

MODERN RUSSIA

THE LAND OF PLANNING

By

LOUIS SEGAL, M.A., Ph.D.

Author of

The Soviet Union in Reconstruction

The Soviet Union Year Book

etc.

"To me this is not only the book of the month, but the book of the year."

SIDNEY R. CAMPION in *The Millgate Monthly*.

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MODERN RUSSIA

WORLD TRADE CONSIDERATIONS

Everyone is now greatly concerned for a successful solution of the world's economic problems, and all countries are seeking for a plan to revitalise international trade.

The planning system described in this book, although designed in particular to meet the needs of modern Russia, has a number of points of contact which are applicable to all countries.

It is only by international co-operation and goodwill that a revival of world prosperity can be achieved, and this book "Modern Russia" should prove a useful contribution on such a vital subject.

9740

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PLANNING FOR :

FINANCE AND BANKING

TOWNS AND HOUSING

AGRICULTURE AND INDUSTRY

RAILWAYS AND TRANSPORT

EDUCATION AND HEALTH

LABOUR AND TRADE UNIONS

SCIENTIFIC AND TECHNICAL RESEARCH

LOCAL GOVERNMENT AND SOCIAL SERVICES

FOREWORD

THE author of this work is well known as a conscientious and reliable authority on Soviet economics, and I can confidently recommend a perusal of the results of his labours, feeling assured that the reader will be well repaid.

There have been many books on Russia during recent years, some of them written with the object of attacking the political structure of the Soviet Union and others overstating the results obtained. The outstanding feature of this book is that an attempt has been made to analyse the economic developments achieved and to explain how this has been done under conditions where political expediency and necessity have over-ridden the application of normal economic principles which generally apply in other countries in respect of industrial and utility developments.

Of all the assets of the Soviet Government perhaps it is its influence on the youth of the country that is the most remarkable. The revolution is now fifteen years old. There are approximately 27,000,000 persons up to the age of 25 years who have known nothing of Russia excepting under the Soviet. They have had absolutely no contact with the bourgeois world, the oldest of them having but dim memories of pre-revolution Russia.

The majority of Russian youth is convinced that the Soviet Union, though possibly far from what they themselves might have expected it already to become, will some day reach a position of being the most progressive nation on earth.

It is the spirit implied by the title of the book—"Modern Russia—The Land of Planning"—and the examination of a vast number of undertakings carried out with a definite psychological and political objective, which the reader is asked more particularly to keep in mind.

HENRY E. METCALF.

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PLANNING AND PROGRESS

THE Soviet Union is at present setting an example of planning and progress which every nation should study carefully.

In this huge territory, extending from the Arctic to Central Asia and from the Pacific to the Baltic, where for centuries the people have groaned under an economic system far behind that of other countries, a new economic unit is being created which staggers the imagination, and will be of epoch-making significance for the rest of the world. That the task is a formidable one every responsible person in Russia fully realises. There is, however, such confidence in the ultimate success of the new system that anyone manifesting the least doubt is looked upon as almost a heretic. The aim of the Soviet Government is twofold. They are working not only to rebuild the economic life of the country, but to do it on an entirely new basis.

The fifteen years which have elapsed since the establishment of the Soviet Government is a short period in the life of a nation, and from it must be subtracted five years of war, civil war, blockade,

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and famine, during which time no economic reconstruction work of any kind could be carried out.

The Three Economic Periods

The economic history of Russia since the revolution can be broadly divided into three periods. The militant communism period which lasted from 1917 to 1921, the new economic policy period from 1921 to 1928, which was the time of the restoration of industry to practically pre-war standards, and the period of economic development, which began in October, 1928, when the Five-Year Plan was introduced, and came to an end in December, 1932, nine months ahead of the scheduled time. It is essential to note these distinct periods in order to understand the progress that has taken place.

The transformation of a primarily agrarian country into one predominantly industrial, was to be attained by means of a wide application of modern technical achievements and the introduction of new methods and principles of planning in national economy. This is indeed proving a formidable task, and the population of the U.S.S.R. are having to live and work intensively to achieve it. They are accomplishing in a few years, and at the cost of great effort and sacrifice, a change which has taken other countries several centuries to bring about. Having attained their objective on the military front, the Soviet next directed all their energy

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to economic problems, which are always spoken of as the economic front.

The need to work according to definite plans is essential, even in the case of small enterprises, and all the more so where a whole State is concerned, in which conflicting interests often have to be adjusted. The establishment of close working relations between the various branches of industry as well as between industry, agriculture, transport, and finance has played an important and significant part in the programme elaborated by the State Planning Commission.

The Plan and the Rest of the World

The plan is of interest in more than one respect. Not only does it represent an attempt to organise production on a scale never before equalled, but it is also of practical interest for the rest of the world; seeing that its realisation will determine to a great extent the progress made in other countries.

Only in 1922, after the introduction of the new economic policy, could Russia resume constructive work. Even the most sanguine optimist did not anticipate at the time a restoration to pre-war standards before the year 1930. However, as a result of remarkable endurance and sustained effort, the principal industries caught up in 1927-28 with pre-war production and the work of reconstruction was then begun.

The effort that was necessary in order to achieve that result will be realised if we consider that in the year

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1921 industrial production had decreased to approximately 20 per cent. and that of agriculture to about 40 per cent. of the pre-war output. The obtaining of coal and oil had practically ceased, and the number of workers engaged in industry had been reduced by 40 per cent.

Before the war Russia was dependent to an enormous extent on the outside world for her supplies of manufactured goods. From August, 1914, onwards until the end of the intervention period, Russia was actually in a state of blockade. This taught her a lesson which she is never likely to forget, as during this time the country was unable to obtain agricultural implements for the cultivation of her soil, medicines and anaesthetics for her sick, or machinery for her decaying factories. While the war was on she accepted this state of affairs as part of the price to be paid, but the continuation of the hardships during the policy of intervention and the sufferings inflicted upon an innocent population have burnt into her soul and the memory of them is still poignantly alive in Russia to-day. If the sacrifices which the people were asked to make for the realisation of the Plan had been many times more severe, the Russians would still have made them in order to free themselves from the menace of a similar blockade in the future.

These sufferings caused the people clearly to realise that every tractor produced, every electrification scheme completed, the winning of coal and oil and

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other raw materials would all bring them nearer to the goal of their determination never again to be in a position where a blockade of this kind could affect them.

Scope of the Plan

The Five-Year Plan of economic development is one of the greatest efforts ever made and by far the biggest industrial revolution ever known in history. Its very conception is impressive and fascinating. To change a backward agricultural State into an advanced industrial one on such a scale and at the same time to transform a capitalist into a socialist economy, are truly gigantic tasks. The realisation of the Plan represents a forward step in the struggle of a Communist State with its ideals of equality and hatred of exploitation, towards lifting the people above themselves and causing them to make sacrifices and to undertake tasks which no hope of immediate gain would move them to face.

In carrying out the Five-Year Plan, Russia endeavoured to jump, as it were, from the eighteenth to the twenty-first century at a single bound. The Plan was so ambitious in scope, so fundamental in its consequences, that it is almost impossible to grasp its full significance or the ultimate influence it is likely to exercise upon the rest of the world.

An intensive propaganda was conducted throughout the Soviet Union, in the Press, in the factories, in the mines and on the farms, for a more enthusiastic devotion to work, and to the objects of the Plan. All the

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methods and devices that could be used to inculcate this spirit of labour and devotion, were assiduously applied.

Russian Workers Awaken

As a result of this appeal, millions of Russian workers discarded their old passive and dreamy attitude and took a more practical and less fatalistic view of their duties and responsibilities. More work and more intensive work was the cry in factory and field. Great schemes of industrial development and agricultural progress were inaugurated and have since been completed, which are destined to transform the country entirely.

The Soviet Government realised early that the only way of utilising the vast resources of the country in the interests of all the people, was by a process of industrialisation. In 1928, when the economic life of Russia again attained the pre-war level, it was felt that the time had come for a vigorous and concerted move forward. The Soviet Union was to be industrialised with the maximum possible speed, but the central aim was to produce only for existing needs, and not for the incentive of profit. National welfare was to be the main preoccupation of the authorities, not the enrichment of individuals, besides which, as already stated, there was the determination to free the country from dependence on the capitalistic nations. Although the Soviet Union, after completing the first Plan, is



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still far from being able to produce all the nation requires of either goods for consumption or for manufacturing equipments; nevertheless, this dependence of the U.S.S.R. on supplies from abroad will become less and less as years go on, until Russia will no longer rely on foreign countries for essentials, but only for the luxuries appertaining to modern civilised life.

THE STATE PLANNING COMMISSION

THE new economic system introduced in the Soviet Union necessitated the establishment of a central organisation to elaborate plans for the development of the country as a whole and to co-ordinate the carrying out of such plans. On February 24, 1921, by a decision of the Council of People's Commissaries, the new organisation came into being under the name of the State Planning Commission of the U.S.S.R. Other Planning Commissions were also established in each of the seven republics which form the Soviet Union, namely, Russia, Ukraine, White Russia, Transcaucasia, Turkmenistan, Uzbekistan and Tadzhikistan.

The State Planning Commission of the U.S.S.R. is under the direct control of the Council of People's Commissaries and the Council for Labour and Defence. The organiser of the Commission was G. M. Krzhizhahovsky, Vice-President of the Academy of Science of the Soviet Union, an eminent scholar, who succeeded in attracting as collaborators some of the most distinguished professors, specialists, economists,

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engineers, and agriculturalists—men with great practical and scientific training and experience.

The Task of the Commission

The chief task of the State Planning Commission is to prepare economic plans for the development of the U.S.S.R. in accordance with the attainments of modern science and corresponding to the needs of the country. This is achieved by the preparation of: (1) A general fifteen year plan; (2) A five-year perspective plan; and (3) An annual plan.

These plans are elaborated with a view to reconstructing the national economy of the Soviet Union on lines of the highest efficiency and for the progressive increase of the productive forces of the country.

The general plan indicates the possible and desirable development within the period named.

The five-year perspective plan provides general directions concerning economic developments within the next five years, it also contains the necessary measures for a rapid industrialisation of the country and the advancement of the cultural level of the population within the framework of the general plan and the economic capacity of the country.

The annual plan contains the necessary directions and instructions for the development of separate branches of national economy, as well as that of each republic and economic district during the year. These annual plans represent a detailed elaborate scheme of the

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corresponding annual section of the Five-Year Plans. In the preparation of the annual plans the results of the past year and the prospects of the coming year are taken into full consideration.

The Chairman of the State Planning Commission directs the work of the whole institution and is assisted by the members of the Presidium. The latter also keep in contact with the research institutions and scientific establishments of the Soviet Union through their corresponding sections and by personal association.

The Structure of the Commission

The work of the State Planning Commission is divided between the following departments :—

The Production Department, whose duty it is to see that the rate of production fixed for industry, agriculture and transport is maintained, to analyse the conditions under which the productive activities of the three principal economic branches are being carried out, and to co-ordinate the work of the various sections with a view to achieving the greatest results at a minimum expenditure of material resources.

The Economic Department, which is mainly responsible for the fulfilment of the programme and for maintaining the necessary balance between expenditure and the process of economic expansion.

The Reconstruction Department, which has the task of reorganising the whole economy of the country on the basis of the new achievements in science and

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technology. Its duty is also to safeguard the carrying out of the policy of industrialisation and rationalisation, and the introduction of electrification. A further activity of this department is to improve the efficiency of the workers by introducing modern methods of operation and organisation,—and, the Department of Labour and Social Culture, which supervises all questions affecting labour conditions and the cultural development of the Soviet Union.

One of the chief functions of the State Planning Commission is to guide the energies and resources of the country so that production shall be greatest where it is most needed. During the first Five-Year Plan it has been laid down that heavy industry, meaning all industries which themselves create further means of production, such as the metallurgical, fuel, machine and electrical industries, shall receive most attention, whereas light industries, which include goods for consumption, food, clothing, footwear, furniture and so on, shall be mainly developed under the second Five-Year Plan.

AGRICULTURE

THE principal difficulty which Soviet Russia had to face in the past was the backward condition of her agriculture, for while State large-scale industry developed at a fast rate, agriculture remained practically at a standstill. During the years preceding the Plan, no supplies were available for export, indeed, stringent economies had to be practised in order to feed the population of the towns without having recourse to the importation of grain. In order to keep the demand within the limits of supply, a system of rationing had to be introduced for a number of foodstuffs. Careful attention was therefore devoted in the first Five-Year Plan to the development of agriculture. This part of the Plan is of special interest as it is a serious attempt to solve a very intricate problem.

In the past Russia has suffered seriously from periodic famines affecting large areas of the country. This is not to be wondered at for the Russian system of agriculture was extremely primitive. Under the Five-Year Plan these ancient methods were swept away, and great industrial farms were built up and supplied with tractors and the latest agricultural machinery and

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implements. It was hoped by this means to minimise and in time gradually to eliminate the recurrence of famine in the Soviet Union.

Redistribution of Land

The agricultural problem which faced Russia at the beginning of the Five-Year Plan was brought about by political factors. The peasants, in their desire to obtain possession of the land, co-operated with the workers during the November revolution in 1917, and in the civil war against the white Russian leaders who favoured the restoration of the soil to the landlords. After the revolution the peasantry took over 270 million acres of land, of which 120 million acres formerly belonged to landlords, monasteries and churches; the remainder being taken over from the rich peasants for redistribution among the poor peasants or obtained from the State and imperial land funds. This redistribution of land caused fundamental changes not only in the economic life of the village, but of the whole country.

Introduction of Modern Methods

Before the war rich peasants controlled 40 per cent. of the total land under cultivation. The changes in the holdings affected more particularly the very rich and the very poor. After the revolution, the number of middle peasants increased and at the same time the very poor peasants practically disappeared.

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Owing to the absence of machinery and cattle, the productivity of labour on the small farm was inevitably insignificant and the Soviet economic authorities came to the conclusion that only a transfer from the small farm system to collective land cultivation was capable of improving the position of the poorer peasants and providing a surplus of marketable grain products for the towns. Hence the decision for a gradual transformation of the private farms into collective enterprises.

The great need was to get rid of the peasant's mediaeval strip husbandry and place him on a collective farm using modern machinery and scientific methods of land cultivation. The small peasant farm had exhausted all possibilities of development and further progress could only be secured by a radical reconstruction of agriculture.

Changed System of Rural Life

While the revolution resulted in almost all industrial activities in the country being transferred to the State, agriculture, for the most part, remained in private hands. But with the introduction of the Five-Year Plan, provision having been made for the reorganisation of agriculture on a collective basis, a complete change took place in the system of rural life. Having started so late the Soviet Union had to do these things in a hurry. Difficulties were experienced because the Government at first was not in a position to supply

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the required machinery, nor to train the peasant to operate it intelligently. However, the results so far have been really remarkable and the Soviet Union bids fair to become in the near future, one of the most advanced agricultural countries in the world.

The use of machinery in agriculture is bound to increase the production of grain in the vast stretches of Russia's fertile land. A great deal depends, however, on the number and quality of the tractors and the supply of technicians to work and repair them.

State Farms

Present-day progress in Soviet agriculture is characterised not only by the increase in the sown area, but by the introduction of State and collective farming and by the extensive use of modern machinery and implements, so that while the area under cultivation is being extended the number of farms is being reduced.

The elaborators of the Five-Year Plan for the development of agriculture laid great stress on the introduction of large State and collective farms. The plan provided for the establishment during the five-year period of 150 large State farms having a total area of 12 million acres, which, however, was considerably exceeded in the first three years of the Plan. At the end of the Plan there were 5,820 State farms. The area under cultivation by State farms in 1932 was estimated at 34.6 million acres and in 1933 46.9 million acres, nearly four times the original estimate.

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The principal State farms for the cultivation of cereals are situated in the following districts : In the Northern Caucasus about 5 million acres ; in Kazakhstan about 5 million acres ; in the Central and Lower Volga areas about 10 million acres ; in the Ukraine 3.7 million acres ; and in Western Siberia approximately 5 million acres.

Training Centres

Tractors, combines, and all the adjuncts of modern large-scale farming were first introduced into the Soviet Union on the State farms, which were established originally to make up the wheat shortage and to act as model training centres. Here the peasant population were to see and learn for themselves the advantages of large-scale mechanised cultivation over their own laborious, antiquated methods. In 1931 the number of combines on the State farms was 6,000 and the tractors totalled 500,000 horse-power. State farms are run on the lines of industrial enterprises, and the workers are employed as wage-earners, in contradistinction to the collective farms, where the workers consist of members of the co-operatives.

The State farms have a large stock of machinery, which is also utilised to assist the collective farms. In 1930 3,707,000 acres of land belonging to the collectives were ploughed and sowed and in 1932 more than 12 million acres.

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Collective Farms

More intensive development is recorded in the organisation of collective farms, than in the State farms.

From the point of view of the future development of agriculture, the collective farm is of interest as it permits of a wide utilisation of agricultural machinery, tractors, fertilisers, the introduction of scientific methods of land cultivation and the employment of agricultural experts.

The collective farms were established by pooling the resources of individual poor and middle peasant farmers, the Soviet authorities and co-operatives providing them with active assistance. The growth in the number of collective farms in the past years was due to a number of causes. The Soviet Government did, of course, everything in its power to encourage the transfer from individualist to collectivist methods of land cultivation. This was done, as we have seen, not only from political, but also from economic considerations.

Rapid Progress of Collectivisation

Collective farms represent groups of individual peasant holdings operated as one farm. In all instances the land is the common property of the peasants concerned, but degrees exist as to the extent of common ownership in the buildings and the other property of the collective, as well as to the manner in which the results of the harvests are divided. The process of collectivisation has made rapid progress in the U.S.S.R.

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in the past few years. While in 1929 only 15.5 per cent. of the total number of peasant holdings were organised on a collective basis, in 1930 it reached 27.5 per cent., and by the end of 1932 it exceeded 60 per cent. of the total number of households. It is of interest to note that the original Five-Year Plan estimated the collectivisation during the whole period of only 20 per cent. of the private holdings. Moreover, in the principal cereal growing areas, from 80 to 90 per cent. of the peasant holdings have already joined collective farms and it is only in the consuming districts, where agriculture does not even satisfy the local needs, that the process of collectivisation has, so far, shown less development.

The area under cultivation by collective farms in the spring of 1932 amounted to more than 200 million acres as against an estimate for that year of 50 million acres. The number of collective farms at the end of 1932 was 211,000. In all 14.5 million peasant households have joined the collectives before the end of the Five-Year Plan, while 9.4 millions have maintained their private holdings.

Though the peasants usually work less intensively on the collective farm than on their private holdings, the crops are larger owing to the better methods employed, and the use of machinery, selected seeds, and fertilisers. Although attached to individual land ownership, peasants living in the proximity of such farms realise the advantages of the system, and go over to collective farming *en masse*.

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Handicaps in the Race for Progress

Great difficulties were met with in the attempt to reorganise farming on a collective basis. Lack of experience and inherent disadvantages due to the low cultural level of the Russian peasants, are making the working and looking after machinery more difficult, and are serious obstacles in the race for progress. Also, the scope of the plans to be carried out in a comparatively short period and the shortage of goods for consumption place severe handicaps on the people. In spite of the initial shortcomings which were unavoidable in the early stages, the collective farms are capable of producing more marketable grain than the private peasant holdings which they replaced. Russia's supply of marketable grain seems, therefore, likely to increase proportionately as collective farming expands.

The extensive introduction of improved seeds, up-to-date machinery, modern methods, fertilisers and so on, has more than doubled the value of the investments during the past two years. The value of agricultural machinery and implements in 1931 constituted 16.7 per cent. of the total basic capital invested in agriculture, while the total value of such machinery had increased by more than 46 per cent. Capital investments in agriculture including livestock, totalled 6,600 million roubles in 1931, as compared with 4,100 million roubles in 1930 and 3,000 million roubles in 1929.

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Claims for the System

The principal cause of this exceptional growth in collectivisation was the superiority of large-scale collective farming which became manifest during the first few years of the organisation of such farms. Collectivisation involved the elimination of boundary strips and the formation of large land areas which enabled a better utilisation of the means of production and machinery. The nationalisation of the land provided the indispensable basis for this transformation of millions of small strips of land into large areas organised as collectives in conformity with the nature of the soil, the technical methods used and the local topography.

A complete transformation in the agricultural system will mark the second Five-Year Plan. With over 60 per cent. of the peasants already organised in collectives at the end of the first Five-Year Plan, and with immense areas under cultivation by State grain farms, and the assistance of machine and tractor stations, it is anticipated that the collectivisation of the principal grain growing regions will be completed in 1933, and that this will apply to the whole of the U.S.S.R. by the end of the second Five-Year Plan.

Attention will be directed to the further mechanisation of agricultural processes through increased production of tractors, combines, complex agricultural machinery of all kinds, motor trucks and so on. The agricultural collectives will also be strengthened by improved organisation of labour. Strong efforts are constantly being

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made to increase crop yields through better agricultural technique, the use of fertilisers, irrigation and other measures against drought.

One of the most important results of the introduction of collective farming is the great improvement in the living conditions of the poor peasants owing to their augmented income. New technical equipment and the steps taken towards the better organisation of labour, have resulted in an increase in the productivity and the income of the collective farmers.

