was divided up among the villagers and run on the three or five-field system. Here, the villagers had to pay the rent for the land either in money or in kind, the landlord taking no interest in agriculture.

Until towards the end of last century the landowners as a whole were content to produce only enough to satisfy the internal requirements of the country, and large-scale farming was of very small importance. About that time, however, it began to be realised that the vast tracts of black-earth soils were an enormous asset, since they could be worked for long periods under one crop without showing any signs of falling off in crop yields. Scientific men, notably one Dokuchaiev, turned their attention to the study of this soil and founded what is now known as Soil Science. It was still some time, however, before agriculturists began to make serious use of the results of scientific research, and in the end it fell to a land-owner in the South to form the first experimental farm. This he did on the lines of the Rothamsted Station, as it was begun by Lawes. Others followed this lead, and at the beginning of the present century, we find farming on a larger scale than had formerly been possible.

The improvement in methods of cultivation did not, however, do much to bring about the desired increase in yield owing to the extensive of farming which still prevailed. The average yield per acre in Russia for the period 1901 to 1919 was 1—3/4 qrs. wheat, 2 qrs. barley and 3 tons potatoes. During these ten years there was a slight decrease in that of barley, but on the whole these changes had little effect on the total output. The fluctuations in yield over a period are remarkable. Thus taking the lowest for spring wheat over the period 1883 to 1898 as 100, we find that the highest is 336. Live-stock showed a large decrease during 1900 to 1912, reaching in the case of sheep and goats 27%. Only in the case of horses was there an increase (5·7%).

An explanation of these decreases is found in the amount of land per head of population. The agricultural population increased from about 50 millions in 1860 to 86 millions in 1900, resulting in a corresponding decrease in the amount of land per head of population. This decrease in some cases amounted to about 50%, i. e. from 12 acres per capita to 7 acres. This "land hunger" caused great hardship among the peasants, lowering the amount of stock the small farms were able to carry, and in general lowering the standard of living of the peasants. To alleviate this suffering, the Asiatic Colonisation Bureau was formed. This Bureau sent out expeditions, which made detailed surveys of various districts and contributed greatly to the knowledge of the country. On the basis of this work peasants were transferred to Asiatic Russia and found there a rich and fertile country.

The first revolution of 1905 had brought very few changes in its wake, and the peasants were very ready to follow the lead of the town workers when the great revolution of 1917 took place. Having thrown off his yoke of servility, the peasant simply carried on his farming in the old way. None of them was rich

enough to purchase the new machinery, and that which belonged to the rich land-owners was often destroyed, and in any case there was not enough to go round. The problem which confronted the new government was how to apply the Marxian theory of economics to such a great problem. Lenin summed up the position in t'e following words: "To live the old way, to live as people lived before the revolution is impossible, and such an expenditure of human strength and means as is connected with peasant farming can no longer continue. The productivity of human labour would be doubled and trebled if the transition from these scattered farms of small size to socialised farming could be made.

The socialization of agriculture has proceeded along two lines—the formation of state farms (*sov'hozes*), and of collective farms (*kol'hozes*). Farms of both types were formed immediately after the revolution, but these did not become factors of any importance until recently. From 1921—27 there was a large decrease in the number of the most highly collectivised farms, due simply to over-eagerness on the part of those sent out to organise them. Those chosen were no doubt good communists but bad psychologists, as was shown by their failure to find the proper approach to the humble but suspicious peasant. Many of the brigadiers, as they were called, had absolutely no knowledge of practical farming.

The "*sovhoz*" is run by some trust which is directly responsible to the Central Government. Each farm has a manager, mechanics, labourers, etc., who are simply paid servants of the State, and are in no way affected by the success or failure of the crops. These farms, which in some cases have reached a colossal size, e.g., the Giant in the North Caucusus, which has an area of 450,000 acres, are the basis of present day agriculture in Russia and towards this form all others tend. In the collectivised sector there exists three types of farms. The first and most primitive is simply an association for the joint tillage of the soil. The products of the land are divided up at the end of the year according to the amount of land owned by each family. This is only the first step towards further collectivisation, of which the "*artel*" represents the second. Here we have almost complete collectivisation, each family being left only one cow and their hens for personal use. In the final stage of collectivisation—the commune—everything is collectivised, except, of course, personal belongings. This state of affairs is found but rarely, the peasants being encouraged to increase the productivity of the land rather than bother about communal houses. The collective farms are run by a committee elected by the villagers, and sometimes, if the village is small, all the villagers may take parts in the work. A president and secretary are chosen by the committee, and they together act as the executive body. An agronomist is generally to be found in each village, but if the district is sparsely populated, one agronomist has to suffice for the whole district. Attached to many of the farms are tractor stations, which are assuming greater importance as the production of tractors increases. The Stalingrad factory was recently producing about 110 tractors per day and the Leningrad factory about 90. The chief difficulty found in the use of tractors is the lack of spare parts, and it is not uncommon to find most of the tractors in one station laid up owing to some minor trouble. The peasants have on the whole taken fairly well to the mechanisation of agriculture, and are ready and willing to learn the handling of the various modern machines which are now at their disposal. The working day is generally one of ten hours, but weather conditions and other factors outside the peasants' control may necessitate much longer hours sometimes. Lateness in the delivery of seed, an increase in the sowing area and mechanical break-downs in machinery are common causes of delay, giving rise to the necessity for extra work. During the sowing and harvesting season it is not uncommon to find a night-shift being worked with the aid of head-lights. The area sowed must be increased every year, and every district is required to furnish a detailed programme for each

financial year. When the total production falls short of the requirements of the plan, the area is increased very often without any regard to the capabilities of the peasants and the conditions under which they work. This is generally responsible for many of the poor crops very often produced by the collective farms. When the harvest is brought in, the government takes a pre-arranged portion at a fixed price. The remainder is divided among the members of the farm. In some cases, the whole of the produce is sold and the money received divided up according to the amount of work done. A strict record of the work performed by each member of the farm is kept, and it is according to this record that the final division is made. Quality counts just as much as quantity. The contract system has been applied in certain cases in order to ensure that there would be sufficient supplies available to the government for State marketing. This system also ensures the peasant a higher standard of living than he would otherwise obtain. More up-to-date machinery and implements are granted to those farms contracting, and the transition to collective farming is thus rendered easier. Some idea of the proportion of crops contracted for, in relation to total area sown, is given in the following table :—

Crops.		1928 per cent.	1929 per cent.	1930 per cent.
Summer corn	...	4·3	25·0	30·0
Winter corn	...	14·7	32·7	...
Cotton	...	100·0	100·0	100·0
Flax Fibre	...	20·5	36·8	37·9
Sugar beet	...	100·0	100·0	100·0
Tobacco	...	66·3	74·9	100·0

This system is being applied more generally each year, and production by this method will eventually reach 100 per cent. for every crop. Recently new regulations have been introduced to allow the peasants to retain a larger proportion of this products than formerly, but these will not affect the contracting system.

The status of women on these farms is the same as that of the men. They enjoy as much freedom and their work counts equally. In most villages, creches have been established where the children are well looked after by a trained teacher or nurse, while their mothers are at work in the fields. When the children reach the age of seven, they must attend school. At that age, most of them have learned to read, write and count, and they continue at school until they are fifteen. Under the old system it was very difficult for a peasant to proceed to the University, but that is now changed, and while the student is attending classes, he receives a grant which enables him to live without depending on his parents for everything.

In most farms, as in factories the peasents form themselves into "*Shock brigades*", and these vie with one another in producing the best results from their labours. These "*Shock brigades*" generally set themselves a definite piece of work and then strive to get it done as quickly and efficiently as possible. Their rewards are more spiritual than material. If a brigade is highly successful in its work, it may gain a Red Banner, which is a much coveted award. Individual members may be awarded the Order of Lenin, but this is given only after long service with the party. Sometimes members of the "Shock Brigades" receive gifts in kind, and the writer was present at a distribution of such awards when these included an overcoat, a pair of boots, a primus stove, a samovar and so on.

An interesting series of figures was given by Jakovlev in 1931 for the distribution of collective farms in relation to three of the main regions of the country.

Percentage of collectivised farmers to Total Number of peasents.

Region.	1928 per cent.	1929 per cent.	1930 per cent.
North Caucusus, Lower and Middle Volga and the Ukrainean Steppes.	3·5	7·4	48·8
The rest of grain producing areas.	1·6	4·0	25·5
The consuming regions	0·5	1·5	8·5

The figures for 1931 show still further increases. The explanation of the large difference is easy to find. The peasants in the vicinity of large towns find it more profitable to remain outside the collective sector and to sell their produce in the open markets in these towns. In the other regions they have not the same facilities, and therefore it is much easier to get them to collectivise. Of course, the first and second regions being the chief grain regions, the government paid special attention to the collectivisation of these districts. There is difficulty in forming large farms in the north owing to the occurrance of great tracts of forest and peat bogs. Very little attempt is made to cultivate the peat, but it is largely used as fuel, since in the north, especially in the Leningrad region, there are no coal deposits of any importance. To compensate for the lack of coal, however, the north has very extensive mineral phosphate deposits, which are used to supply the large phosphate deficiency found in all the northern soils. The main crops in the north are flax, oats and rye. Attempts are now being made to concentrate around the large towns market gardens, which up to the present have been scattered over a fairly large area.