Planning in Agriculture

The development of State and collective farming has converted the Soviet Union into a country of large-scale agriculture. This has considerably increased the importance of planning in agriculture. From its inception every State and collective farm is faced with the task of working according to a plan. It must, by the very nature of things, utilise all its machinery and implements in a rational and efficient manner, in order to bring about an increase in the productivity of labour and a reduction in the production costs.

Agricultural planning is the basis for a rational geographical allocation and specialisation of crops so that everywhere the most profitable crops and the most valuable branches of agriculture, from the social and economic point of view, can be introduced.

Tractor Service Stations

The work of the tractor service stations was of great

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importance for the realisation of the Five-Year Plan. These stations were organised in connection with the existing collective farms in order to utilise the available tractors and agricultural machinery for the cultivation of private peasant farms in exchange for a certain portion of the crop. The first station was established near Odessa, in the Ukraine, early in 1929, and by the end of September of the same year, there were more than a hundred, while at the end of 1932 there were 2,498 machine tractor stations in the Soviet Union. It is anticipated that by the end of the second Five-Year Plan there will be a sufficient number of stations to serve all the collective farms in the country.

Agreements between Stations and Peasants

Agreements are being concluded between the stations and the peasants for cultivating their land. These agreements provide for the establishment of producers' unions or collectives, each comprising a number of villages, whose land is cultivated by the tractor station. When organising these collectives, all boundaries between individual holdings are obliterated to facilitate the working of the tractor column. The agreement also provides for the rotation of crops, and stipulates that all the work in the fields should be done by the peasants themselves without the use of hired labour. The agricultural machinery and tractor service stations undertake to teach the peasants the correct way of using tractors and other modern

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agricultural machinery, and in addition to this to supply them with selected seeds in exchange for their own. For all the services rendered the station receives from 25 to 30 per cent. of the crops. According to the original form of agreement, the collectives were required to sell a proportion of their grain surplus to the State and co-operative buying organisations. They had also to become shareholders in the joint stock machine service companies. The shares were paid on the instalment system, the poorer peasants paying two roubles per hectare annually and the well-to-do three roubles per hectare, while rich peasants could not become members of collectives or unions.

Supply of Agricultural Machinery

Adequate supply of machinery is one of the most important factors in the reconstruction programme for agriculture. The Plan provided for an increase in the amount of agricultural machinery in use from approximately 1,000 million roubles at the beginning of the five years to 3,000 million roubles at the end of the period.

Special attention was devoted to the question of tractors and out of an estimated 180,000, approximately 147,000 were produced during the Plan. Two large tractor factories were opened in Stalingrad and Kharkov, each with an annual output of 50,000 tractors. In addition to this the Putilov works in Leningrad is now engaged in the manufacture of spare parts for tractors and a plant is being erected in

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Chelyabinsk, with an output capacity of 60,000 caterpillar tractors per annum, the largest in the world.

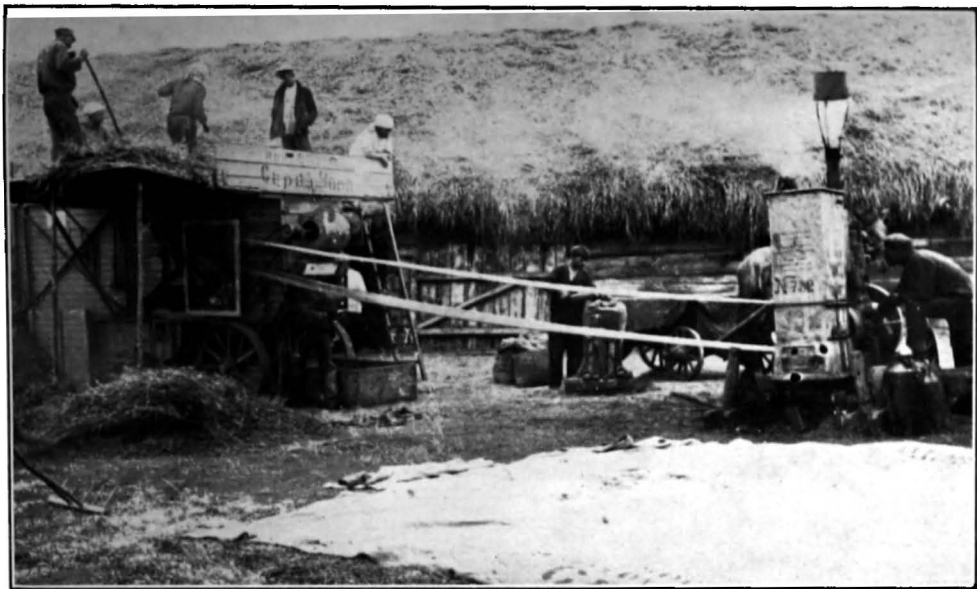
In the first half of 1931 progress in output was unsatisfactory, owing to the slow development in the Stalingrad works. In the early autumn of that year Stalingrad had increased its output to 100 tractors a day and in 1932 the output reached at times 145 per day.

During 1932 the production of tractors in the Soviet Union was 50,250 as compared with 13,400 in 1930, and 4,500 in 1929. The largest number was produced at the Stalingrad, Putilov and Kharkov works, while some 1,036 tractors were manufactured at other plants.

It is of interest to note that the Kharkov works, which has the same productive capacity as the Stalingrad works and was opened sixteen months later, produced more tractors in its third month of operation than the Stalingrad works produced in its tenth month. The Kharkov works not only profited by the initial difficulties at Stalingrad, but had the advantage of starting up with a large contingent of workers trained at the Stalingrad works.

It is now assumed that both Stalingrad and Kharkov will reach full production during 1933, when the Chelyabinsk works will also be put into operation. The estimated output for 1933 for the whole of the U.S.S.R. is 100,000 tractors, or nearly double the production of 1932.

In addition to the home production some 24,000 tractors were imported from the United States in 1931



AGRICULTURAL MACHINERY IN ACTION
Threshing on the Red Star Collective Farm, Central Volga Area

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and several thousands from other countries. Three-quarters of the total export of tractors from the United States during 1931, went to the Soviet Union.

Before the revolution there were less than 500 tractors in the whole of Russia and they were all small type machines, whereas at the end of 1929 there were 35,000 tractors. In the spring of 1930 this figure reached 75,000, and in the autumn of 1932 approximately 147,000, with a total of 2,057,000 horse-power. The demand for tractors has, naturally, followed the advance of the collectivisation movement, as the collective farms are served by the tractor and machine stations scattered throughout the farming districts of the U.S.S.R.

Use of Fertilisers

Chemical fertilisers are gradually being introduced in the U.S.S.R., but their use is still very limited. Nevertheless, in the past four years the increase has been more than tenfold, or in actual figures from 216,000 tons in 1928 to 665,000 tons in 1930, while in 1932 about 2,500,000 tons were used. The discovery of large deposits of apatites in the Kola Peninsula, which are estimated at 375 million tons, has played an important part in the development of the use of fertilisers. Large potash deposits were discovered at Solikamsk and Berezniky, which are particularly valuable to the Soviet Union in view of the fact that about 48 per cent. of their European soil needs potash.

Land Organisation

The Five-Year Plan included a very ambitious programme of land organisation, reclamation, and irrigation work. The total sum allocated for this purpose was 520 million roubles, of which more than half was provided from State resources. As a result of the carrying out of this plan millions of acres of land became available for cultivation. The plan of land organisation was also closely connected with the new programme of road construction and the development of motor transport, which was becoming all the more essential with the introduction of tractors and heavy agricultural machinery.

Extensive irrigation work is being carried out in Central Asia and Transcaucasia in connection with the plan for the development of cotton growing. The total area to be irrigated during the five years was more than four million acres, and this plan has been almost fully carried out. As a result the increase in the area actually under cotton during the period has been very considerable. The aim of the Soviet economic authorities was to increase the production of cotton within the country to approximately two million metric tons in order to eliminate the necessity of importing cotton from abroad. The realisation of this plan released considerable sums for the importation of industrial equipment.

The area under cultivation has been steadily extended during the past four years. In 1928 the total

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area under cultivation amounted to 273.5 million acres; in 1929 it was increased to 297.5 million acres, in 1930 to 315.8 million acres, in 1931 to 341.0 million acres, and in 1932 it was 336.8 million acres. The increase in 1932 over 1928 was therefore 63.3 million acres. It is of interest to note that during the whole of the last decade before the war, the increase in the area under cultivation in Russia amounted to 37 million acres.

The Electrification of Agriculture

Under the first Five-Year Plan only the initial steps were taken to utilise electrical energy in agriculture, which was in the nature of an experiment.

The reorganisation of agriculture on socialised lines with large-scale farms and a high degree of mechanisation provided considerable scope for the extensive development of rural electricity, the importance and effect of which cannot be adequately gauged in the present early stages, but promises a complete revolution of all known agricultural methods.

The most urgent problem was the setting up of electrical stations to serve certain specific areas. At a conference on electricity held in 1932, ten million kilowatt hours were allotted for agricultural purposes during 1933. This energy is to be utilised on State farms and experimental stations. The electrification scheme was begun with the erection of electrical stations for large agricultural units and with supplying electric power from regional and other stations where such a

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course was advantageous. On three State farms electrical apparatus was already in use. In the Northern Caucasus, electrical processes were being applied to a vineyard covering 3,000 hectares and electrical cultivators, sprayers, and other implements were already in use on the "Dzhemet" farm. On the "Industrial" State farm five electrical units had been applied to 2,000 hectares planted with sugar beet; the new combine used there was the first of its kind in the world for beet harvesting. The third station, "Pokroysk," in the German Volga Republic, is having sixteen electrical ploughs, and all labour processes electrified. Ten thousand hectares of grain were sown in this way in the spring of 1932, and by the end of the year it was planned to sow 23,000 hectares.

In addition to these, two experimental stations were under construction in 1932 under the control of the Bureau for the Electrification of Agriculture. One was being erected at Tashkent and will be mainly devoted to cotton growing, ploughing and irrigation, and the other near Moscow on the State farm "Klementievo." On a pig-breeding farm complete electrification of all processes will be introduced, from the mixing and distribution of food to the supplying of water, and a poultry farm will be similarly equipped. The Bureau is also supervising the electrification of the Volga Dairy Institute and the erection of a hydro-electric station on the State farm "Belogorko."

In the Leningrad district four large stock farms have

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been partially electrified and electrical threshing and silo-filling have been used on three State farms. The State Agricultural College at Kolpino, which has 3,000 milch cows has started the electrification of all the milking, distribution and pasteurising processes.

Machinery Suitable for New Methods

In this connection it was necessary to carry on a continuous development of machinery to keep pace with the electrification work. Although the output of agricultural machinery has increased steadily, the process of electrification demands the evolution of new kinds of machinery as well as the replacement and adaptation of old machines. In 1932 the industry was reorganised not only to increase its output, but also for the production of completely new types of machines and motors for use with electric power. Electric ploughing outfits, threshing machines, hay lifters, cranes, cultivators and sprayers are now available. One of the most powerful electric ploughing units was produced by the "Medvedev" plant in Oryol and can plough under the most difficult soil conditions to the depth of one metre ; this machine has a capacity of 35 hectares per day.

Scientific Developments

The second important problem is the utilisation of electrical power in the form of X-rays, high-tension currents and ultra-violet rays. The work of the

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Electrical Research Institute on these subjects is already being used. It has been found that the electrification of the atmosphere by a special apparatus promotes growth and output and resists disease. These recent discoveries in ionisation are being extensively utilised on the farms under the direction of the Electrification Bureau.

A considerable number of small stations, several hundreds in number, have been established in the villages and are utilised for supplying energy to various enterprises engaged in the working up of agricultural produce as well as for lighting purposes. The estimates of the State Planning Commission provided for increasing the number of rural stations to 1,800, but, as the final figures are at present not yet available, it is impossible to say whether this has been achieved. The erection of the village stations was largely financed from local resources.

Cattle Breeding

The question of the development of cattle-breeding was given great prominence in the agricultural section of the Plan, and subsequent events fully proved how justified was the interest devoted to this problem.

As a result of a special effort, important progress has been made in the building up of State livestock farms, which were first established in 1930. The four livestock trusts controlled by the Commissariat for Agriculture had established by the end of 1932 some

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2,000 State farms, each of them sub-divided in several sections. The experience of the first year showed that many of the State livestock farms were much too large for efficient administration, hence the sub-division of the farms into smaller units, of which there were 10,000 by the end of the Five-Year Plan.

The herds of the State farms have grown considerably in the past two years and towards the end of 1932 they numbered some 9,500,000 heads, consisting of 2,500,000 heads of large horned cattle, 1,250,000 pigs and 5,750,000 sheep. The area controlled by the four trusts is approximately 150 million acres.

Dairy Farming

The collective livestock farms were first established on a large scale in 1931, and are chiefly engaged in dairy farming. In less than two years they have accumulated large herds of cattle and have played an important part in augmenting the nation's food supplies. On the other hand this increase has been offset by the considerable reduction in the number of cattle owned by individual peasants. As a result of this, the question of supplying the growing needs of the population in dairy products and meat still remained only partially solved when the first Five-Year Plan came to an end.

INDUSTRY

THOUGH the agrarian revolution which is transforming millions of peasants from individualist into collectivist farmers is of great importance in the development of the Soviet Union, and when finally completed will eliminate one of the most glaring contradictions in the economic system of the country—a contradiction between the socialist town and the capitalist village—the more important development concerns the town not the village, i.e., industry, not agriculture. Indeed, even the agricultural plan could only be realised with the assistance and co-operation of industry. Without an adequate supply of tractors, agricultural machinery and fertilisers, the transfer from individual to collective land cultivation would either be greatly retarded or entirely stopped. Hence the importance that was attached to the carrying out of the industrialisation plan of the Soviet Union

Industrialisation as a Remedy

The need for industrialisation was most acute also for other reasons and enormous sacrifices were required

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and willingly made to achieve it. This struggle for industrialisation is one in which practically the entire population of the country takes part and for which everybody must make some sacrifices and endure some privation. Out of a population of more than 150 million people, only about two-and-a-quarter million were engaged in large industry at the beginning of the Plan, while in Great Britain, for instance, with a population of less than one-third of that of Russia, the number of persons so employed was more than six millions. As a result of this the quantity of goods produced in Russia was considerably less than was required by the nation to satisfy its most pressing needs and the standard of living was consequently low. There was less clothing, furniture, fewer tools and transport facilities, and, in general, a shortage of practically all the goods which are considered essential in modern life. It was fully realised that the Soviet Union would be unable to improve the standard of living of her people until she had reorganised her methods of production, in short, until she had become an industrial State.

The great advantage of the industrial planning, and of the Soviet economic system in general, is that haphazard manufacture has been replaced by organised production. In this respect the most significant part is not the scope of the construction that is going on at the present time, but the methods employed. It is unique in that instead of being a slow, gradual progress

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spread out over, say, a century, the Soviet Union is endeavouring to accomplish it in a few years.

Vast Natural Resources

The Soviet Union is in a fortunate position in many respects for it has all the facilities for industrialising the country. One of the principal factors which is assisting the Government in its great industrialisation effort, is the possession of vast natural resources. Untold riches lie within the boundaries of the U.S.S.R. She has the largest forests in the world and enormous mineral wealth : coal, oil, iron, gold, platinum, non-ferrous metals, all this in abundance. The agricultural possibilities of the country are also extensive. Grain and sugar-beet, cotton and flax, tea and tobacco, in addition to numerous other raw products are only at the beginning of their development.

Some of the new factories and works that have been erected are of outstanding size. For equipment and layout there is nothing to equal them in the world. A number of the best American and German engineers, assisted by several thousand foreign foremen and workers, were employed to erect them, and the most up-to-date machinery from the United States, Great Britain, Germany and other countries has been installed.

The Opening Up of New Industries

The Soviet Union has not only put up new factories, but established new branches of industry entirely

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unknown in pre-war Russia, such as artificial fibre, synthetic rubber, aluminium, new branches of the electrical industry, chemical industry, the production of precision instruments for aircraft, clocks, etc.

The great task of industrialising the country was begun on October 1, 1928, and the results that have been attained in four years are almost incredible. Over 1,500 new factories, works, and electrical stations have been built, and nearly all of them have already started working. Soviet Russia has thus progressed more in four years than Imperial Russia did in forty years. These factories have not been erected at isolated spots, but are scattered over the whole territory of the Soviet Union. All the way from the Kola Peninsula in the north to Central Asia in the south, and from Minsk in the west to Vladivostok and Kamchatka in the east, are districts bearing marks of the great constructive drive.

Shortage of Skilled Workers

The realisation of the Plan has not been without difficulties, and in certain industries, production has fallen short of the estimates of the Plan. The main cause of these shortcomings was the technical backwardness of the country, and the absence of skilled and semi-skilled workers. The result was that semi-skilled men had to be put on skilled jobs, and agricultural labourers had to be entrusted with semi-skilled work. This difficulty was partly overcome by the employment

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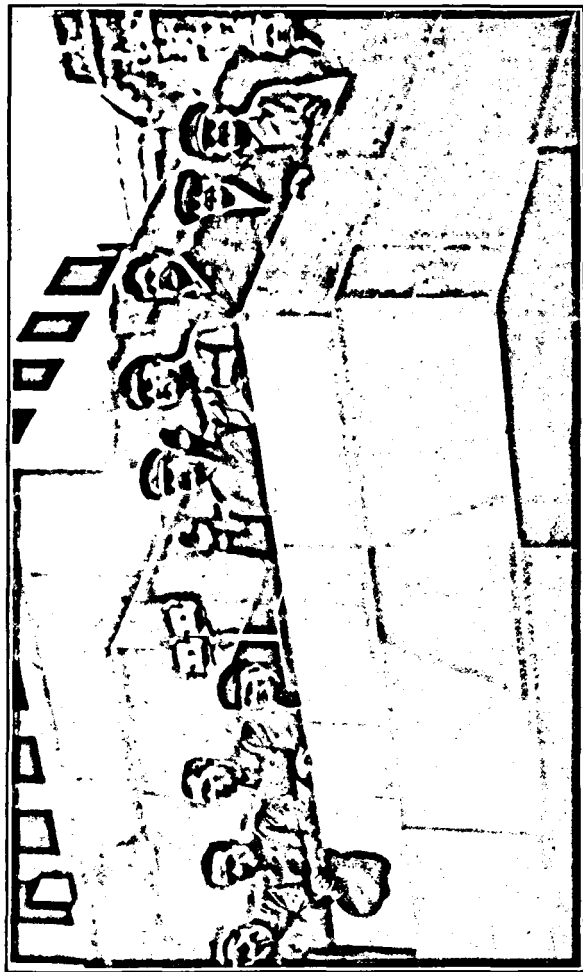
of a number of foreign engineers, and by the setting up of technical classes for the intensive training of skilled and semi-skilled men. Many of the schools were built even before the factories were completed. At the Kharkov tractor works, for example, a school was erected on the spot for preparing the personnel by intensive training, while several hundreds of workers were also being trained for responsible positions at the Stalingrad tractor works. The factory schools have a normal course of two years, and include theoretical instruction in addition to a general practical training in the use of machinery. These schools produced 57,000 graduates with higher education in 1929 and 216,000 in 1932, while the number of graduates from the secondary technical schools in these respective years was 55,000 and 288,000. All students are regarded as workers and are paid a wage during the period of training.

Organisation of Production

Over 80 per cent. of industrial production is controlled by several hundred Union and State trusts. These trusts, like the tea, sugar, or tobacco trusts, may perform all the operations from the growing of tea, beet, or tobacco to the marketing of the finished product, or they may specialise in a given industrial process carried out by a number of factories in a certain geographical area, as, for instance, the textile trusts.



SOVIET LEADERS TAKING THE SALUTE ON THE LENIN MAUSOLEUM, MOSCOW



SOVIET LEADERS TAKING THE SALUTE ON THE LENIN MAUSOLEUM, MOSCOW

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The trusts are controlled as to their general policy, fixed capital, prices and the appointment of managing boards respectively by the Commissariat for Heavy Industry, the Commissariat for Light Industry and the Commissariat for the Timber Industry. Each trust is legally independent and responsible for its own financial obligations. It contracts for its raw materials, arranges for the marketing of its products, borrows from the banks, keeps its own accounts, and registers at the end of the year a profit or loss after allowing for depreciation.

The Strong Helping the Weak

The profits from one trust are utilised by the Government for financing another. Thus an industry need not necessarily suspend or curtail its activities if it is not covering production costs, provided its losses are due to conditions over which it has no control. With the help of this common pool, industry is balanced, the strong helping the weak, until the latter can stand on their own feet. Individual factories within a trust, which consistently show losses, due to uneconomic location or other serious considerations, may be, and are often, closed down. Great care is taken not to subsidise for any length of time enterprises which have no reasonably economic justification for existence. Factories which ought to show profits and do not, usually have a change of administration or experts are

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appointed who have had experience in reorganising uneconomic enterprises.

Reconstruction of the Metallurgical Industry

The realisation of the Five-Year Plan necessitated a rapid expansion of the metallurgical industry, for example, the iron and steel industry, which had never been sufficiently developed, was scheduled to increase output to about three times that of the pre-war period. Since the ratification of the Plan the programme has been modified several times and though the production of iron and steel did not grow at the rate anticipated, the output in 1932 was practically double that of the year preceding the introduction of the Plan. In actual figures the production of pig-iron increased from 3,280,000 tons in 1927-28 to 6,250,000 in 1932, the output of steel from 3,778,000 to 5,800,000 and of rolled metal from 2,788,000 to 4,250,000 tons. Fifteen new blast furnaces were constructed and put in operation during the period, ten of which were completed in 1932.