The transition to modern farming methods has thus been going on with varying degrees of success since 1917. During the period of civil war the area under crop decreased by about 20 per cent and did not reach the pre-war level again until 1925. During the last few years, however, the grain output of the country has increased enormously, as can be seen from the following figures. Two sets are given, one for the collective farms and one for State farms.

Year	State Farms.	Collective Farms.
1927 ...	...	2·0 mill. cwt.
1928	6·4 mill. cwt.	3·6 ,,
1929	7·9 ,,	12·7 ,,
1930	18·0 ,,	82·0 ,,

Figures for 1931 are not available, but the increase in production certainly would be continued, as a much larger area was under crop. The expected yield would not, however, be obtained owing to the fact that weather conditions were most unfavourable to cereals during the whole growing season.

To conclude this brief account of agricultural conditions in Russia, a few notes on agricultural science may be added. Agricultural science in Russia may be said to date from the 18th century, but in most branches the contributions of Russian scientists were very meagre until the 19th century. During that century the possibilities of expansion in the agricultural markets gave science the necessary impetus, and towards the end of the century we find the Russian scientific men coming into their own. The study of the soil as a natural body was the chief contribution from Russia. In 1883 Dokuchaiev issued his monumental work on the Russian Black Earth, and the principles which he laid down in that work have become the foundation stones of the modern study of the soil. The practical aspects of the problem were not ignored, but the Russians felt that a thorough study of the actual processes of soil formation would give in the end a more complete picture of the conditions obtaining in the soil and hence a surer basis for rearing the structure of applied soil science or agronomy, as it is now known.

Dokuchaiev had many illustrious pupils, and these in turn carried on the task of making a complete study of the soils of their vast country. Small-scale maps of both the European and Asiatic parts of Russia have been issued, and an attempt is now being made to cover every important part of the country on the scale of 1 inch to the mile. These soil surveys are made the basis of any agricultural expansion and for the introduction of new crops. In other branches of agricultural science, the achievements of the Russian scientists have not been so marked. Since the revolution, the net-work of agricultural experiment stations has been brought into better co-ordination, and all problems are investigated on a co-operative basis. Thus, instead of each station working away independently on its own region, the problems cropping up in that region are attacked by a number of institutes, and thus the final results are far more valuable than if each had pursued a line of work regardless of others. This co-operation is seen in the so-called "complex" expeditions which are sent out by the Academy of Sciences. We may take as an example the expedition sent out to investigate the Salt Lakes of Siberia. It was well-known that the salt content of the lakes was high and that it would prove profitable to work them. However a difficulty at once arose from the fact that in the neighbourhood the soils were so impregnated with salt that cultivation was impossible. Thus to investigate the region properly, there were needed: geologists to study the salt deposits and other rocks in the vicinity; botanists to study the present flora: soil scientists to study the soil and advise on the proper methods for bringing it into a state fit for cultivation; lastly, chemists, to study the methods for extracting the salt. The expedition will return again this year for more detailed study of the region.

Time alone will show how this great experiment is going to work out. Many of the difficulties often appear insuperable, but by whole-hearted co-operation they may be overcome. The general backwardness of the agricultural population has been one of the controlling factors, but by raising the cultural level of the people a higher efficiency should be attained. The people on the whole are in sympathy with the new system, and that means a great deal. A rigorous application of Marxian principles to agriculture has proved impossible, but suitable modifications would appear to have been of great value in ordering the life and work of that vast country :— *Scottish Journal of Agriculture, October, 1932.*

Notes and Comments

(1) **The Mannargudi Agricultural Colony.** We cannot sufficiently congratulate the movers of this laudable scheme of establishing an Agricultural colony for the uplift of the rural population—especially at a time when the agriculturist is in need of some real stimulus in this direction. The scheme appears to be to open an Agricultural colony and to impart practical instructions in the different aspects of agriculture to the population and in this way to educate the agriculturists especially of the surrounding area and carry on rural reconstruction work. The Government also have shown their appreciation of this idea by granting a site of about 200 acres of land near Vadavun about nine miles from Mannargudi, Tanjore District. The prime mover of the whole movement is Rao Saheb S. V. Kanakasabhai Pillai, retired P. W. D. Assistant Engineer. Even while in service Mr. Pillai was carrying on silent and unostentatious work in this direction. He