The Soviet Union is the only country in the world which has increased the productivity of its metallurgical industry during the past three years. As recently as 1931 the Union still occupied the fourth place in the world's production of pig-iron, while in 1932 it reached the first place in Europe and was second only to the United States.

Iron and Steel

A great improvement has also been effected in the

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quality of iron and steel produced. Relying on imports from abroad the U.S.S.R., before the planning period, produced high-grade steel on a very limited scale, the output in 1927 being only 66,000 tons as compared with 500,000 tons in 1932.

The equipment of the iron and steel industry was considerably extended and the number of blast furnaces in operation in 1932 exceeded one hundred. The remarkable achievements under the Plan are not, however, confined to increased production only. Preliminary planning and prospecting work has also been carried out towards the installing and starting up of nineteen new blast furnaces of four million tons capacity, sixteen Siemens-Martin furnaces of 3.4 million tons capacity and eighteen rolling mills.

The major part of the capital investments provided for the metal industry during the Plan has been allocated to the iron and steel industry, which has considerably exceeded the estimated figure.

Most of the new steel mills have been built in the southern part of the country, in the Urals and in Siberia, the areas where this industry is chiefly concentrated.

Magnitogorsk

The Magnitogorsk metallurgical plant which was erected in the southern part of the Urals is the largest of its kind in the world. The ore resources of the Magnet Mountain (Magnitnaya Gora) will be the

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production base of the works. The latest estimates place the reserves of ore at Magnitogorsk at more than 300 million tons with an average iron content of 60 per cent. The annual output at Magnitogorsk based entirely on surface production is estimated at seven million tons of ore, which quantity is to be later increased to 12 million tons per annum. The yearly output of pig-iron when working to full capacity is estimated to be from 2,500,000 to 2,900,000 metric tons.

Coke ovens are built at the works, the coal for which is obtained from the Stalinsk basin in Siberia 2,000 kilometres away.

The Magnitogorsk steel mill was built according to the most advanced technique of engineering. The coke ovens of the plant use the by-product gas of the blast furnaces as fuel, and the gas obtained from coke production in its turn heats a battery of open-hearth furnaces. The rolling mill and electric power plant also come into the gas-heating system. An electric power station which will have an ultimate capacity of 280,000 kilowatts has been installed. The works will have a chemical plant for the production of chemical fertilisers and a number of subsidiary works, including brickyards.

Magnitogorsk is the greatest single enterprise in the world under construction. Though the steel mill was only opened in November, 1931, a dozen large factories, including a wood working plant, fire-brick

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works and concrete works had been functioning at full speed for some time. Amongst the important new constructions is a kilometre-long dam which has created a lake in a once barren valley.

Over the ridge in the next valley, which is at present desert land, will be started other works as large as Magnitogorsk, for the manufacture of steel and of steel products. In Western Siberia the Stalinsk, formerly Kuznetsk, metallurgical works has been practically completed during the operation of the Plan. The first two blast furnaces, each with an output of approximately 1,000 tons per day, were set in operation in 1932 and in the same works the construction of the first rail mill in the U.S.S.R. was also completed and started up in the same year.

Dneprostal

A number of large metallurgical enterprises are being built in the vicinity of the Dnepr hydro-electric station which was officially opened on October 10th, 1932. The steel plant which is referred to as "Dneprostal" will specialise in high-grade steel, including sheets for the automobile industry, structural and tool steel. It will be the most important works in the Soviet Union for the production of high-grade steel. The annual output is estimated at 1,250,000 tons.

This plant is being constructed under American methods of production. There will be three electric furnaces for the manufacture of special steels, all other

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steel being produced by blast furnaces. There are four blast furnaces with a volume of 1,000 cubic metres each and two open-hearth furnace units, one for sheet steel production and the other for special steel. Should two additional furnaces be installed, for which provision is being made, the total annual output can be raised to 1,875,000 tons.

Other Important Plants

The ferro-alloys plant, called the "Dneprosplav," will be the third new ferro-alloys factory in the Soviet Union. The importance of the "Dneprosplav" as a unit in the combine lies not only in the fact that it is a constant user of electric current, but also in its rôle as consumer of surplus power during the peak operations of the hydro-electric station. The cheapness of power on this account will bring about a considerable economy in production.

In Krivoy-Rog, in the Ukraine, the construction was started in 1930 of a steel works to utilise ores with a low iron content. The original estimate was an output of 650,000 tons of pig-iron, 410,000 tons of rolled metal and 214,000 tons of castings, but a later investigation showed the possibility of extending the capacity of the works to 1,300,000 tons of pig-iron and of correspondingly increasing the quantities of the other products. The first two blast furnaces were started in May, 1932, and the other two were put into operation

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before the end of the year. The works are expected to be in full operation in 1934.

The construction of important metallurgical plants was also started under the Five-Year Plan in a number of other districts, including the Petrovsk plant in Eastern Siberia, the Dashkesan works in Transcaucasia, the Bashkir Republic, the Lower Volga Region, Kamenskoye (Ukraine), the Donetz Basin, the Lipetzsk (near Tula), and Sinarsk (Urals). As a result of the construction work that is proceeding in these places the Soviet metallurgical industry is expected to assume by the end of the second Plan in 1937, a leading position in the world, not only in gross output, but in up-to-date machinery and methods.

Non-Ferrous Metals

In the non-ferrous metal industry, a branch in which Russia has always been very backward, a number of large works were put into operation in accordance with the provisions of the Five-Year Plan. The programme for the development of this industry has, however, been subjected to considerable modifications since its adoption with a view to satisfying more adequately the growing demand.

Even as late as 1929 the U.S.S.R. occupied the tenth place amongst the countries producing copper its share being 1.4 per cent. of the total world's output of that metal. In respect of lead the Union occupied fourteenth place with 0.3 per cent. of the world's

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output, and in zinc seventeenth place with 0.2 per cent. of the world's output. Other non-ferrous metals such as aluminium, tin, antimony, nickel and magnesium were either produced in very small quantities or not produced at all. The initial steps for the development of the non-ferrous industry were taken under the first Plan, while the second Plan provides for an extension of the industry to its maximum capacity. The preliminary estimates of the second Plan, which will now, probably, be considerably reduced and modified, provided for an output in 1937 of 1,300,000 tons of copper ; 717,000 tons of lead ; 620,000 tons of zinc ; 545,000 tons of aluminium ; 45,000 tons of nickel and 81,000 tons of magnesium. The full significance of this project will be realised if we compare it with the output of the principal non-ferrous metals during the years of the first Plan and the last year before its introduction. 1927-28 the output of copper was 15,000 tons, lead 2,600 tons and zinc 3,200 tons ; while the estimates for 1932 were for the production of 100,000 tons of copper, 46,000 tons of lead and 28,000 tons of zinc.

Kazakstan as Principal Centre

During the period of the second Plan, Kazakstan will become the principal centre of non-ferrous metallurgy. Though in 1933 this region is still to produce only 20 per cent. of the total output of copper in the Soviet

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Union, by 1937 it is to be responsible for 50 per cent. In the period of the first Plan the Urals were the principal centre of copper production in the country.

The Kazakstan copper industry will be concentrated in three places. The first, the copper smelting works on Lake Balkhash will be the largest of its kind in the world. Its output for 1935 is scheduled at 200,000 and for 1937 at 300,000 tons. This plant will work the ore from the Kounrad deposits which are estimated to contain more than 1,700,000 tons of copper metal. The construction of the Balkhash smelter works was started in 1931 and including the expense for geological survey and development of mines, is estimated to cost some 600 million roubles. It is the largest single enterprise to be started under the first Plan, as the cost of the Dneprostroy and Magnitogorsk, the two principal enterprises of the period, was only about 220 million roubles each.

The second centre of the Kazakstan copper industry will be at Dzhekazgan, the deposits of which are estimated at one million tons of metallic copper. The total cost of construction of the smelter in this locality is estimated at 300 million roubles.

The third copper producing plant in the Kazakstan region is to be located on the Irtysh River. This plant will use the copper ore deposits of Northern Kazakstan. The reserves of metallic copper in that district are estimated between 600,000 and 700,000 tons; the cost of construction is estimated at 200 million roubles.

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Ural Copper Combine

In the last quarter of 1932 the construction began of a large copper combine in the Urals, which when working to full capacity will have an annual output of 100,000 tons of metallic copper. The capacity of the first section of the combine is to be 50,000 tons annually and this will be gradually increased until full output is reached in 1936.

This combine is being built at the junction of the Sverdlovsk-Perm and the Sverdlovsk-Kazan railways. An abundant water supply from the nearby Revda River will enable a flotation plant to treat 14,000 tons of ore daily. The ore to be used is from the nearby Degtyarinsky copper deposits.

In connection with this copper plant a chemical combine will be constructed for the manufacture of sulphuric acid, crystalline sulphur and other chemicals.

Aluminium—a New Industry

The production of aluminium is a new branch of industry created during the course of the Five-Year Plan. It was begun at the Krasny Viborzhetz plant in Leningrad from Tikhvin bauxite in 1929. The alkaline method of obtaining aluminium oxide, worked out by Soviet scientific research institutes, has been successfully applied at special test plants, which were established for the purpose of organising production by this method. The capacity of the Volkhov aluminium plant will be extended to 12,000 tons of

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aluminium a year under the second Plan as compared with the 5,000 tons under the first.

The aluminium plant which is under construction in connection with the Dnepr hydro-electric station will have an output of 40,000 tons of aluminium per annum. It will be the largest of its kind in Europe and second only to the Arvide works in Canada. The Dnepr works will also treat Tikhvin bauxite. While the Volkhov plant is entirely equipped with imported machinery, most of the equipment for the Dnepr plant is being manufactured in the country.

The construction of a large plant will be started at Sverdlovsk (former Ekaterinburg) in 1934, with an output capacity of 50,000 tons of metal aluminium per annum. A test plant for extracting aluminium oxide from clay (with the aid of acids) is now under construction in Moscow.

An aluminium plant of an experimental nature was erected in 1932 at Gandzhy, Transcaucasia. The experience gained from working this plant will be utilised for the establishment of an aluminium combine to be built in the same place at a later date. The preliminary estimates provide for the production in 1937 of 30,000 tons aluminium in Transcaucasia. The aluminium ore deposits of the Sharoo-Kar mountain in that region are estimated at 100 million tons.

Natural Resources

The Tikhvin aluminium deposits in the Leningrad

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area are reported to contain more than one million tons of the metal. However, considering losses in the manufacturing process the net amount of aluminium to be obtained is estimated at 700,000 tons.

Numerous deposits of bauxites have been investigated in the Urals during 1932. The partly investigated deposits at Kamenskoye are at present estimated at 2½ million tons and those at Nadezhdin at one million tons.

Recent geological surveys led to the discovery of new deposits of non-ferrous metals, the total reserve of which has been considerably augmented. At the end of the Five-Year Plan the copper reserves of the Soviet Union were estimated at 5,200,000 tons ; lead 2,300,000 tons, and zinc 3,800,000 tons. The so-called Ural-Stalinsk combine, which will comprise the non-ferrous industries of Kazakstan, Urals, Western Siberia and Bashkiria will account for 85 per cent. of the copper production and a considerable proportion of other metals.

Electrification Programme

It was early realised by the Soviet authorities that electricity was one of the essential factors for the reorganisation of the economic system of the country and it was this realisation that determined the Soviet Government to proceed to carry out its electrification programme. Starting from almost nothing at the end of the civil war in 1921, the electrification output

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reached in 1932 a total of 13,500 million kilowatt-hours, as compared with only 1,900 million kilowatt-hours in 1913. This development would have been a great achievement under any conditions, and seems particularly remarkable if we bear in mind the difficulties that were facing the Soviet Union during the period.

The Five-Year Plan for the electrification of the U.S.S.R. represented in the main a continuation and further development of the programme elaborated by the State Electrification Commission in 1920. The programme provided for the construction by the year 1933 of thirty-nine regional electric stations. The rapid industrial progress of the U.S.S.R. necessitated, however, an extension of the original programme to forty-eight stations with a capacity of nearly three million kilowatts.

On October 1st, 1928, when the Five-Year Plan became operative, the capacity of all electric stations in the U.S.S.R. aggregated some 1,875,000 kilowatts, of which the central regional stations accounted for 799,000 kilowatts. In December, 1932, when the Plan came to an end the capacity of the stations operating was 4,700,000 kilowatts, of which the regional stations accounted for 2,799,000 kilowatts. With the economic growth of the country the power requirements increased tremendously, and the regional stations were the first to be called upon to satisfy the growing industrial requirements. The location of these stations is of interest in its bearing upon the

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important problem of the utilisation of local fuel resources, a serious consideration for a country which has to transport its fuel over long distances.

Power Resources

The power resources of the Soviet Union consist of coal, oil, water power and peat, and they are, as a whole, fairly well distributed over the whole country. The deposits of peat in various parts of the Union are now being utilised to an increasing extent in the production of electric power.

The utilisation of water-power also is growing in importance. There are many large rivers in the country, which, though their fall is not great, have such a volume of water that immense quantities of power can be obtained.

Of the various power resources utilised in the central regional stations in 1932 local coal dominated with 30 per cent. The next position was occupied by peat with 22.5 per cent., oil accounted for 17.5 per cent., imported coal 13, hydraulic power 9, gas 6.1, and wood 0.9 per cent. Thus more than half of the regional stations utilise local brown coal and peat of which there is an abundance in the Soviet Union.

Principal Electrical Developments

The principal electrical development proceeded, naturally, in the industrial areas. In the Central Industrial Region the increase in the capacity of the stations

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during the operation of the Plan was from 280,000 to more than one million kilowatts. About one-third of the new stations use the brown coal of the Moscow district, and the remainder the peat resources of that region. The Ivanovo-Voznesensk station of 75,000 kilowatts is considered one of the best in the world in which peat is used as fuel. In addition to the construction of a number of new stations, the principal extension work was carried out in the Kashira station, Moscow, which has been increased from 12,000 to 186,000 kilowatts.

In the Leningrad Region the capacity of the electric plants was more than doubled during the Five-Year Plan, the increase being from 200,000 to 440,000 kilowatts. This was attained by extending some of the existing plants and by the erection of the Red October station of 100,000 kilowatts capacity. In the main, in addition to the utilisation of water-power, this region depends for its fuel on local peat resources and on Donetz coal.

In the Northern Caucasus, where no regional plant existed before the introduction of the Five-Year Plan, the capacity of these stations at the end of the Plan was about 200,000 kilowatts. This remarkable power development of a predominantly agricultural region has given a great impetus to the growth of industry. A number of factories were opened to utilise the electric energy, particularly in Rostov, the capital of the region, which has become a centre for the production of

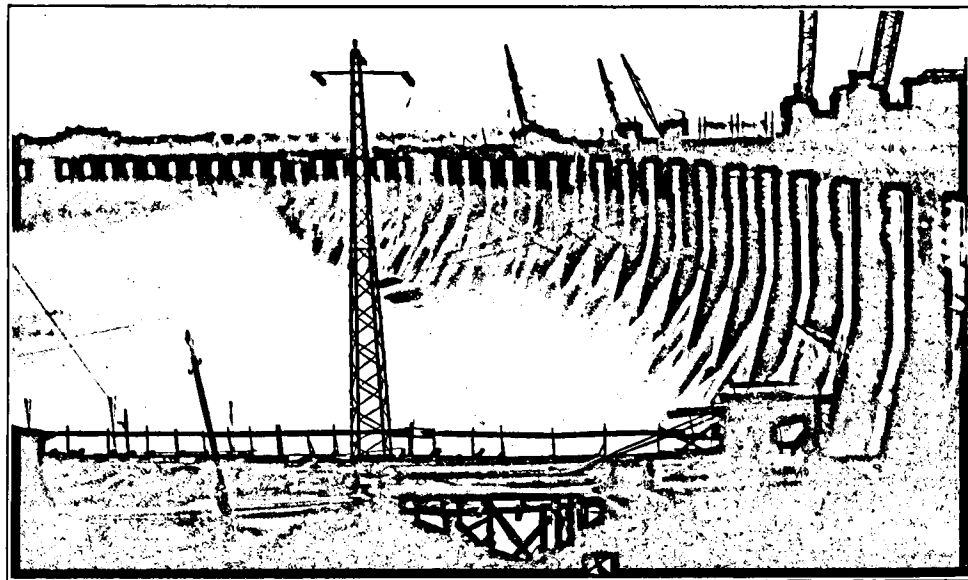
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agricultural machinery, and for various light industries.

In Transcaucasia the total capacity of the power stations has been more than doubled and at the end of 1932 exceeded 200,000 kilowatts. Several of the existing stations have been considerably enlarged and new stations have been built in Georgia, besides the Dzorages hydro-electric station of 22,500 kilowatts, in Armenia, and stations in Baku and other districts of Azerbaidzhan. An important scheme of railway electrification has also been carried out in Transcaucasia.

The Largest Hydro-Electric Station

The most important area of electrical development is in the Ukraine. Many of the existing stations have been considerably extended, new constructions, including not only the largest power station built under the Plan, but the largest hydro-electric station in the world. The Dnepr station which was opened in October, 1932, is equipped with nine turbo-generators each of 62,000 kilowatts capacity, while two further 3,000 kilowatts generators are to be installed. Five of the units started working in 1932. The foundations of the station were laid in November, 1927, and since that time in addition to the hydro-electric station itself a number of metallurgical works and a new town have come into being. Current is supplied to all these works by the



DAM OF THE DNEPR HYDRO-ELECTRIC STATION, OPENED OCTOBER 1932

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Dnepr station as well as to the neighbouring towns of Dnepropetrovsk and Zaporozhye. The following figures will give some idea of the magnitude of the undertaking. For the erection of the works it was necessary to uproot and transfer peasants from a site of about 100,000 acres to other parts of the country. The concrete used in building the dam, which is a mile-and-a-quarter long, amounted to 43,200,000 cubic feet; enough to fill Trafalgar Square to a height nearly twice that of Nelson's Column. More than 30,000 workers have been employed on the scheme. Alongside the dam a new town with a population of 120,000 people has arisen. The building of the dam has raised the level of the upper part of the Dnepr by about 130 feet, making navigation possible along the entire river. The barrage has forty-eight openings which are closed and opened by water gates, each weighing about 48 tons, which regulate the inflow of water to the turbines. On the left bank of the Dnepr locks have been built enabling ships to pass from one water level to another. Across the dam at a height of 52 metres a wide road has been built for motor-car and tramway traffic, which leads to the new industrial districts on the left bank of the river. The cost of construction of the hydro-electric station is approximated at 220 million roubles, which sum does not include the cost of the building of the various factories and new towns. The total capacity of turbines in operation up to the end of December, 1932, was 310,000 kilowatts and when

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completed the plant will be of 560,000 kilowatts capacity.

Other Stations

New electric plants have been built in other parts of the Ukraine including the Zuev (Donetz) Basin station of 150,000 kilowatts capacity, the Donsoda station of 73,000 kilowatts, the Kharkov station of 45,500 kilowatts, and the Kiev station of 44,000 kilowatts. The Shterovka plant, which was the only regional station in the Ukraine before the introduction of the Plan, has been extended from 20,000 to 157,000 kilowatts.

In the Volga area a regional station was constructed in Stalingrad of 51,000 kilowatts. A new station was built in Samara of 17,800 kilowatts while the capacity of the Saratov station was increased from 11,000 to 21,000 kilowatts. The development of an adequate electrical supply in this area was hindered in the past by the shortage of fuel resources. This difficulty will be overcome under the second Five-Year Plan. An elaborate programme has been decided upon, and preliminary work was started in 1932. This programme includes the construction of three hydro-electric stations in the Central Volga basin and one on the Lower Volga, about 100 miles from Saratov.

One of the stations is to be built in the Ivanovo-Voznesensk area, the second in the Gorky (Nizhni-Novgorod) area and the third on the Kama River, a

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tributary to the Volga, near Perm. The combined capacity of the three stations will be between 800,000 and 1,000,000 kilowatts.

The importance of this project could hardly be over-estimated considering the industrial activities of the Central Volga area. By providing cheap electric power to the Ivanovo-Voznesensk province, which is one of the oldest and busiest industrial areas in the Soviet Union, its further development will be made possible. The new plants built in that area include textile mills, rubber factories, non-ferrous, machine-building works and others.

The Gorky province is already one of the largest centres of the machine-construction industry in the U.S.S.R. This region is specialising particularly in the manufacture of motor-cars, Diesel engines and various transport equipment. The other industries which are being developed in the province include paper-making, wood-working, and the chemical industry, particularly wood distillation. The rapid industrialisation of the Gorky Region is being accompanied by a constantly growing demand for fuel and electric power and this leads often to a decided shortage of power resources. In the future, with the completion of new factories and works, the demand for power will, of course, be even greater. The fuel resources of the Gorky, as well as of the Ivanovo-Voznesensk regions, consist mainly of peat, and although the peat reserves

are comparatively large, they are insufficient for the needs of the local industries.

Harnessing the Rivers Kama and Volga

The construction of the first of the hydro-electric stations planned for the Kama River will be of great value to the area adjacent to the city of Perm. The power generated by the Perm station will be used by the factories of Nizhni-Taghil and the Central Urals. The industrialisation of this area has been carried on in recent years at an exceptionally rapid rate, and the construction of the Nizhni-Taghil iron, steel and waggon-building works will considerably increase the already large demand for electric power.

The construction of power plants calls for the building of high pressure dams which will radically change the nature of navigation in the upper regions of the Volga River. At present navigation on the Upper Volga is frequently handicapped by shallow water, but when the new dams have been completed this will be changed and the river will be deep enough in those parts for the largest Volga boats to pass.

The power station which is to be built on the Lower Volga, will be of two million kilowatt capacity, or nearly four times the size of the Dnepr hydro-electric station. It will provide for the mechanical irrigation of an area of more than 11 million acres of steppe land for wheat-growing on the left bank of the Volga River. In addition to supplying energy for irrigation purposes

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the plant will furnish considerable power for the needs of industry in the district.

Electrification of the Urals

The supply of electric power in the Ural Region was very small before 1928. Considering the scope of the Five-Year Plan developments assigned to this region in the way of production and general development, the question of power was a serious one. The principal stations constructed in the region during the operation of the Plan were Chelyabinsk 75,000 kilowatts capacity, Berezniky 72,000 kilowatts and Magnitogorsk 36,000 kilowatts, while the Kiselov station was extended to 66,000 kilowatts. The programme under the second Plan provides for an extension of the Magnitogorsk and Chelyabinsk stations, the erection of a hydro-electric station with a capacity of 150,000 kilowatts at the junction of the Kama and Pechora rivers, the erection of a peat power plant in the lower Saldinsk district and a plant in the Nizhni-Taghil to utilise blast furnace gases.

Several stations have been erected in Siberia including one each in Stalinsk (formerly Kuznetsk), Kemerovo, Novo-Sibirsk, Igarka and others.

The Central Asiatic republics have had the capacity of their electric power stations increased by nearly 100,000 kilowatts. This was obtained by the construction of a number of comparatively small stations, chiefly for irrigation work.

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These are the general outlines of the achievements in electrical development, which is one of the principal factors in furthering the industrialisation of the country and increasing its power equipment under the Five-Year Plan.

During the operation of the Plan some 7,000 kilometres of high-tension cables were laid as compared with a total of 30 kilometres in pre-war Russia. Several short-distance railways have been electrified and provisions have been made to connect all the regional electric stations of the country in a single system.

The aim of the Soviet Government under the second Plan is to achieve by 1937 a production of electricity up to a total of 100,000 million kilowatt hours. The carrying out of this programme will involve an extension of generating plants to approximately 22 million kilowatts.

The manufacture of electrical equipment also developed rapidly. Before the war the electrical industry was entirely undeveloped in Russia, and practically all articles of mass production and other more important machinery had to be imported from abroad. The needs of this industry were fully realised from the beginning of the electrification policy by the Soviet Government, and as a result of the effort made, the rate of expansion of electrical machinery production was greater than the average rate of growth of all Soviet industries, or of any branch of the heavy industry group. Thus during the past six years the output of

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electrical machinery increased tenfold. The industry was at the same time successful in reducing appreciably its production costs.

Electrical Machinery Industry

Every year the electrical machinery industry has started the production of new types of equipment which previously had to be imported. The new lines of products manufactured by the United Electrical Machinery Industry are estimated to have resulted in the saving of hundreds of millions of roubles.

The success in the electrification of Soviet industries and agriculture is now an established fact, but it has been based largely on machinery purchased abroad. This was particularly the case as far as generators, transformers, accessories, and special machinery are concerned. This dependence on imports constantly handicapped the development of Soviet electrification.

The present industrial reconstruction of the country imposes on the electrical machinery industry demands for greater varieties of machines and equipment, a demand which has been inadequately met by the industry. It is estimated that in 1931 the production of Soviet electrical equipment was from 40 to 45 per cent. below the national demand. The estimates for 1933 of the United Electric Machinery Industry indicate that the requirements will still remain not fully satisfied.

During the operation of the second Five-Year Plan,

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the Soviet Union will build electric stations of a total capacity from 14 to 18 million kilowatts. This extensive programme naturally calls for a large increase in the production of electrical equipment within the country. The demand for electrical machinery will increase not only on account of the increased use of it, but also because of the development of new industries as, for example, electric welding, electro-chemistry, electro-metallurgy and the extensive plan for the electrification of a third of the railway transport. It is anticipated that by the end of the second Five-Year Plan the output of electrical power in the Soviet Union will approach that of the United States. It must, however, be noted that the United States attained their high standard gradually over a period of many years. The maximum increase in capacity of electric stations during one single year has never exceeded 2,500,000 kilowatts. In the U.S.S.R. the increase during 1932 was approximately 1,500,000 kilowatts, while from 1937 which is the last year of the second Plan, the annual increase in capacity of the stations is estimated to be not less than five million kilowatts.

Import of Foreign Machines

Although the developments of the Soviet electrical machinery industry are extensive in so far as the production of high-tension equipment is concerned, the U.S.S.R. still lags considerably behind the more advanced capitalist countries. For building large

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turbo-generators of 50,000 to 62,000 kilowatts, the U.S.S.R. must still import some of the more important parts from abroad. An attempt is now being made to organise the manufacture of large turbo-generators up to 200,000 kilowatts, also high voltage generators for direct current, besides which the industry is to produce powerful electric locomotives, electric accessories for railways, electric furnaces, up-to-date electric equipment for the mining and peat industries and so on.

Fuel Requirements

The problem of electrical development is closely connected with the fuel industries and particularly with coal production. In order to ensure the development envisaged in the Plan a steady and adequate supply of fuel was essential. Considerable attention was therefore devoted in the Plan to the provisions for a steady increase in the production of coal, oil and peat in addition to the utilisation of water-power for generating electric current. The following is a brief summary of the developments in the fuel industry.

Coal still remains the principal fuel used in industry and great attention was devoted in the Plan to organise the mining of coal on an adequate basis. In spite of all the efforts to organise the industry coal-mining has been carried on in the past few years under considerable difficulties. The rapid industrialisation of the country created a growing demand for coal which the home industry was unable to supply owing to the slow

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increase in output. This resulted in a coal shortage which was at times very severe owing to inadequate transport facilities.

Even as late as 1927 the coal industry was still somewhat disorganised. A number of the mines were filled with water as a result of the cessation of work during the revolution and the lack of equipment and technical personnel necessary to accomplish the work of reconstruction in the post-war period. Enormous efforts were therefore necessary to raise the industry to the standard required under the Plan.

Another difficulty experienced in the past four years was due to the shortage of labour. With the large construction programme going on in the country there was a decided tendency amongst the workers to gravitate to other industries in order to avoid having to work underground. As a result, progress has not been as rapid in the mining industry as would have been possible had sufficient men been available to work the mines to full capacity.

Working Conditions in Mines

Various improvements have been introduced in the working conditions of the miners, with a view of attracting more labour for the mines. The Soviet labour laws provide for a six-hour working day for underground miners and seven hours for surface workers. Underground workers receive four and surface workers

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two weeks' holiday with full pay every year, and provision is made for their care during illness.

The housing and living conditions of the miners have been improved to a remarkable extent under the Plan. No enterprise could be designed unless the engineers incorporated therein provisions for housing, clubs, hospitals and so on. The result of this activity has been that mining villages have sprung up where modern stone and brick houses with tile roofs take the place of the old huts with straw thatched roofs which the Russian miners formerly occupied.

As a result of these special efforts coal output in 1932 was approximately 60 million tons as compared with less than 29 million tons in 1913, and the estimated 75 million tons in the original Soviet Plan. Though the original programme has not been carried out in full, the achievements must be considered satisfactory in view of the difficulties the industry had to face, of which the shortage of labour was the most serious.

New large coal deposits have been discovered in various parts of the country which have greatly augmented the resources. As a result of these discoveries the known coal deposits which were estimated at the beginning of the Five-Year Plan at 475,000 million tons, are now calculated at more than double that quantity.

Oil—An Important Factor

Oil has become one of the most important factors

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in the industrialisation of the Soviet Union and in the development of agriculture. The increase in the number of tractors, motor-cars, lorries, oil-propelled ships, aeroplanes and so on, as well as an extension of the requirements of the foreign market necessitated the elaboration of a very ambitious programme of development under the Five-Year Plan. As a result of the special effort made in the past few years the production of oil has been developing at a particularly fast rate, and the oil industry was the only one in the country to carry out the Five-Year Plan in two-and-a-half years. At the present time this industry is in a particularly high state of organisation and development.

The pre-war oil output was reached as early as in 1926-27, and in 1931 it was 22,300,000 tons as compared with 9,200,000 tons in 1913.

The oil industry was nationalised in 1920, and soon after the nationalisation radical technical reconstruction was started and large sums were allocated for the work. In the five years Oct., 1923—Oct., 1928, the capital investments amounted to 728 million roubles. Under the Five-Year Plan an enormous extension of the industry took place, the capital investments during that period being 1,454 million roubles.

The old methods of drilling have been entirely replaced by modern American rotary and cable methods. The rate of drilling has been doubled and deep pumping and other new methods of obtaining oil have been introduced.

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In 1913 the drilling operations covered only 270,000 metres, in 1931 they constituted 703,000 metres, and the estimate for 1932 was the drilling of 1,012,000 metres. Thus about four times as much drilling was carried out as in the last year before the war.

Important achievements are also recorded as far as oil refining is concerned, and the cracking process has been widely adopted. In 1913 the total quantity of crude oil refined was 5,700,000 tons, and in 1931 it rose to 19,900,000 tons, an increase by nearly 250 per cent.

New Oil Products

The Oil Syndicate has established the manufacture of a number of new commodities. The whole geography of the oil industry is changing. The Soviet Union has learned to manufacture its own cracking plant, and is establishing new oil refineries in various parts of the country, in the Central Industrial Area, in the Ukraine, in the Central Volga, and in the East.

As a consequence of the development of industry in the U.S.S.R., particularly the production of motor-cars, tractors and the extension of air services, larger quantities of oil products are being absorbed from year to year. However, the Russian oil industry is not only satisfying the requirements of the internal market, but is increasing from year to year the quantities of oil for export, and in 1932 the export was five-and-a-half times as large as in 1913.

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The U.S.S.R. is already obtaining oil from a number of rich new deposits in the Urals, Emba, the Bashkir Republic, Turkmenistan, Northern Caucasus, Ukhta, in the Volga area, Georgia, Yakutsk, Baikal, Kamchatka, and in the Crimea.

There are extensive oil reserves in the U.S.S.R. which are probably larger than those in any other country in the world. The Soviet Union is fully determined to obtain the oil and to utilise it in the interests of its national economy. A full programme has been elaborated for the Soviet oil industry for the years 1933-37, and from the success achieved in the realisation of the first Five-Year Plan it is manifest that there is every justification to anticipate that the second and more extensive plan will also be carried out in full.

Peat Deposits

The peat deposits of the Soviet Union represent one of her chief sources of energy and are capable of considerable exploitation. They are so extensive that they are sufficient for supplying the requirements of the whole Soviet industry during 350 years. At present, peat is extensively used as fuel in electric stations, industrial enterprises and even in private houses, for which purpose briquettes of peat are being manufactured. Most of the peat bogs are situated in the central and northern regions and in Siberia. The deposits in the latter regions have not yet been extensively investigated.

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A number of electric generating stations have been built in the peat areas. As a result of this activity both the production and consumption of peat has increased considerably. The production of peat which amounted during the first year of the Plan (1928-29) to five-and-a-half million tons has attained in the last year of the Plan, 13,840,000 tons, exceeding the planned estimates by more than 12 per cent. This increase was only possible owing to the organisation of peat production on modern scientific lines. The small independently working enterprises have been combined and are worked now on modern lines by large trusts, while a sum of nearly 400 million roubles has been invested during the period for the development of the peat industry.

Soviet research institutes have made valuable discoveries which enabled the direct utilisation of peat and lignite, known as brown or bog coal. Formerly lignite had to be made first into briquettes before it could be used as fuel; the new process not only eliminates this necessity, but makes it possible for a ton of lignite to give the same amount of heat as a ton of briquetted lignite.

There are more than 350 million tons of lignite available in the Ukraine, and hundreds of million tons in other regions of the Soviet Union. In some places deposits are 26 metres thick, which represents an ideal condition for mining.

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Production of Machinery and Equipment

The machine construction industry has shown better results than any other during the operation of the Plan. Considering it forms a basis for progress in almost every other branch of industry including agriculture and transport, the Government has concentrated great attention to secure its proper development.

In accordance with the original programme, the output in the last year of the Plan was to have been three-and-a-half times that of 1927-28. Actually this output was reached by the end of the third year (1931), with the result that industry, agriculture and transport are now being largely supplied with home manufactured machinery and equipment. The actual output of machinery in 1932 exceeded the Plan by 54 per cent., i.e., during the fourth year production was to that extent greater than was planned for the fifth year.

In the four-and-a-quarter years of the Plan, the various types of machinery built in the U.S.S.R. included tractors, motor-cars, motor lorries, aeroplanes, ships, locomotives, combines and all kinds of agricultural machinery, also turbo-generators, Diesel engines, pneumatic machines, printing machines, machinery and equipment for the metallurgical, oil, coal, peat, electrical, chemical, textile and other industries.

Agricultural Machinery

With a view to assisting in the development of agriculture, particularly the State and collective farms,

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a number of agricultural machinery and tractor works have been built in the Soviet Union. The very extensive works which came into being during the first Plan include the Stalingrad and Kharkov tractor works, each with an ultimate annual output capacity of 50,000 tractors, and the Rostov agricultural machinery works. Another, the largest of all tractor works, which is being completed and will start operation in 1933 in Chelyabinsk, will have an output of 60,000 caterpillar tractors per annum. These enterprises rank amongst the greatest in the world of their kind and their design and equipment are of the most modern type.

There have been built a number of agricultural machinery works also in other parts of the country, including the Ukraine, the Urals and Siberia with the result that the Soviet Union is at present the largest agricultural machinery producer in Europe.

The production of about seventy new types of agricultural machinery has been developed, especially tractor hitches for grain farming, and new machinery for harvesting technical crops, such as flax, cotton, sugar-beets and tea.

Tractor and Motor Car Production

The progress made by the tractor and automobile industry is especially striking. In 1927-28, the last year before the introduction of the Plan, only 667 automobiles and 1,279 tractors were produced in the Soviet Union, while in 1932 the output was 26,700

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automobiles and 50,250 tractors. Though it was estimated to turn out only 91,000 tractors during the operation of the Five-Year Plan the actual production was 105,850.

To-day the Soviet Union has two great automobile works, the Stalin (formerly Amo) works in Moscow and the Nizhni-Novgorod (now Gorky) works, besides two automobile assembling works.

The town of Nizhni-Novgorod, recently renamed Gorky in honour of the great writer, has been selected as the site of Russia's first large automobile factory. The factory is situated a few miles away from the town on the banks of the Oka River, which joins with the Volga in Gorky. The plant is equipped to produce Ford cars and light motor lorries of 1½ tons, and is modelled on the Ford Detroit works ; its full capacity is 140,000 cars or lorries a year.

The Stalin works in Moscow was designed for the manufacture of 2½-ton 66 h.p. motor lorries and motor 'buses. It is equipped with the most modern machinery and is capable of producing all necessary parts, with the exception of electrical appliances, glass and rubber. When working to full capacity with two shifts the output is estimated at 75,000 motor lorries. Another factory, for the production of heavier lorries, is being completed at Yaroslavl.

Shipbuilding

The realisation of the shipbuilding programme

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under the Plan has been particularly difficult since the engineers and workers for the most part had no experience in the construction of mercantile vessels. Practically no specialists were invited from abroad and not only the machinery, but even sheet metal had to be imported. In the decade preceding the beginning of the Five-Year Plan only twelve ships with a total tonnage of 45,000 tons had been launched in Soviet shipyards, but during the Plan seventy-three ships were built, of a total tonnage of 180,000 tons. These included oil tankers, lumber vessels, refrigerators, trawlers, cargo and passenger ships. The ships launched at Soviet yards are now entirely Soviet built and equipped. There are five shipbuilding yards in Leningrad, one in Nicolaev and one in Sevastopol. About 40,000 people are employed in these yards.

The programme for the next five years provides for launching 250 ships of a total tonnage of over 700,000 tons. The realisation of this extensive programme should go a long way towards freeing the Soviet Union from dependence on foreign shipowners and save large sums of foreign currency which has now to be paid for the transportation of goods.

Heavy Machinery

The original design of the turbo-generator plant in Kharkov prepared by a well-known American firm, called for about 19,000 tons of metal, most of which had to be imported. In order to economise on the amount

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of metal used Soviet specialists had to solve the problem of replacing structural steel by concrete. This problem was successfully solved and the final design provided for an economy of 12,000 tons of metal.

The plant is one of the largest in the Soviet Union and it will turn out turbo-generators of a capacity varying from 50,000 to 200,000 kilowatts. The combined output of turbo-generators produced in 1933 will be 1½ million kilowatts and by 1935 it will reach 2.3 million kilowatts.

The entire works are completely mechanised. Up to 3,000 men will be employed in 1933 and approximately 5,000 in 1935.

Locomotive and Other Engineering Works

On January 1st, 1933, the largest locomotive works of the Soviet Union situated in Lugansk, Ukraine, started operations. The annual designed output of the plant is 1,080 locomotives which is greater than the combined output of all the other locomotive works in the country. The programme for 1933 provides for an output of 250 locomotives, of a powerful type with a load capacity of 20 tons per axle.

The Lugansk plant has no equal in Europe and is second only to that of the American Locomotive Co. The plant took four years to build and equip, and a sum of approximately 100 million roubles was invested in the enterprise.

The construction of a locomotive works in Stalinsk

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(formerly Kuznetsk) was started in 1932. This plant is designed to turn out 500 super-power locomotives of American type and 25,000 tons of spare locomotive parts annually for use on the Siberian and Central Asiatic railways. The site of the locomotive works is within 5 kilometres of the Stalinsk metallurgical plant.

The Kramatorsk machine building plant will produce annually the complete equipment for six blast furnaces and thirty open-hearth furnaces, sixteen sets of gas and air-blowers, three blooming mills, sixteen trains of rolls with spare parts, and a certain amount of equipment for coke ovens, turbines, cranes and so on.

The Kramatorsk works is equipped with machines the equal of which in size there are few in existence. A press of 10,000 tons pressure, a duplex lathe weighing 216 tons, and a milling machine of the same weight are installed in these works.

The engineering works at present functioning in the Soviet Union are producing a large variety of equipment from the simplest lathe to the most delicate scientific instrument, and the most complicated machinery. The value of engineering supplies produced in Russia in 1932 was almost ten times what it was during the last year before the war.

The Chemical Industry

The chemical industry plays an important part in the industrialisation of the Soviet Union and considerable attention was devoted to it in the Five-Year

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Plan. Its main functions are the development of the productive powers of the country, the improvement of the living conditions of the citizens, the supply of agriculture with necessary raw materials, the increase of output of agricultural labour and the provision of adequate means for protecting the country against foreign aggression.

The industry is still behind all the other industries of the country, but this is not surprising, as the Soviet Union inherited it in an embryonic stage from pre-revolutionary Russia, and had to start practically from the very beginning.

During the last few years the reconstruction of the chemical industry has been carried out on a large scale and with remarkable success. Its growth can be judged by the figures for expenditure of 1,300 million roubles in 1932 as against 400 million roubles in 1926-27. It must also be taken into consideration that the real increase of output due to capital investments in the last few years will only become apparent after opening the new factories which are at present under construction. The capital invested in this industry during 1932 alone exceeded 600 million roubles.

In spite of such a big step forward the chemical industry of the U.S.S.R. has not yet won the position to which it is entitled and which is dictated by the requirements of the other industries in the country. Bringing it up-to-date will be one of the great problems of the second Five-Year Plan, the development of



NEW ARCHITECTURE—CHEMICAL WORKERS' CLUB
IN MOSCOW

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the branch which supplies chemical fertilisers being of special importance.

Chemical Industry and Agriculture

Potassium fertilisers, and especially nitrogenous ones, were not produced in pre-war Russia. The production of artificial fertilisers was limited to the manufacture of a negligible quantity of superphosphates which, in 1913, amounted to only 55,000 tons.

In agriculture the best results are obtained with nitrogenous fertilisers, the efficiency of which is further increased by their rational combination with other chemicals. On the other hand the manufacture of this kind of fertiliser is, from a technical point of view, much more complicated and raises a number of serious problems for the designers of chemical equipment and machinery.

The production of ammonia was started in a special plant of the Chernorechensky Chemical Combine, and recently the first sections of similar plants have been put into operation by the Bereznikov and Bobrikov Chemical Combines. The programme includes the erection of several plants in districts where coke is abundant, these being considerably larger than the first Soviet undertaking for producing ammonia which are at present working.

The second Five-Year Plan includes the development of ammonia production by means of water electrolysis. In the chemical industry of the world this method

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represents some 15 per cent. of the various processes used. The exploitation of exhaust gases of coke batteries will also play an important part in the production of ammonia during the next five years.

The constructive work in connection with the manufacture of synthetic ammonia is expected by 1937 to bring the U.S.S.R. level with Germany, which is at present leading the world.

The anticipated increase in ammonia production, and the resulting rise in the output of nitrogenous fertilisers, should ensure by 1938 an adequate fertilisation of land under technical and special plants only. As far as vegetables are concerned, only 40 to 50 per cent. will be fertilised, whereas grains will be left over until the third Five-Year Plan.

Phosphorus and Potassium

The development of the production of phosphorus and potassium also means special treatments of raw materials, but this problem is solved more easily, because it does not call for extensive outlay of capital nor does it require the complicated chemical machinery which is indispensable for the production of nitrogen, etc.

The extremely rich resources of potassium discovered in the Solikamsk district led to extensive construction work being carried out during the Five-Year Plan. A number of large mines will be completed and the

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production of several valuable chemicals will be developed under the second Plan. The output of potassium salts is estimated to reach the high figure of 12 million tons and 250 million roubles will be invested in their production. Mining conditions are very satisfactory, as rich layers of salts are to be found at a depth of only 300 feet, digging and boring operations being thus considerably simplified. Phosphorus mines are to be found in many parts of the Soviet territory, some of which were in exploitation before the war. Considerable prospecting has disclosed very rich resources in the Khibinsk and Akhtubinsk regions and has made it possible for new constructive and productive work to be carried out in those localities. The technical side of these undertakings is progressing favourably. Artificial enrichment of phosphorus ores, and the manufacture of high-grade fertilisers like double and treble superphosphates fully make up for the high cost of transporting phosphoric ores and finished products. The output of soluble phosphoric fertilisers is estimated to reach, by the end of the second Plan, 1,500,000 tons. Such an increase should give the U.S.S.R. the first place amongst the phosphoric fertiliser producers in the world.

The most important benefit derived from the manufacture of high-grade fertilisers is in the increased productivity of the land, as compared with using nitrogen, potassium and phosphorus independently of each other.

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Sulphuric Acid

The manufacture of fertilisers requires a large quantity of sulphuric acid. The estimates show that in 1937 some 3,200,000 to 3,500,000 tons will be needed. To ensure an adequate supply in such large quantities, new plants will be erected and existing ones will undergo extensive alterations. The erection of new plants is projected in the Urals, Central Asia and other districts.

The programme of the second Five-Year Plan also includes the development of other branches of the chemical industry, the one deserving particular attention being for the production of calcined soda. This product was manufactured in 1932 at the rate of approximately 300,000 tons per annum, which figure will be raised five times so as to provide an adequate supply for the rapidly growing glass, aluminium and soap industries, as well as for the needs of the home and export markets.

By-products of Coal

The by-products of coal distillation and special treatments of coal tar are other problems of the Soviet chemical industry. In Germany, contrary to pre-war Russia, not a ton of these valuable products is wasted. Large plants manufacture a variety of coal by-products, which are used for a number of purposes; dyes, explosives, motor fuels, etc. A great deal has already been done in that direction in the U.S.S.R. during the

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last four years, but the work is as yet not very far advanced.

The speedy development of the dyestuff industry, the growth of aviation and the necessity to increase the defensive powers of the country, call for an extensive chemical utilisation of coal. The output of synthetic dyes, for example, in connection with the growth of the textile industry is planned to be raised from 250 to 300 per cent. ; together with this increase, the production of high-grade dyes (indigo and others) will be raised at the expense of the less valuable ones. There is also the question of adopting gas for lighting and heating purposes.

The exploitation of exhaust gases of coke furnaces is considered of great importance and a big step forward has been made by metallurgists. But the U.S.S.R. chemical industry is still far behind and much will have to be done during the second Plan. Closely linked with this problem is underground gas generation by means of burning coal in the mine itself. On the question of employing gas for lighting and heating purposes, suitable localities for erecting new gas plants will be chosen, depending upon the disposition of factories supplying the necessary raw material and of towns consuming the gas.

Rubber and Plastic Compounds

The rubber industry will also be developed during the second Five-Year Plan. The demand for automobile

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tyres alone during 1937 is estimated at 6,000,000 tyres. The production of rubber shoes and other goods is also to be considerably extended.

One of the less developed, but at the same time promising branches of the chemical industry is the production of various plastic compounds. These compounds are used for the manufacture of many articles of technical and home use, as, for example, certain machine parts, a considerable number of motor-car components (bakelite battery boxes, magneto parts, etc.), household utensils (crochery, etc.), pedestals for electric lamps, cigarette boxes and cases, and even wall-paper. Since the war, owing to increased demand, the production of plastic compounds in Europe has been greatly augmented, but in the U.S.S.R. it is still in its infancy. During the last few years, however, the output has been raised to some 10,000 tons per annum. This is, of course, insufficient to cope with the ever-increasing demand, and the second Five-Year Plan includes a programme for the development of this industry up to a yearly output of 250,000 tons of plastic compounds, which will replace about a million tons of ferrous and non-ferrous metals.

Rich Natural Resources

The development of the Soviet chemical industry as a whole is facilitated by the possession of extremely rich natural resources of raw materials especially is this true in connection with the timber industry.

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The production of resin, camphor and turpentine is proceeding very rapidly, more particularly resin, which is one of the principal ingredients in soap manufacture. It is estimated that the output of soap in 1937 will reach two million tons, which means that hundreds of thousands of tons of resin will be required.

The products of wood distillation are also very important. Without mentioning charcoal, which is indispensable for the metallurgical developments, the manufacture of acetic acid, methylated spirit and various other products will be greatly increased. Side by side with the manufacture of natural by-products of charcoal distillation, Soviet chemists will also give their attention to the production of synthetic materials on a wide scale. The manufacture of artificial silk is planned to develop speedily during the next five years.

One of the most unprofitable branches of the Soviet chemical industry is at present the pharmaceutical one. The population of the country is supplied with medicines at the low rate of 40 kopeks per person per annum. This supply is, of course, totally inadequate, and is planned to be considerably increased in the near future.

The country's natural wealth in raw materials is, as already mentioned, big enough for such an ambitious programme to be successfully carried out. The unlimited supplies of potassium and coal make it possible to build up the production of artificial fertilisers on a very large scale. A sufficient supply of raw

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materials for the manufacture of synthetic products like dyes, methylated spirit, ammonia, etc., etc., is also fully ensured. Similar fortunate conditions prevail in the wood distillation industry.

The exploitation of lignites and peat is also of considerable interest and will result in the production of synthetic liquid fuels and in the use of gases for manufacturing ammoniacal and other synthetic products. The carrying out of the second Five-Year programme will bring the U.S.S.R. level with other European countries. In the supply of potassium it will be equal to Germany; as regards nitrogen, only slightly behind the Germans, and in the production of phosphorus it will lead the world. The output of sulphuric acid and coke will be next to the U.S.A.; the production of synthetic dyes should equal that of France and Great Britain, being behind only Germany and the U.S.A.; the production of rubber will occupy second place and the manufacture of plastic compounds, artificial yarns, etc., will also be widely developed.

Needs of the Light Industries

Though the light industries, which include the production of goods for consumption, were comparatively neglected under the first Plan, and the estimates were not carried out in full, it must not be assumed that nothing was done for their development. As a result of the work that was carried out under the Plan, the output of the light industries was in 1932 some-

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87 per cent. higher than in 1928. However, what is even of greater importance than this increase, is that these industries entered the second Plan with well-equipped factories and with an increased home supply of raw materials which should assure them more rapid progress within the next few years.

The food industry was one of the very few in this group that has actually exceeded the estimates by 9 per cent. Under the first Five-Year Plan 553 new food plants were opened in the Soviet Union, which included 227 mechanised creameries, 70 canneries, 49 cold storage warehouses, 32 kitchen factories, 22 fruit-preserving factories, 15 modern poultry combines, 10 meat-packing combines, seven confectionery factories, 10 vegetable oil factories, six sugar refineries, seven margarine plants and numerous other enterprises.

The output of the confectionery industry has been more than double the estimates of the Plan. Altogether 450,000 tons of confectioneries were produced in 1932, while the estimates for the last year of the Plan were for an output of 214,000 tons. In 1927-28 the output was only 76,000 tons.

The fishing industry exceeded the planned estimates by 10 per cent., the output of which was more than doubled during the operation of the Plan.

The macaroni industry has increased its production to 155,000 tons, the original estimates for 1933 having provided for an output of 112,000 tons only.

The canning industry has increased output from 90



NEW WEAVING MILL AT IVANOVO-VOZNESENSK

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million cans in 1927-28 to 748 million cans in 1932. The Five-Year Plan provided for an output of 650 million cans in 1933. There are now 48 large canning works in the Soviet Union with an annual output capacity of 1,000 million tins of conserves. A further seven works have been almost completed, and are to be set in operation in 1933.

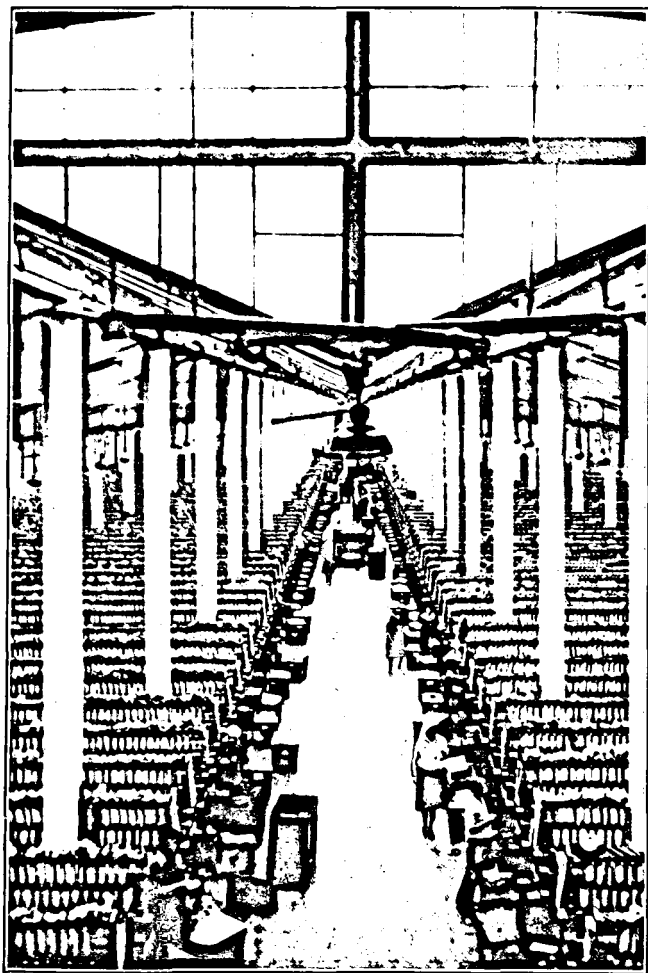
The Textile Industry

The textile industry occupies an important position in the economic life of the Soviet Union, both on account of its output and the number of people engaged in it. Under the Five-Year Plan the industry has seen some development as a result of which its output now surpasses that of the pre-war period. In spite of the extension of production, however, the industry is still unable to satisfy the requirements of the country in textile goods and the demand still considerably exceeds the supply. The reason for this was the necessity to concentrate on the development of heavy industries at the expense of those producing goods for consumption.

The present main groups of the textile industry in the Soviet Union are in Ivanovo-Voznesensk and the Moscow and Leningrad districts.

Ivanovo-Voznesensk has some 80 textile factories, Moscow about 40—exclusive of vicuna and colour print works—and Leningrad over a score.

In addition, there exist spinning, weaving, dyeing and finishing mills in various other parts of the Soviet



NEW WEAVING MILL AT IVANOVVO-VOZNESENSK

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Union, and silk mills are growing in number in Central Asia, as silkworm cultivation becomes rationalised and extended.

The three factors which dominated the development of the textile industry under the Five-Year Plan were raw materials, labour and transport. The output of the mills during the past four years was often retarded by the shortage of raw materials, skilled and semi-skilled labour, and by the overburdened transport system which was unable to cope with the requirements of the nation's economic life.

In spite of these serious obstacles, the textile industry has been considerably developed, many new enterprises were started, and there was an upward trend in output which was valued in 1932 at 4,880 million roubles. This output, though below the estimates of the Plan, showed, nevertheless, a substantial advance over 1927-28.

Raw Materials

The objective of the Soviet authorities was to make the textile industry entirely self-supporting as regards raw materials, and the progress in the spinning and manufacturing sections had, therefore, to be based upon the development of the cultivation of raw materials. In this respect the Five-Year Plan was of decisive importance, since the process of collectivisation in agriculture has been brought to a stage when the planned production of raw materials by collective and

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State farms has become possible. Large areas devoted to the cultivation of cotton, flax, hemp and new fibres have now become collectivised, thus rendering possible the use of modern agricultural machinery and chemical fertilisers. As a result of this development the Soviet Union was able to stop entirely in 1932 the importation of cotton, whereas in 1927-28 these imports amounted to 145 million roubles.

The equipment of the textile industry varies greatly. In the older and smaller centres there are a number of enterprises where the machinery is obsolete and in need of replacement ; whereas in the Ivanovo-Voznesensk, Moscow and Leningrad areas, a great deal of the machinery is of the latest and best design ; many of the recently constructed factories are as nearly up-to-date as possible, and these are gradually replacing the old ones. Amongst the best equipped new factories must be counted the "Melange" group at Ivanovo-Voznesensk, the Dzerzhinsky, Krasnaya Talka and Lakin spinning mills, and various new spinning and weaving mills at Fergan, Ashkhabad, Leninakan, and Azerbaidzhan. In other cases, old established factories have been entirely reconstructed and re-equipped, as, for instance, the linen mills of Ivanovo-Voznesensk and White Russia. Automatic looms of the newest type have largely replaced the old machine looms and the latest methods of ginning are replacing in Central Asia the more primitive process of the past.

Considerable attention is being devoted to the

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development of the textile industry in Central Asia under the second Five-Year Plan. It is in Central Asia that cotton is grown, and it has therefore been decided to build textile mills in that area with a view to concentrating the spinning and manufacturing side of the industry near the source of raw materials.

The production of artificial silk was also given serious attention though this industry is still in its infancy. It is, however, estimated that in 1933, production will reach 11,000 tons, after which year the progress is to be more rapid and output is to grow to 34,000 tons in 1934, and 55,000 tons in 1935.

Estimates for the Second Plan

The growth in the production of raw materials, the increased railway facilities and the modernisation of factory equipment should render possible a considerable advance in textile production during the second Five-Year Plan. Estimates include the following : cotton goods output is to rise to 6,500 million metres in 1937, or an increase of 212.3 per cent. over 1932 ; the output of woollen goods is to be in 1937 three times as much as in 1932 ; linen production is to attain 4.75 times its present output, of which 500 million metres will be reserved for individual consumption, and the rest for industrial purposes. In knitted goods, increases from 1932 to 1937 are as follow : Stockings from 101 million pairs to 350

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million ; socks from 60 million pairs to 150 million ; children's hosiery from 40 million pairs to 200 million ; underwear from 29 million metres to 300 million metres, over a tenfold increase. Various measures are outlined for increasing the area under cotton, for the development of sheep-breeding, for the production of special quality wools, merinos, etc., etc.

Special attention is to be paid to Central Asia during the second Five-Year Plan. New mills, with a total capacity of 685,000 spindles for cotton goods, and of 205,000 spindles for knitted goods, are to be constructed in that area. The silk production in Central Asia is to be raised from 600 tons in 1932 to 3,000 tons in 1937, while the cocoon crop is estimated to reach in 1937 a total of 31,000 tons.

The nation-wide organisation of the textile industry, and the possibility of planned co-ordination in all its branches guarantee a rapid advance which, within a few years, should make the U.S.S.R. one of the greatest textile-producing countries in the world. The growing population are now demanding products in ever-increasing number, as their cultural level and well-being rises. For the Soviet textile industry there exists, therefore, an almost limitless home market for many years to come.

The Clothing Industry

The clothing industry has by far exceeded the estimates of the Five-Year Plan and the level of



A SOVIET CLOTHING FACTORY AT EGOREVSK

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production set for 1933 was actually reached in 1931.

The Plan called for an output in five years, of 4,688 million roubles worth of goods at 1926-27 prices, while the actual output of the clothing factories during the four years was to the value of 5,160 million roubles.

The Plan has been exceeded not only in respect of output. Capital investments for the construction of new factories exceeded the estimates by 50 per cent. The number of workers employed in the clothing factories was more than three times that of the preceding year before the introduction of the Plan, and reached 174,000 of whom 80 per cent. were women; the output per worker has increased by 84 per cent. and the total output of the industry has grown more than five times.

Fifty-seven new factories have been built during the past four years, some of which were not included in the Plan; these include the Dnepropetrovsk, Novo-Sibirsk, Orenburg, Penza and Briansk factories. There were at the end of 1932 some 135 plants, several of which were amongst the largest in the world.

The entire industry is now working a seven-hour day. An interesting feature was the establishment in Moscow of a central cutting factory which cuts goods for all the other factories. This central factory cuts from 110,000 to 120,000 metres of wool, silk and cotton material per day, which is sent to the other factories, to be turned into suits, dresses, coats and hats. This centralised cutting enables the introduction of a very high grade of

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rationalisation, as practically every inch of material is utilised.

The Knitting Industry

Important progress has also been made in the knitting industry though the Five-Year Plan has made practically no provisions for its development. Before the war there were only 13 factories situated in the present territories of the U.S.S.R. as the industry was mainly concentrated in Poland and Lithuania. These thirteen factories worked up about 1,000 tons of yarn per annum, while in 1932 approximately 24,000 tons were used up. As compared with the last year before the introduction of the Plan, the consumption of yarn has been increased fourfold.

From a small-scale handicraft branch of production it has grown into an important branch of industry. Output in 1932 was valued at more than 400 million roubles. Large knitting mills have now been erected in various parts of the country and the production of knitting machinery has been organised on an extensive scale.

TRANSPORT—MEANS AND REQUIREMENTS

THE difficulties encountered in the realisation of the Plan were tremendous, and those connected with transport were of the first and most serious ones. Almost throughout the planning period the country suffered from inadequate transport facilities—railroad and water. The country had always been undersupplied in this respect whether measured by area, population or goods to be transported.

In its railway system Tsarist Russia was among the most backward countries in the world; inland navigation remained largely undeveloped and efficient road transport was practically non-existent. What railway and waterway traffic Russia possessed was concentrated in the European part of Russia, while the wide territories of Asiatic Russia remained in a primitive state. During the periods when road communication was made impossible by prolonged seasonal rains, towns and villages which were not linked by railway systems—and they were in the majority—were completely cut off from each other.

But things went from bad to worse during the Great and Civil Wars, and the primitive transport system was

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reduced to a deplorable state. It is sufficient to mention that the number of engines, trucks, and ships out of service considerably exceeded those in service, besides which most of the bridges had been destroyed, and rails stretching over thousands of kilometres had been ripped up.

Reorganising the Railway System

The Soviet Union set itself the task of restoring and at the same time remodelling the railway system, and at the outset of the first Plan the preliminary work had been completed. In 1928 the railways carried 150,600,000 tons of goods as against 132,400,000 tons in 1913 ; 88,200,000,000 ton-kilometres were worked as against 65,700,000,000 ton-kilometres in 1913. Even greater results have been achieved with passenger traffic, the number of passengers in 1928 reaching 281,000,000 as against 185,000,000 in 1913.

The Plan for the development of railway transport was drawn up in two alternative schemes : one was considered to represent the minimum of development and the other, known as the "maximum" scheme, was to be carried out in case of especially favourable conditions. In the process of realising the Plan the development of transport has been so rapid that it has even exceeded all the schedules of the "maximum" scheme.

Preliminary results of the Plan are now available. Of the carriage of goods and passengers it may be

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stated that the actual results from year to year have exceeded the total estimated expectation of the Plan.

The freight turnover scheduled for the fifth year was exceeded in 1931, i.e., in the third year. It is interesting to note that owing to the systematic distribution of work between the various forms of transport, river navigation, as a cheap and convenient form of transport for mass cargoes, increased its share in the country's general freight turnover from 21 per cent. in 1929 to 26 per cent. in 1932. The same progress was also attained in passenger transport, the figures for five years having been considerably exceeded in four years.

Achievements such as these have been made possible by the improvement of the transport system on the technical side which synchronised with its reconstruction. The total capital investments in railways, river, marine and motor transport during the period of the plan has exceeded 9,530 million roubles instead of the scheduled 6,430 million roubles.

During these four years 5,500 kilometres of new railway lines have come into operation, including Turksib which connects Siberia with Central Asia and also a large number of secondary tracks have been laid down. Soviet transport enters the second Five-Year period with a railway network of over 82,000 kilometres as against 58,200 kilometres in 1913. Railway stations and junctions have been extended and reconstructed; 330 kilometres of railway lines have been electrified, including that of the Souram Pass, and work

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is proceeding on the electrification of 1,638 kilometres. Considerable success has been attained in the application of automatic pulleys, brakes, and couplings, and 3,300 new engines, 98,000 goods trucks and 4,500 passenger waggons have been put into operation.

Waterways

The navigable system of waterways in operation reached in 1932 some 85,000 kilometres. Waterways with nightly illumination of fairway have increased from 36,000 kilometres to 58,000 kilometres, while the stretch of riverways of standard depths has doubled during the period of the Plan. The construction of the Dneptrostroy solved the problem of the Dnepr and its transformation into a navigable river along the whole of its course. Navigation conditions have been considerably improved on all rivers, including those neglected in pre-war time, the giant rivers of the east and those of the borderlands. The total length of the navigable network has increased by 8,000 kilometres.

In regard to sea transport, a considerable increase has been effected in the number of regular lines in every one of the ten seas which wash the shores of the U.S.S.R. There are a number of new lines on the northern maritime routes, and in addition ports have been restored and re-equipped, while a number of new ports have been established. At the time the Soviet Government assumed power the ports were in a dilapidated condition. During the war foreign shipments

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were confined to a few, more or less, protected ports, while the remainder were largely neglected. The result was that the efficiency of the Russian ports was reduced to approximately one half. The years of civil war had a particularly bad effect, for many of the seaports served as a base for the invading foreign armies, and were also the scenes of great strife. Buildings, equipment and machinery were plundered and destroyed.

The Five-Year Plan provided for a doubling of the shipping capacity of the important ports and this programme was fully carried out. Dockyards have been constructed, wire and radio communication set up and the time control system, similar to that of the railways, has been adopted for shipping.

Road Transport

Achievements in road transport have also been considerable. There have been put in operation some 85,000 kilometres of new roads, gigantic automobile-construction works have been built in Moscow and in Nizhni-Novgorod, and a third, intended for the manufacture of motor lorries, is nearing completion in Yaroslavl. In civil aviation there will be this year 50,000 kilometres of lines in operation, exceeding the schedules of the Five-Year Plan by 20 per cent.

By the nationalisation of transport and the systematic utilisation of ships and the railway rolling-stock, results

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have been achieved which far surpass those of the pre-war period. For the operation, for instance, of a volume of river transport far in excess of 1913, only half of the steam vessels and one-third of the sailing vessels in commission in 1913 are needed to-day.

Similar achievements have been recorded on the railways. Though the average axle load was scheduled for 1933 at 4.85 tons in 1932 already 5.5 tons had been reached. The axle load on passenger coaches in 1932 was ten tons, instead of six as scheduled in the Five-Year Plan.

Important results have been achieved in connection with improving the conditions of labour for the transport workers, among whom unemployment had been entirely eliminated. The number of transport workers of all categories employed is growing considerably from year to year. The number of permanent employees engaged in railway transport has increased from 878,700 in 1928 to 1,165,100 in 1931.

But in spite of its unprecedented development, the Soviet transport industry has not yet attained the high rate of progress aimed at. The growth of the industrialisation of the country, the reconstruction of agriculture on the basis of collective farming and its transformation into a highly mechanised agricultural system, the development of new areas possessing vast natural resources, the rise of *the borderlands* through their being drawn into the economic life of the country—all these factors have put a heavy strain on transport. Therefore much as has been accomplished it cannot

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keep pace with the ever-increasing demands of industry and other branches of the national economy—hence the very serious difficulties which the country has experienced on that account.

Transport Programme for the Second Plan

The principal task of the transport system under the second Plan is to accelerate development in order to catch up with the general rate of progress and fully meet the growing demands put upon it. The completion of the first Plan for transport in four years has created a solid foundation for the realisation of this important task.

The second Plan is being drawn up on a basis of doubling the goods traffic, and more than trebling the passenger traffic.

In railway transport the Soviet Union has to complete a radical technical reconstruction, to build not less than 25,000 to 30,000 kilometres of new railways, with the electrification of not less than 18,000 to 20,000 kilometres of main and local lines for carrying heavy goods and passenger traffic. This work is intended to benefit in the first place the most backward and distant areas of the Union.

The introduction of powerful locomotives and heavy cargo trucks, and a wide use of Diesel engines, is included, and at the same time the second Plan is projecting the construction of a number of new bridges over the principal waterways.

Water transport developments will be rapidly

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carried out on a large scale in view of the backwardness of this form of transport. Its share of the general traffic turnover is estimated to increase from 26 to 30 per cent. towards the end of the second five-year period. In the first place the reconstruction of river and merchant marine shipping will take place on the basis of standardisation and specialisation. In ship-building use will be made of the latest internal combustion engines, electric motors, and improved types of steam power plant. The construction of new ship-building and repair yards will be carried out in accordance with the river and overseas traffic requirements.

It is aimed to utilise during the second five-year period thousands of kilometres of new waterways, and the construction of artificial waterways is to be greatly extended. The Plan includes a scheme for the creation of a "Greater Volga" with large hydro-electric stations and a minimum depth of four metres on the whole navigable expanse, the reconstruction of the whole of the Dnepr waterway, the reorganisation of the Marinsky system (section of Greater Volga from Rybinsk to Leningrad), and the construction of a canal to connect the Volga and the Moscow rivers.

The principal ports will be raised to the level required by world shipping. Wherever possible electrical equipment will be adopted. It is also hoped to develop motor transport to a great extent.

Airways

Aerial transport is of the utmost importance to the

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U.S.S.R. owing to vast territories still lacking transport and communication facilities. The establishment of extended regular air lines will greatly assist in the economic and cultural development of these areas which are at present most backward because of the absence of such facilities. Passenger air traffic has shown great improvement since the introduction of the Plan and in 1931 a total of 23,000 passengers were carried by Soviet air liners, while the distance covered was seven million kilometres. In 1928 only 8,653 passengers were carried, while the flights totalled in that year 2,383,000 kilometres. Mail and freight carried during the period has more than doubled during the same period, the increase being from 220,000 to 500,000 kilograms.

The Plan for the reconstruction of the air service provides for putting into operation many thousands of kilometres of new airways. The programme also includes the establishment in the U.S.S.R. of the longest regular air route in the world connecting Moscow and Vladivostok. The distance is more than 8,000 kilometres. The air line will be operated all the year round and the scheduled time from Moscow to Vladivostok will be forty-eight hours. Large five-motor air liners will be used for this route.

Transport Machinery

The transportation of oil products and the distribution of gas and electric power are also part of the second Five-Year Plan for transport. It is intended

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to build up a huge network of pipe-line and cables as a component part of the transport system.

For the realisation of this immense programme of transport development the second Plan provides for the creation of centres for the manufacture of transport machinery. For this purpose it is planned not only to reconstruct those in existence, but also to build new locomotive and waggon works, as well as automobile and aeroplane works.

The Soviet Union is faced with an immense task in developing its transport system, but the experience of the first Plan has shown that by systematic planning striking results can be attained. The achievements of the first Plan have created a solid foundation for the second Plan and have paved the way for further progress.

FOREIGN TRADE

FEW questions have attracted so much attention in connection with the Five-Year Plan as its programme of foreign trade development. The time has long passed when the Soviet Union could be considered a negligible factor in world trade. At one time it was generally held by the uninitiated that the U.S.S.R. could not be expected to increase production to a level which would enable her to augment considerably her exports and thus be in a position to import more. The fallacy of such a mistrust of Russia's economic capacity is now becoming manifestly clear, and the main factor under consideration at the present time is how Russia's development is likely to affect other countries.

The collectivisation of millions of peasant holdings has created the necessary conditions for an abnormal expansion of the purchasing power of the Soviet rural population. The establishment of agricultural machinery and tractor stations, the extensive plans of rural electrification, the organisation of large cattle-breeding farms,—all this required considerable quantities of agricultural and electrical machinery,

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implements and so on. The progress in industry and electrification created a wide demand for machinery, raw materials, transport equipment, etc. The growth and development of Soviet cities caused an immense demand for all kinds of industrial commodities which could only be partly satisfied.

The development of foreign trade was, therefore, one of the most important questions in the Five-Year Plan since the estimates were required to fulfil the following essential conditions :

Whilst being obliged to increase foreign purchases dependence on foreign imports were to be reduced.

The importation of goods was to be utilised as far as possible for the industrialisation of the country and for the development of agriculture.

Exports

The exports of the U.S.S.R., which were restricted owing to the backwardness of agriculture, were to be developed in conformity with the general growth of the various branches of national economy.

An important problem of the Plan was that of the development of exports. This was not actuated by a desire for profits but was determined solely by the country's requirements in imports. The extension of exports was only aimed at in order to provide funds abroad to pay for the increased imports required in connection with the realisation of the industrialisation programme. This scheme provided for gradually

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increased exports during the whole period until they amounted in 1932-33 to 2,047.5 million roubles.

In addition to the increase in exports a considerable change was planned to take place as far as the nature of the goods exported was concerned as compared with the pre-war period. The principal articles in the export list were timber, oil and other industrial products, whereas before the war grain and other agricultural products were the main articles of export from Russia.

The export of agricultural products including vegetables, animal products, game and fish formed about 75 per cent. of Russia's total exports before the war. Since the war the proportion of these commodities to the total exports from the Soviet Union has decreased and in 1931 they only formed 42.2 per cent. as compared with 65.8 per cent. in 1923-24. In 1932 the proportion of agricultural products in the total exports was even less.

In order to attain the expected total of exports, large allocations have been made for the development of timber, oil, flax and other industries working for export.

As a whole the development of foreign trade has not kept pace with the general growth of the productive system of the country during the operation of the Plan. While the volume of output in 1931 was more than double that of 1913, the export trade was only 811 million roubles as compared with 1,521 million roubles in 1913, that is, a decrease of 46.7 per cent. And there

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was a further reduction in the value of exported goods in 1932.

Difficulties Encountered

The Soviet export trade was faced with a number of difficulties in the past three years. The break in the world prices so far from being the handiwork of the Soviets, as some people asserted at the time, only increased the difficulties of the Soviet Government and prevented the realisation of the foreign trade section of the Plan. They had to increase considerably the quantities of the goods exported in order to maintain the necessary import of machinery required for the realisation of the Plan. Products had to be sold under extremely unsatisfactory conditions caused by the general economic crisis. Production was decreasing all over the world, the purchasing power of every country was steadily dropping with the resultant shrinkage of imports.

Every country was busily engaged in building up high tariff walls and restrictions which tended to retard the normal progress of world trading relations.

Other difficulties were due to the reconstruction work that was proceeding in the country itself. In exporting goods abroad, home industries and markets had to be considered first. It was necessary to give an impetus to the export trade without putting a brake on the industrial development of the country and without unduly depriving the population of articles of major necessity.

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The goods exported from the U.S.S.R. consisted mainly of the following five categories : grain, timber, oil, fur and flax, which formed from 70 to 75 per cent. of the total Soviet exports. The annual output of these commodities is subject to certain fluctuations, while owing to the restrictions imposed by some European countries upon the import of semi-manufactured products, and especially upon finished goods, the U.S.S.R. had to export primarily raw materials and semi-manufactured goods.

Seeing that for the Soviet Union exports are not the result of the necessity to find a market for the surplus production of industry and agriculture, which cannot be profitably disposed of on the domestic market, but serve merely as a means of paying for needed imports, the selection of goods for export is determined after careful study. In the first place, such goods are exported as can be spared with the least disturbance to domestic consumption and the national economy ; secondly, the condition of the world market is taken into consideration, such goods being selected for export as can most easily be absorbed by the world market.

Imports

With the expected expansion in the production of raw materials within the country, the import of raw materials has declined somewhat, while the import of cotton has ceased entirely. It was intended to utilise the available sums for the importation of goods for

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general consumption, which have been bought in very limited quantities before the introduction of the Plan. The importation of large quantities of such goods was considered desirable in order to raise the standard of living of the people of the Soviet Union. However, this part of the programme could not be carried out to any extent owing to the severe slump in prices of goods exported by the U.S.S.R. as a result of the general dislocation of the world market.

FINANCE AND THE BUDGET

THE Soviet system of national finance has no counterpart in any other country since the financial plan embraces a considerable proportion of the industrial, trading, transportation, and financial activities of the country. The economic transformation which is taking place in the country requires large capital investments. The erection of new factories and works, the reconstruction of agriculture, the building of new railways and roads, as well as the satisfying of the growing cultural requirements of the population demand the mobilisation of the financial resources of the country. In other countries economic development is financed from private resources and foreign loans while in the Soviet Union the State has to find all the necessary resources within the country. Systematic capital accumulation and utilisation of the available resources is therefore one of the most important duties of the financial system.

The vast rate of industrialisation produced serious changes in the relations between the classes, the number of workers has grown tremendously, while the private capitalist sector has been considerably reduced. The

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transfer of millions of small peasant householders into collective farms and the practically complete liquidation of the kulaks as a class, produced similar results in the villages.

The growth of national accumulation during the four years of the Plan has been very extensive and is estimated at 25,640 million roubles, including all the capital investments during that period. Excluding amortisation and enterprises which have been closed down, the net gain during the period represented more than 16,500 million roubles.

One of the serious reforms carried out in the financial system during the operation of the Plan was the adaptation of the entire financial and credit organisation to a system of economic accounting, and of accumulation of funds within the enterprises. The system of automatic crediting of State and co-operative organisations was abolished and the granting of credits was made dependent on the fulfilment of production plans by the respective economic organisations and on other economic factors.

Each organisation was made responsible for the realisation of its plans, the rationalisation of production costs, and accumulation of profits.

Another measure of great importance introduced during the operation of the Plan related to the diverting of profits from industry into the State budget. Previous to the decree issued on May 3rd, 1931, the major part—81 per cent. of the profits of industry, was

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transferred to the State budget and redistributed for the financing of the entire national economy. Now, however, most of the profits remain under the control of the economic organisations themselves to be used for capital investment, increasing the turnover funds, and so on. This decree strengthened the direct interest of the respective organisations in the accumulation of profits and hence in the lowering of costs and rationalisation of production.

A further decree, issued on December 2nd, 1931, provided that all industrial concerns and trusts should leave a part of the profits accrued in fulfilment of the Plan, for the direct disposition of the factories and enterprises which have earned them. All profits accumulated in excess of the amount planned shall remain with the enterprise earning them and utilised for increasing the capital investments for cultural and social needs of the workers and for bonuses.

The State Bank

The State Bank, which is the only short-term credit institution in the country, supplies credit to various organisations only for definite objects, and on conditions of refund at stated dates. By this means it was assured that the bank's resources would be utilised for purposes specified in the Plan.

Credits are granted by the State Bank only for building up stocks of raw materials, for fuel, productive and auxiliary materials, stocks of finished goods, their

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financing during transport, and so on, as well as for the different needs during the process of production. The necessity for repaying credits, the right of action against defaulting creditors, and the new system of floating capital, all induce the various institutions to limit their bank credits by increasing their resources and mobilising their own funds. The short-term credits may not be used to cover deficits or floating funds. Before the State Bank decides to give such credits, balance-sheets and reports must be submitted by the organisations seeking such credits.

The State Bank is now the central credit institution of the Soviet Union and has a wide power of control over the other banks. The resources of the State Bank which are used for financing the industrial and trading organisations are derived mainly from the following sources :—

1. From the bank's own capital, reserves and accumulated profits ;
2. From the Soviet Government's deposits with the bank ;
3. From the emission of banknotes ;
4. From the deposits of industrial and trading enterprises and private persons.

The bank's own resources (capital, reserves and undivided profits) amounted to 702.3 million roubles on July 1st, 1932.

The bank was granted the right to issue banknotes (chervontzy) on November 11th, 1924. By means of

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the issue of the chervontzy banknotes the currency system of the Soviet Union has been fundamentally reorganised. The issue of banknotes has steadily increased since January 1st, 1925, when 596 million roubles of banknotes were transferred to the head office and by July 1st, 1932, it had reached 2,925 million roubles. The firm cover of the issues has been maintained during the whole period at a higher level than the 25 per cent. of the value of the issue fixed by law.

As an issue bank, it engages in activities to maintain the stability of the chervonetz and to provide the Russian importers with such foreign currency as they require. It became necessary, therefore, for the bank to accumulate a reserve of bullion and currency, because the issue has to be covered to not less than a quarter of its value by bullion and stable foreign currency. The remaining three-quarters is covered by short-term bills and easily realisable goods or documents.

The growth of the national economy in the Soviet Union has been fully reflected in the activity of the State Bank. As a result of the economic expansion the bank has had to provide larger credits to the various industrial and business undertakings, while at the same time it has been receiving a great influx of resources.

The increased financing of national economy by the State Bank can be seen from the following figures: While the total outstanding advances on October 1st, 1929, was 3,903 million roubles on January 1st, 1932, the figure was 9,938 million roubles.

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The credit reform which was introduced in January, 1930, was one of the most important financial innovations in the Soviet Union. The main principle underlying it was the substitution of bank credit for goods credit. The change aimed at diminishing the need for the use of money by prescribing for State economic organisations a system of payment between themselves, based upon cheques and credit transfers, rather than upon actual cash payments.

Under the new system the State Bank became a sort of central clearing house for financial operations between industrial and commercial organisations. State institutions, co-operative organisations and mixed companies not employing foreign capital, were prohibited from supplying goods or rendering services to each other on credit, and all transactions between them were to be conducted on a strictly cash basis. The State Bank now provides credits not to the vendor of goods, as was the case under the system of discounting bills, but to the buyers of goods and the receivers of services in accordance with the credit plans.

Long-Term Credit Banks

The long-term credit banks of which there are the following four: The Long-Term Credits Bank for Industry and Electrification, the Central Municipal Bank, the Agricultural Bank and the Co-operative Bank, also supply credits only for definite objects. These banks aim at establishing strict principles of

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accountancy in the new enterprises over which the banks exercise a certain financial supervision. The credit institutions of the Soviet Union, particularly the long-term credit banks, while not of importance as far as independent accumulation of national resources is concerned, fulfilled an important function in supervising capital expenditure in connection with the Five-Year Plan.

The task of the Long-Term Credits Bank for Industry and Electrification is to accumulate the surpluses available at the various industrial enterprises and to redistribute them as industrial investments. The bank enjoys a number of privileges which enable it to carry out its work successfully, one of which is the right to deduct 10 per cent. of the net profits of State trusts and syndicates. It is also the duty of trusts and syndicates to keep in the bank, in the form of long-term deposits, half of the annual allocations to their extension funds and a considerable part of their free amortisation funds. This has enabled the bank to develop into an important redistributing agency of the resources available for investment in industry.

The bank's resources thus consist, in addition to its own share capital and accumulated profits, of the internal accumulations of the industries themselves, such as allocations from their profits, amortisation funds and non-utilised working capital. Other important sources of capital are the budget allocations for industrialisation purposes.

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During the last three years the activity of the Long-Term Credits Bank has increased considerably owing to the progress in new construction in industry and electrification. As a result of this activity the bank's influence as a redistributor of the resources obtained both from industry and the State budget has shown rapid increase.

In accordance with the sources from which the funds are obtained a different method of financial operation has been established. The credits supplied from the bank's own resources are given at a definite rate of interest and are repayable at fixed periods. No interest, however, is charged for the advances made from the other resources and these are not repaid by the customers. The bank in accordance with its charter exercises financial control and watches that the advances made by it are utilised in accordance with the plans approved by the respective People's Commissariat and that the work is carried out with the maximum efficiency.

The work of the bank has proved so satisfactory that it has been decided to organise long-term credit banks also for other branches of national economy, such as transport, agriculture and co-operation. This specialisation of banks is all the more necessary in the Soviet Union now that a large number of enterprises are being completed and are starting their productive activities. As more and more units are put into operation the financing of new construction will be carried out on a

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still larger scale by utilising the profits deducted from and the capital accumulations of the finished enterprises.

Mobilisation of Resources

The principal means of mobilisation and redistribution of financial resources is the State budget. Through this is achieved both the redistribution of the resources of the State and co-operative organisations, as well as the mobilisation of the savings of the population. The Soviet budget consists of a Union budget, the budgets of the various republics, and local budgets for the villages, towns and regions. Each of these budgets has its own sources of revenue—that is, its place in the general system of redistribution of the national income as well as its own items of expenditure.

In addition to the budget and credits, the finances of the economic organisations also occupy an important position in the financial system of the country. Not all the resources accumulated by the various State organisations are drawn into the national exchequer. Only the excess of such accumulations is appropriated by the budget and is utilised for redistribution to organisations requiring financial aid. The major part of the investments of individual organisations and the working capital is, however, obtained from their own accumulations.

Through the budget about 70 per cent. of the resources of the organisations are redistributed. The 1932 budget estimated about 80 per cent. of the total

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revenue to be derived from the State and co-operative organisations. The greater part of the profits, however, accumulated during the period, remained within the organisations for their own use.

A considerable proportion of the resources of the population is utilised for budget purposes in the form of subscriptions to loans. The improvement in the conditions of the workers and the rise in wages enabled the Soviet Government to increase the loans issued from year to year. The successful placing of the 3,000 million rouble loan in 1932 has made possible the complete realisation of the financial plan so far as revenue from loans is concerned.

Financing Economic Development

It is of interest to note that more than 70 per cent. of the budget expenditure is allocated for financing economic development. About half of the amount is utilised for industry and electrification, while the remainder is divided between agriculture and transport. The major part of the expenditure is devoted to capital reconstruction.

Social and cultural development in the Soviet Union is financed from the budget only so far as special educational and scientific investigation institutions are concerned. The major part of the expenditure on these requirements is met by the local budgets and by the social insurance system. Out of 9,325 million

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roubles spent on these objects the State budget contributed only 1,557 million roubles.

The great importance of the budget system in the financing of economic and cultural development will be seen from the sums spent on these items since the introduction of the Five-Year Plan. The total sum expended on these services from October 1st, 1928, to the end of 1932 has reached 73,000 million roubles. Out of this sum 51,500 million roubles, or 70.5 per cent. was utilised for the financing of economic development. During that period the budget has increased more than fourfold. In the first year of the Five-Year Plan the budget total was only 6,554 million roubles, in the second year it increased to 10,988 million roubles, in 1931 to 20,454 million roubles and the estimate for 1932 amounted to 27,542 million roubles.

The development of the country under the second Five-Year Plan will require considerable financial resources. According to the preliminary estimates for the period, capital reconstruction will require a sum of 140,000 to 150,000 million roubles, or more than double the amount spent during the first Five-Year Plan.

TOWN PLANNING AND TOWN BUILDING

AN important feature of the Five-Year Plan was the extensive town planning and building scheme. This included the erection of new industrial cities, new agricultural centres, and the rebuilding and modernisation of old towns. By its daring conception, by the extent of the effort required, by its scope and ultimate aim, it can rank amongst the greatest achievements under the Plan.

The basis for the new cities are factories or industry. The position of each is carefully selected from the point of view of economical production and distribution. As soon as the question of the site for the new industry is settled, the final city is planned as a complete unit. The erection of buildings of all descriptions proceeds simultaneously, so that by the time the factory is completed, the social needs of the workers to be employed there are also provided for.

All building is carried out according to a definite plan. New and existing cities are developed methodically according to pre-arranged schemes. Since the State has complete control over all building it is in a position to achieve a uniformity in town design and planning which is satisfactory from the aesthetic, utilitarian, and economic points of view.

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The main task was to expand town building to an extent that the requirements of the increased population and their new cultural needs are fully met. Before the revolution workers were mostly housed in the outskirts of the town in the worst type of slums, or barracks, while the centre of the town was reserved for the well-to-do citizens. In the outskirts, where the workers lived, there was usually no water supply, no pavement and, indeed, none of the elementary needs of civilised life.

Rents were very high and usually absorbed more than a third of the workers' wages.

The revolution changed all this. The houses which formerly belonged to capitalist owners were taken over by the town Soviets and the masses of workers' families were moved from the filthy outskirts to the central areas in the towns. For the first time Russian workers were provided with the usual amenities of modern civilised life.

Great Difficulties Surmounted

At the same time the Soviet State had to overcome great difficulties.

The town planning of pre-war Russia lagged far behind most European cities and declined still further during the war and civil war when no repairs were carried out, while many of the towns were ruined and in others great damage was done during the struggle.

After the termination of the civil war the Soviet State



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had first to restore the industrial and agricultural life of the country. The restoration of towns was of necessity a secondary consideration.

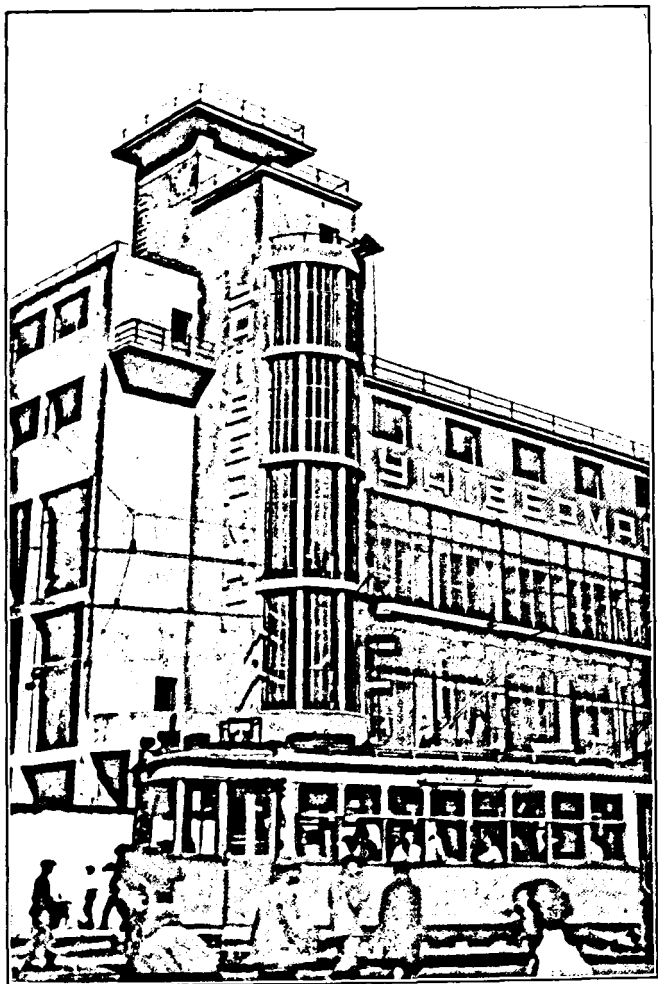
It was only after the introduction of the Five-Year Plan that it was possible to take up the problem of town planning and house building in a serious and thorough manner, and the results of this effort are already manifest. The Soviet Union has not only completed the work of restoration, but has carried out an extensive scheme of new construction.

The industrialisation of the U.S.S.R., the establishment of factories in areas which had previously been purely agricultural, and the reorganisation of agriculture on socialist lines, necessitated vast town-planning schemes and the establishment of socialist cities in which healthy housing conditions are accompanied by cultural facilities, as well as communal restaurants, kitchens, crèches, wash-houses and so on, to help to liberate women workers from the drudgery of unnecessary household duties.

Under incredible difficulties the Soviet Union has accomplished feats of construction that have probably no parallel in history. The difficulties were manifold and were due to lack of resources, shortage of building materials and lack of technicians.

Town Building Activities

In spite of all these difficulties, considerable work has been carried out and important achievements reached.



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Architects and engineers were actively engaged in building the new socialist cities and in reconstructing the old. A special Commissariat was established to handle the problems of municipal economy, and a scientific institute has been formed for research work in this connection.

Abundance of air, sunlight and space was the guiding factor in the building of new cities. Although the housekeeping arrangements were socialised by the establishment of communal restaurants, kitchens, crèches, laundries, etc., each new house had everything required for individual housekeeping. Day nurseries, schools, libraries, clubs, theatres, sports grounds and parks were included in all plans.

Dwelling-houses were built near the place of work, with pleasant approaches through lanes of trees. It was aimed to avoid the concentration of large human masses and this was achieved by a planned distribution of industry over as wide an area as possible, taking into consideration the available supplies of raw materials, transport facilities, nearness to the consumption market and so on.

Industrial centres will be surrounded by extensive agricultural zones. Agricultural enterprises are to develop industries to use their products at the centre of production. The aim was that town and country should each acquire the best characteristics of the other and eventually merge so that there should be no such strict differentiation as there is now.

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While the plans for socialist cities were being elaborated the new industrial enterprises drew large numbers of workers and their families to formerly sparsely populated districts. Out of the barren wastes new industries were springing up, and thousands of people were concentrated to build and operate the factories. Cities had to be built before even the plans for socialist cities could be perfected. Though these new cities are far behind the plans for the socialist cities of the future, they are also far ahead of the settlements which they replaced.

A similar process has taken place in the villages. With the establishment of large State and collective farms, machine and tractor stations, which were applying industrial methods to agriculture, the village population concentrated into more compact units, and this led to a complete transformation of the countryside. With the development of local industries connected with agriculture, the centres of mechanised agriculture will form the basis of hundreds of new towns in the agricultural districts.

From the Arctic to Baku and from Minsk to Vladivostok rose the new towns of the Soviet Republics, which not only provided the workers and peasants with modern houses, but also with a new cultural life, which plays its part in the development of the country and the sweeping away of the old limitations and ignorance.

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Overcrowding Due to Influx of Population

One of the great difficulties that is facing the principal cities is the large influx of population as a result of which there is considerable overcrowding. The process of growth of the town population has been continuous and uninterrupted in the past few years. Before the war the urban population of Russia was 21 million persons and in 1931 there were already 34 millions. In 1926 there were, in the Soviet Union, only thirty-one cities with a population of 100,000 or over, by 1931 the number of such cities increased to forty-five. Since that time, however, several new cities have entered that category.

While an enormous amount of building and repairing has been done, it has not kept pace with the growing population. Before the revolution the population of Moscow was 1,618,000. In 1920 it dropped to 1,027,000 and by 1931 it reached 2,800,000 persons. There has been a considerable increase since then. In 1931 new building accommodation was provided for 75,000 people in Moscow and during 1932 new quarters have been provided for 250,000 people.

The streets of Moscow have been paved, new electric lamps brighten the streets. Hundreds of new tramways, motor buses and cars help to solve the problem of transportation which is still very serious. The work on the Moscow Underground is now proceeding and it is hoped that it will be completed by January, 1934. The other large constructions include

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the Palace of Soviets, a large hotel, and several new suburbs. Preparations have also been made to build a canal linking the Moscow River with the Volga.

Town Amenities

Another example of the transformation of an old town is Stalingrad, formerly Tsaritsin. For 300 years this town stood on the banks of the Volga, and all that was added to it in the three centuries were fifteen churches, two high schools, 400 taverns, a bad water tower, and two small factories. Now there is a tractor factory, a shipbuilding wharf, sixteen technical schools, two institutes and a University. The new town is built over an area of 50 kilometres. Old Tsaritsin is crumbling away, and in its stead a new city is growing up.

A number of new towns have sprung into existence since the introduction of the Five-Year Plan, while many of the old towns are undergoing complete transformation. The change from the old cities to the new is not only one of mere increase in the number of inhabitants.

The public utilities in the towns of pre-war Russia were extremely limited. For example, less than a dozen cities had electric tramways before the revolution. Now the number of those with electric tramways is more than thirty.

The same is true of the water supply and of the sewerage systems. Since the revolution about 200

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new water systems have been constructed, and the improved sanitary conditions resulting from this and other measures is seen in reduced mortality in Soviet cities to about half the pre-war figures. Thus planning and rebuilding are applied as far as possible to the old cities as well as to the new. Moscow, Leningrad, Kharkov, Kiev, Nizhni-Novgorod, Ivanovo-Voznesensk, Baku, Novosibirsk, Tashkent, Sverdlovsk, all these are being completely transformed as a result of the activities of the new towns.

A Great Achievement

Magnitogorsk is in the true sense of the word amongst the most notable achievements of the Five-Year Plan. There is the element of grandeur in this great enterprise. The huge works and the long line of brick and wooden houses are bounded on one side by the narrow Ural River and on the other by the Magnet Mountain, which is estimated to contain 300 million tons of high-grade iron ore. It was the presence of this ore that determined the selection of this formerly barren spot as the centre for the building of a great industrial city.

Magnitogorsk was the largest single enterprise undertaken under the first Five-Year Plan, though its completion will stretch out far into the second. By the end of 1932 it already had a population of 250,000 people.

The building of this town was fraught with countless

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difficulties. Shortage of engineers and skilled labour, the necessity of bringing up vast quantities of building materials, coal, foodstuffs from distant parts, with inadequate railway communication, and roundabout lines to this formerly deserted steppe, were some of the obstacles which had to be surmounted. However, the energy and perseverance of the builders is conquering all difficulties and gradually a work is emerging that will be a lasting monument to the creative effort of the nation.

Magnitogorsk is linked up economically with Stalinsk (formerly Kuznetsk) in Siberia, and has the largest deposits of iron ore in the Soviet Union, but it has no coal. Stalinsk, on the other hand, possesses the largest known undeveloped coal reserves of the country but no iron. The two districts have therefore been joined economically. Trains bringing coal from Stalinsk to Magnitogorsk are loaded for the return journey with iron ore. A large steel plant is being constructed at Stalinsk which is inferior only to that of Magnitogorsk and an important city is arising in Stalinsk around the metallurgical works.

Developments in Siberia

The development of Siberia makes increasingly heavy demands upon transport and in this connection the new port of Igarka near the mouth of the Yenisey River is of importance. Three years ago there were only a few dugouts on that spot. To-day a new town

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has sprung up with a population of more than 15,000 people. There is now a temporary port at Igarka, but a seaport is under construction so that ocean liners will be able to come right to Igarka in the future.

In summer Igarka is lighted by the midnight sun, in winter by electricity from its own power station.

A new House of Soviets and Palace of Labour are being built, and a large new theatre has been opened. There is a technicum, a high school, a number of elementary schools, a hospital, a dispensary and public baths. It is anticipated that by 1937 the permanent population at Igarka will reach from 50,000 to 60,000 people and it will then be the most populous industrial city within the Arctic circle.

On the northern shore of the Lake Balkhash in Kazakstan, a new city Kounrad is being built. Soviet geologists have discovered there large deposits of copper ore and a huge copper plant, the Balkhashstroy, was started. In connection with this plant, a town is gradually arising which is planned for 50,000 people. The investments in 1932 for the building of the towns were estimated at 24 million roubles. In addition to the water supply system, which is to be of most modern type, a large hydro-electric station of about the same size as the Dnepr station is planned.

New City on the Dnepr

Near the Dnepr hydro-electric station the Novoye-Zaporozhye city has been founded extending each side

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of the river. Five years ago there was nothing but an empty steppe and rustling grasses stretching over a wide plain. Now the whole spot is alive with activity. Large factories have been built and the city is to grow until it can accommodate a population of 250,000 people.

A huge dam, the largest of its kind in the world, 170 feet in height spans the River Dnepr over a distance of half-a-mile, and across it Lenin's slogan "Communism is Soviet Power Plus Electrification" in huge letters is brightly illuminated at night. On both sides of the river, houses, gardens, parks, paved streets, tramways, public baths and a theatre—all the features and essentials of a modern town. Already a hospital, polyclinic, a People's House, a Palace of Soviets, a school, a technical school with mechanical electrical and constructional departments, have been built and are in operation. The whole thing is one of the most worthy monuments of the Five-Year Plan.

Chelyabinsk Tractor Works

Chelyabinsk is seeing the largest heavy tractor plant in the world erected two miles away from its walls. The Chelyabinsk tractor works, which is scheduled to start operation early in 1933, is equipped to produce 60,000 caterpillar tractors of ten tons, 60-horse-power. The first year the output is to be 10,000 and the plant is to work to full capacity in 1935.

Chelyabinsk is particularly suited for this plant. It is

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the centre of the Ural territory and an important railway junction. It is conveniently near the sources of supply of its main raw materials—timber, iron, steel and copper—all the necessary materials are there in sufficient quantities to ensure production. The adjoining heavy soil of Western Siberia is admirably suited for the use of the caterpillar tractor. In the neighbourhood of the factory, brick houses have been constructed for the workers already there, and new standardised houses are being erected to accommodate the workers who will man the factories when completed.

Growth of Sverdlovsk

Sverdlovsk, the former Ekaterinburg, bears testimony to the rapid industrialisation that is proceeding in the Soviet Union. Before the war Ekaterinburg was a sleepy town of about 75,000 inhabitants. The present Sverdlovsk boasts of more than half-a-million citizens and its process of growth is far from being at an end. So fast is the rate of its development that it is expected to have a population of a million-and-a-quarter five years hence, when the second Five-Year Plan will come to an end.

The principal works in that town are a machine building plant, the Uralmashstroy, which can range amongst the largest engineering works in the world. The mechanical department alone covers an area of almost 14 acres. This plant gets its power from an immense gas works consuming about 100 carloads of

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peat a day. The energy is conveyed to the works through a system of tunnels a mile long.

Like many of the other Soviet factories, Ural-mashstroy is planned to extend its capacity until its originally planned output of 100,000 tons a year will increase to 175,000 tons.

In addition to the factories and works already existing in Sverdlovsk very extensive schemes will be carried out during the second Five-Year Plan. The most ambitious of these is the construction of about fifteen new works devoted to the production of every kind of electrical equipment, including generators, turbines, transformers, cables and so on. These works are to employ about 100,000 people and will be the largest in the world engaged in the production of this kind of equipment.

The other works planned in Sverdlovsk include one for the production of excavators and another for the production of equipment for chemical factories. The completion of this extensive programme is sure to make Sverdlovsk one of the largest industrial cities in the world.

Kandalaksha Chemical Combine

In Karelia a new town has arisen in the past few years, Kandalaksha in the place of a small fishing village of the same name which existed there before the war. There is already a population of 12,000 in Kandalaksha, and the town is still growing rapidly and it is estimated

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to have 90,000 inhabitants by the end of 1937.

The large Northern Chemical Combine is established there, where Khibinsk apatite and nepheline is being developed. Three electric stations of a total capacity of 264,000 kilowatts are under construction, the first was completed ready for service by January 1st, 1933.

Kandalaksha is, as a result of this industrial activity, being transformed into a large Arctic city; sawmills, fish-canning factories and building material works have been established.

Central Asia

In Central Asia a new town, Frunze, has sprung up with a population of 100,000 in place of the old Pishpek, which had from 5,000 to 6,000 inhabitants. Frunze, which is the capital of the Kirghiz Republic, has now a number of industries including a sugar factory, a textile mill, machine shop, pharmaceutical factory, rice-cleaning plant, cannery, meat-packing plant, macaroni factory and a number of brick kilns. Many public utilities have been started, children's institutions, clubs, public baths, a scientific research institute, a regional museum, agricultural and other colleges, a national theatre, five cinemas, a park and a new hotel.

Novy Chardzhuy in Turkmenistan is being built near the old Chardzhuy, a typical old Asiatic city, with dirty and with narrow streets. The new city has already a population of 90,000. The various constructions

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at present being erected include government departments, an apartment house for specialists, a printing combine, and a refrigerating system. When these are completed there will be erected a silk-spinning plant, a building material plant, while a large paper, textile, hosiery and artificial fibre mills are planned.

The former mountain village, Dushambe, has now become Stalinabad, the capital of the newly-created Tadzhik Republic. There were 600 inhabitants in Dushambe before the revolution ; it has now increased to 60,000.

A railway station and two theatres have been built in Stalinabad. A branch of the Academy of Science of the U.S.S.R., schools, day nurseries, a hospital, a workers' club, a Red Army house have been established. The streets and the new houses are electrically lighted. The hydro-electric station is connected with the largest irrigation works in the U.S.S.R. Squares and parks have been laid out ; there are motor-buses to connect the more distant parts of the town, while industry is not neglected. The industrial enterprises include a factory producing construction parts, and a machine shop.

Cheremkhovo in Eastern Siberia, was comparatively recently a small Siberian village, but has now a population of 40,000, and is one of the largest cities in that region. There is every likelihood that it will soon become the largest coal and metal centre of Eastern

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Siberia. Its metallurgical plant is to have an output of 1,150,000 tons of ferrous metals and will also be the centre of zinc, lead, aluminium and machine industries. An electric station of 50,000 kilowatts is at present under construction which is to be extended afterwards to 300,000 kilowatts capacity.

Other Regions

Even as late as 1929 only a few nomadic Laplanders lived in Khibingorsk in the Arctic regions below Kandalaksha, and in 1930 its population was 160 persons. The discovery of Khibinsk apatites started the development of the town. At the beginning of 1931 there were already 15,000 inhabitants, while the figure has now risen to 40,000. Houses of all kinds have been erected there and modern improvements introduced.

Between 200 and 300 kilometres from Moscow, not far from the former Tolstoy estate, in the centre of the coal basin of the Moscow region, in the midst of typical old Russian country houses with thatched roofs, a new group of miners' houses are rising, and the foundation is laid for a new town designed by an Argentine architect.

A hundred kilometres further south, at Bobriki, a new town is springing up with a population of 50,000 people around the electro-chemical combine which has been constructed there. Before the revolution this was only a workers' settlement, but now it has assumed

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the aspects of a modern town, with new houses, clubs and theatres.

Prokopevsk, in the centre of the Kuznetsk basin, is a younger brother of Magnitogorsk. Before the revolution there was one small railway station, Gussyaty; now there is a town of 100,000 inhabitants as a result of the new industrial activity.

The architecture of the planning period shows remarkable courage and vision. Modern Russia is seeking a new form of expression in architecture, which should be suitable to the specific conditions of the country and be in harmony with the Communist ideal. And they have found it in the direct, simple and honest straightforwardness of the modern style, with its complete absence of ornaments and mouldings. Fine examples of this new architecture, noble in its utilitarian severity, can now be seen in every town of the U.S.S.R.

PUBLIC HEALTH

THE Five-Year Plan provided not only for the erection of new factories and works, large farms and electric stations, cities and towns, but also included an elaborate programme for the setting up of gardens and parks, public squares and children's playgrounds, hospitals and sanatoria.

Medicine is a State function in the Soviet Union and its principal aim is to keep the population in good health. Health facilities are free to the population and practically all doctors are employed by the State. Private practice continues to some extent, but it is merely incidental and on a small scale. The laws of labour protection and social insurance are so drafted as to safeguard the health of the people. The code provides for social insurance to cover free medical service, as well as payment of wages during illness, leave with pay for pregnant women for a period of six to eight weeks before, and a similar period after childbirth, old age and sickness insurance, death benefits, and so on. Maternity relief provides also for a wage increase during the nine months after the baby's birth for its nursing and care.

Sanitary Improvements in Cities

The sanitary and health amenities of the country have by no means been neglected in the Plan. In the

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new towns and in a number of the old, a water supply and a sanitary drainage system have been introduced. By the end of 1932 some 360 towns have had a water supply installed as compared with 210 before the war, while seventy towns have had a modern drainage system built. Before the war only nineteen Russian towns had a regular system of drainage.

Many of the visitors to U.S.S.R. have a great deal to say about the overcrowding prevalent in the principal Russian towns. In all such reports, however, not only present conditions must be taken into account, but also the starting point and the achievements during the intervening period. Very little is known of the terrible insanitary and overcrowded conditions under which a large proportion of the town population lived before the war. Even in a city like Moscow nearly a third of its population—500,000 out of a total of 1,650,000—lived in lodging-houses and barracks (often men, women and children together) under most undesirable conditions of overcrowding, squalor and dirt. These lodging-houses were used by factory workers, shop assistants, hawkers and others of the low-paid and poor sections of the population.

There is no wonder that the mortality rate was very high in Tsarist Russia, being about 30 to 32 per thousand as compared with only 14 to 18 in other European countries. Even in 1913, of every thousand infants born in European Russia, 275 died before they were



"PLAYING THE GAME" IN THE CHILDREN'S TOWN OF THE PARK OF CULTURE
AND REST, MOSCOW

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one year old. By 1930 the death-rate amongst children was 130 per thousand.

Housing Problems

One of the first acts of the Soviet Government was to organise a fairer distribution of the available dwelling space. With this end in view, it nationalised all the large buildings in the towns while the smaller houses were left in private hands. About 50 per cent. of the total urban dwelling space was nationalised, the proportion in the large towns being about 80 per cent. The workers who had lived hitherto in cellars, barracks or in overcrowded insanitary houses, were accommodated in the large, better-built, more sanitary nationalised houses.

The external aspect of this reform was undoubtedly not pleasing. It is manifest that a building which housed a single family with numerous servants was maintained in a far better condition than it was when it housed several workers' families not accustomed to the comforts of higher class life. However, from the point of view of national health, there can be no question as to the justification of the reform.

In Moscow alone, about half-a-million workers' families were taken away from the squalor and overcrowding of their old habitation, and were to experience for the first time in their lives the joys of living in a well-constructed house in the centre of the town.

Soon after the cessation of the civil war, the Soviet

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Government proceeded as rapidly as possible with the restoration of the pre-war national economy, and as far as their means allowed, with the capital repair of houses, a great many of which were either destroyed or came into disrepair during the years of the war and civil war. At the same time, a start was made with the construction of workers' settlements for the oil workers in Baku and Grozny, the miners in the Donetz, the textile workers of Ivanovo-Voznesensk and so on. These settlements were fitted with running water, proper drainage system, and electricity, and were provided with public gardens and other amenities.

With the completion of the restoration period and the introduction of the Five-Year Plan, housing construction became more and more intense and formed part of a systematic scheme of town building. During the operation of the Five-Year Plan approximately 5,000 million roubles (about £500,000,000) have been invested in new housing.

Health Centres

Considerable progress has been made under the Plan in establishing health centres in the various towns and large villages. The increase in the number of medical centres has resulted in greater efficiency in the organisation of health work, especially in the villages. The establishment of dispensaries, maternal and infant clinics, which have more than doubled during the operation of the Plan, has tended in the same direction.

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Maternity and infant protection is given first consideration, since infancy is regarded as the decisive period for the building up of a healthy people.

Each health centre is a complete organisation embodying a large number of functions. It has to organise a system of registration, observation, prevention of disease, as well as research in industrial and community causes of disease. Its activities extend from inspection of the home, food and water supply, working conditions, to medical treatment, training of nurses, and education of the individual. Each family is the centre of attention and case histories are kept of the family as well as of the individual. The district health centre has its laboratories, disinfectant station, equipment for electro- and hydro-therapy, X-ray department, dietetic kitchen, drug stores, social welfare and health education departments.

The number of doctors has increased by nearly one-half under the operation of the Plan, while the increase as compared with 1913 was more than fourfold. Nearly half of the doctors in the Soviet Union are women.

Everywhere one can see health propaganda and instruction for health culture and physical fitness have become almost a religion in the U.S.S.R. The Soviet Union takes great pride in her parks of culture and rest with their sports grounds, swimming pools, theatres, cinemas, libraries, etc., and such parks are being established in every town.

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Children's Townlets

An important feature of these parks is the Children's Townlet, where parents may leave their children to be fed and cared for for a whole day at a cost varying in the different towns, and in accordance with the age of the child, from sixpence to about one shilling.

Each townlet comprises a number of buildings surrounded by a garden and children are accommodated there from four to about fourteen—each of the buildings accommodating children of a different age. There are nurses and instructors to look after the health of their young charges and to teach them games, music, dancing, eurhythmics. In the workshops they amuse themselves with learning to make their own toys, while in the children's theatre they act their own plays. In the garden they have their little plots where they cultivate their flowers and vegetables. To prevent the spreading of infectious diseases amongst the children, each child is medically examined as he comes in. His clothes are taken away and he is given only a pair of shorts. There are wash-basins and shower-baths, and the children are taught how to use these as well as how to take care of their health.

Welfare of Workers

The realisation of the Plan resulted in the absorption into industry of several millions of workers and this necessitated a considerable extension of the health work in the country. Every Soviet worker and employee

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receives annually, from a fortnight to one month's holiday with pay. Those in need of longer rest are also provided for. The Government supports this work as an investment in the physical and mental welfare of the workers. To care for the worker's health is considered a social need. The sick worker, after examination by a doctor under the direction of the State Institute for Health Resorts, is sent to the resort that is best suited to his complaint and where he can receive the best treatment.

The healthy worker either rests at home or takes a tour under the direction of the Proletarian Tourist Society, which has branches in practically all factories.

Rest Houses

There is a large variety of rest houses, sanatoria and so on and these have been established during the operation of the Plan in hundreds. In addition to those built by the Social Insurance Central Committee numerous establishments have been erected by factories, works, department, etc., for their workers and employees. It is manifest that the intellectual worker has different rest needs from the manual worker. Some are healthy, others have mild illnesses, while still others have the beginning of serious complaints and need months at some sanatorium. Serious investigation has been conducted by a number of Soviet scientists on the effect of various altitudes and climates

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on different diseases, and as a result 10,000 sites for new resorts have been chosen.

Near Moscow a new health city, the Green City (Zeleny Gorod) is to be built under the second Plan. No factory, workshop or industrial enterprise will ever be built on this area, and the whole 15 square kilometres of it will be used for the construction of rest houses. When the Moscow and the Volga rivers are joined, the fresh waters will flow through the centre of the Green City and provide it with bathing accommodation.

EDUCATION FOR THE PEOPLE

EVEN the greatest enemy of the Soviet Union will not accuse it of indifference to popular education. When the Soviet Government assumed power it was faced with the formidable task not only of fighting ignorance, but the complete illiteracy of about 70 per cent. of the population. The energy and enthusiasm with which they threw themselves into the work of educating the people certainly deserves the highest praise.

Education in the Soviet Union must of necessity be different from that in other countries, because the system of society is different. The principal aim of the Soviet educational system is to bring up the pupil to be a worthy member of a co-operative State. He must prepare himself to be an efficient worker in his particular vocation and he has to learn how to use his leisure wisely.

Important strides have been made during recent years in extending and improving the educational system of the country. From the pre-school institutions to the colleges and universities, every branch of the educational network has been largely developed. And the achievements in the educational sphere during the past four years have gone far beyond those originally

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outlined in the Five-Year Plan. Especially outstanding have been the results attained in the fight against illiteracy and in introducing universal, compulsory primary education. As a consequence of the great drive for education nearly one-half of the population was attending schools, evening classes or courses of some sort in 1932.

Since the revolution about 30 million illiterates have been taught to read and write, and about three-quarters of these during the period of the Plan. It is now anticipated that by the end of 1933 illiteracy will be non-existent in the country. This accomplishment is due to a considerable extent to the efforts of millions of voluntary teachers who have taught classes of illiterates in their spare time. An attempt is now made to establish universal education for adults, including the rudiments of social science, chemistry, physics, biology and the technical processes of production.

State provision for the educational and physical development of the child begins practically at birth and continues until educational training is completed, whether this stage is reached on completion of school or university. Up to the age of three, the child is cared for in a nursery while its parents are at work. From three to seven years it attends a kindergarten. From seven to fourteen or fifteen, school, and then some of them continue their technical education supplemented by a certain amount of actual factory

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experience while others go to work, but have to attend classes.

The schools of the Soviet Union are largely self-governing which greatly increases the value of their work.

Soviet Schools and Technical Colleges

In the reform of the educational system, instituted in 1930, the schools were reorganised into a unified system of polytechnical education. The word "polytechnical" is used in the sense of training all children from the very inception of their education in certain fundamental principles. Under this system every school, from the primary school to the university, is linked up with an industrial or agricultural enterprise. With the youngest children this takes the form of visits and excursions to factories and farms.

The aim of the educational system is thus to link up the school or college work with practical social and technical problems from the very beginning of the educational process, and to bridge the gulf between theory and practice. In the technical institutes and colleges the students divide their time between theoretical and practical work in industry, while the teaching, is, to a great extent, in the hands of engineers and specialists actively engaged in the work of the respective industries.

The training of skilled workers, engineers and technicians is now under the supervision of the various

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Government departments in control of industry. Each industry is directly responsible for the technical training in its own branch and must provide the necessary facilities for the purpose. This system marks a radical change from that prevailing in the early years of the Soviet régime, when all types of education were under the direct control of the Commissariat for Education.

A close connection has thus been established between school and factory. The rapid development of industry has made each year heavy demands for the training of qualified workers, engineers and technical men and the educational system has been adopted to satisfy this demand.

Combining Work with Study

The first factory schools were introduced in the Soviet Union in 1921. They were established on the principle of combining education with productive labour. From the day of their entry at the age of fourteen into a factory, the working youths receive at the factory school, or the district school, instruction of a general character, together with social, political, and technical tuition both general and specialised. In a little over eleven years, from the introduction of the schools, to 1932, the number of pupils had grown to 600,000. Including branches like agriculture, transport and trade, the total number of youths receiving instruction in 1932 was more than one million. The

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growth of the factory school system during the last few years has been mainly due to the fact that the schools embodied in practice the principle of combining instruction with practical work, and thus provided better qualified workers for industry.

In the last year before the introduction of the Plan in 1928, there were only 65,000 pupils in the factory schools, which was about half of the total number of juveniles employed. The remainder either received no instruction whatever, or were taught only the productive processes of the industry in which they were engaged. They received no tuition in science, and no general education, or political and technical instruction. At the beginning of 1931 already three-quarters of the juveniles employed in industry were receiving instruction in the factory schools, while at present only a negligible proportion of them employed in small concerns are not receiving instruction.

Under the second Five-Year Plan it is aimed to complete the task of establishing a universal, compulsory polytechnical education for all children and adolescents of both sexes up to the age of seventeen. A greater number of children will also be receiving pre-school education. The amount allocated for educational cultural purposes under the second Plan is about three times the sums spent under the first.

In addition to the development of technical education, which covers at present practically all workers' children and a considerable proportion of the children

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of collective farmers, extensive progress has been made with various forms of technical instruction among adult workers. In the majority of large factories various technical schools, courses of instruction, and study circles have been established. These provide short terms of tuition of less than a month and long terms of from two to three years, at which adult workers are able to improve their technical knowledge. In some factories this form of technical education covers more than half of their workers.

In the majority of factories introductory courses are arranged which every new worker has to attend. In these he becomes acquainted with the factory, the nature of the production process, the position of the factory in the respective branch of industry, the Five-Year Plan as well as a certain amount of political information. Besides these introductory courses, there are schools and longer courses of instruction, where the workers receive a general or specialised education. There are also "improvement courses" to help the worker to move on to the next stage in qualification and to master new kinds of work.

As a result of the extensive development of technical education the Soviet Government has issued a decree that all workers employed in responsible and dangerous work must possess the necessary technical knowledge. After January 1st, 1934, no worker will be engaged for certain duties unless he possesses this minimum

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qualification and holds the necessary certificate to that effect.

In the last few years evening courses have been largely developed in connection with the secondary and higher educational establishments. These enable a highly skilled worker to increase his knowledge and to become a qualified engineer without interrupting his ordinary work.

Other Educational Facilities

The need for additional educational facilities has brought into being the "Workers' Faculties," which are attached to the higher schools with courses of three to four years' duration. These faculties are of a general educational character and their aim is to prepare workers for entry into the higher schools. At the present time large numbers of workers are receiving instruction at night without leaving their places of employment in these establishments.

That the workers are making good use of the educational facilities provided for them by the State can be seen from the fact that in 1932 more than a million students were attending technical schools. This represented a fourfold increase as compared with 1928. During the same period the number of university students has increased more than threefold and reached in 1932 a total of 500,000.

At the end of 1932 there were some 8,000 workers' clubs in the Soviet Union, each of them an educational

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as well as a recreation, social and political centre. There are usually libraries, gymnasia, theatres, cinema, restaurants, playing fields and so on, attached to the clubs. Almost every club has its own literary, dramatic, scientific, and sports societies. No workers' clubs existed in Russia before the revolution.

The Screen and Stage

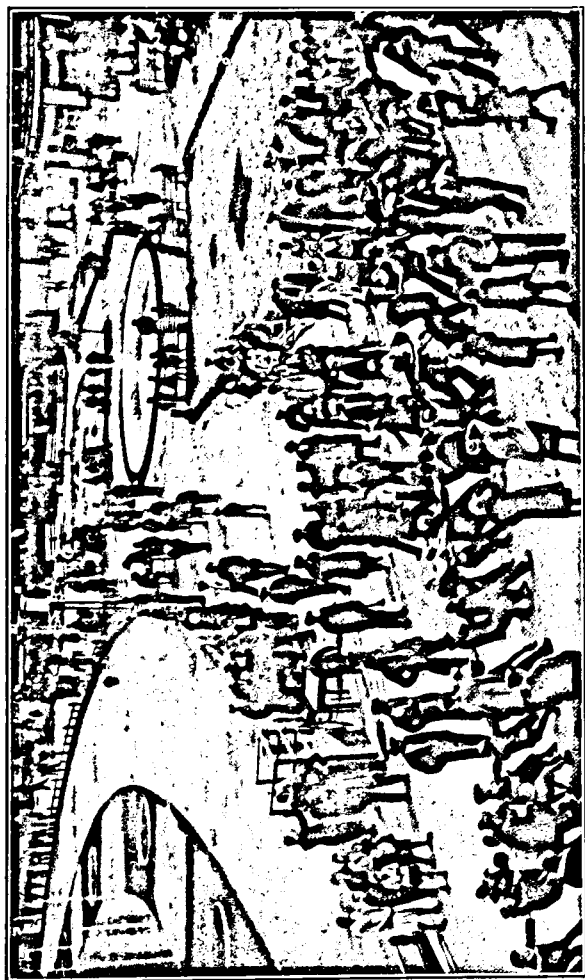
The cinema, like the theatre, is largely utilised in the Soviet Union for educational and propaganda purposes. Before the war everything connected with the film industry, including cameras, projectors and films was imported from abroad. Only few films were produced within the country. In 1913 there were in the whole of Russia some 2,000 cinemas, as compared with the 30,000 in existence in 1932.

The development of the film industry began in 1922-23 and during the past ten years it succeeded in establishing itself on entirely new lines. The Soviet Union manufactures at present also a considerable proportion of the apparatus used in the country, while the merits of Russian films have now attained general recognition.

In the past few years the increase in film output has been very considerable. From a modest beginning with twelve motion pictures in 1922-23, the total for 1932 was 600 full-length dramatic films and 1,000 six-reel propaganda films.



"A TUG OF WAR" AT THE SPORTS STADIUM, MOSCOW



"A TUG OF WAR" AT THE SPORTS STADIUM, MOSCOW

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The cinema has been extensively used to popularise the aims and objects of the Five-Year Plan amongst the population and by its wide appeal it has contributed in no small measure to its successful realisation.

The Reading Habit

Book publishing has also not been neglected and great efforts have been made to encourage both printing and distribution. There are nearly a hundred publishing houses in the U.S.S.R., the majority being either State, co-operative or trade union concerns and only a few private firms. In the past four years the number of books published has more than doubled and reached in 1932 18 million copies, while the programme for 1933 is for an output of 25 million copies.

There are also many organisations dealing with the distribution and popularisation of books. The greatest efforts are directed towards the villages and to the remote and neglected parts of the country.

One of the effective means of developing the reading habit among the masses is the extensive educational work which is carried on in the Red Army. At the completion of service every Red Army man is supplied with a small portable library, selected to meet his special and general interests. If a peasant he is given books on agriculture, cattle-breeding, agricultural co-operation, and so on, while a craftsman is supplied with books dealing with his particular craft.

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With the spread of literacy the newspaper habit is winning more and more converts with the result that both the number of newspapers and their circulation are constantly growing. Thus their number has increased from 576 in 1927-28 to more than 6,000 in 1932, while the circulation has grown from $9\frac{1}{2}$ to $38\frac{1}{2}$ million copies.

In the fight for culture the Soviet authorities are endeavouring to make full use of the numerous museums which the country possesses at the present time. Moscow alone has now about fifty museums of a very wide and diverse scope : of advanced western art and eastern culture, the eighteenth century and porcelain, modern machinery and pedagogy, export commodities and folk songs, toys and labour protection.

Both the number of museums and the objects preserved in them have greatly increased as a result of the social changes brought about by the revolution. All large private collections were nationalised and a number of palaces, churches and mansions transformed into museums.

After establishing the museums, new functions and duties were assigned to them. Instead of being merely repositories of rare objects, accessible only to scientifically trained people, they have been converted into schools of art, science, life and so on.

The educational authorities have grasped the possibilities of the museum as a medium of popular

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instruction and a successful attempt is being made to utilise them to the maximum for the spreading of culture amongst Soviet citizens. They are nearly always crowded with eager groups of visitors, workers, Red Army men, school children, excursionists and so on, all eager to learn from the official guides everything they are capable of imparting to them.

Scientific Institutes

The advance made by Soviet industry in the past few years has been greatly assisted by the scientific institutes which have rendered considerable help in the industrial advance. These institutes are engaged in research on a definite and limited range of problems, for which they employ the highest specialists in the respective branches. The specialists are assisted by research workers, graduates of universities, or technical schools. An institute may work on the chemistry of coal or metals, or the physiology of certain specific wild plants, in short, on any one of the numerous scientific problems on which the advance of modern agriculture, industry and transport is based:

During the operation of the Five-Year Plan the number of institutes has been increased from 224 to 770. An important reform carried out during the operation of the Plan was the transfer of these institutes from the control of the Commissariat for Education to that of the various economic commissariats, whose needs the institutes served. They

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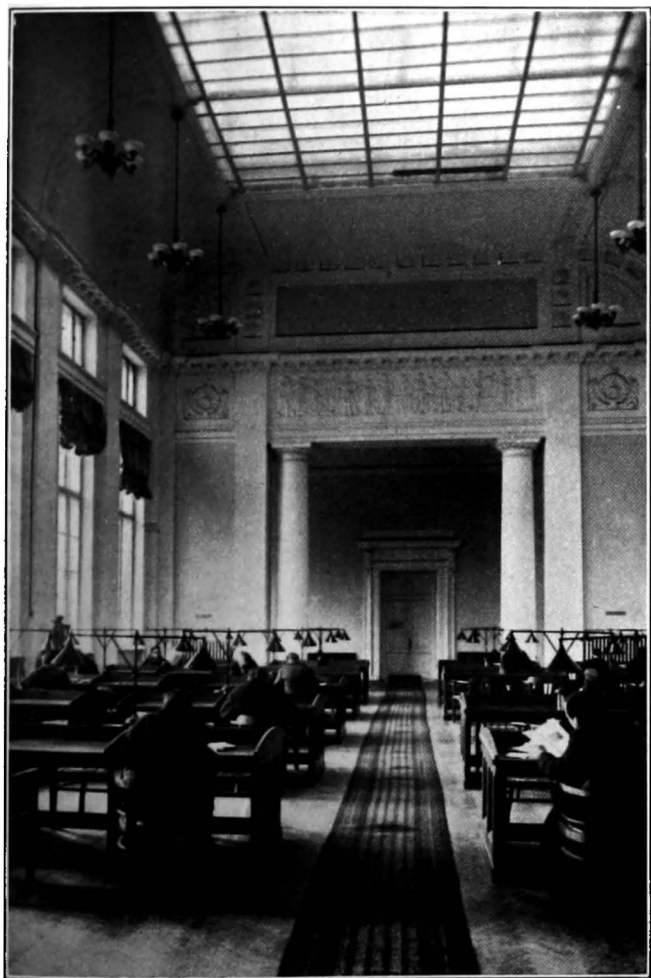
were thus able to obtain greater support and were brought into closer touch with the actual problems they were called upon to solve. The subsidies for scientific research from State and local budgets has been increased from 72 million roubles in 1928 to 252 million roubles in 1923. These allocations were, however, supplemented by the grants from industrial organisations.

There have been at the end of the Five-Year Plan 238 institutes connected with the Commissariat for Heavy Industry alone. Nineteen of these specialised in power problems, twenty-one dealt with metallurgy, thirty-six with machine building, and fifteen with the various aspects of mining.

The intensive growth of scientific work in agriculture has led to the organisation of seventy-six institutes with more than 1,100 affiliated branches, stations and experimental fields.

There are also institutes connected with the study of foreign trade, as well as in connection with the Academy of Science and with various universities.

The scientific development of the country does not proceed without difficulties. In common with many other organisations in the Soviet Union the institutes suffer from the lack of accommodation, materials and particularly of trained personnel, with the consequent introduction of insufficiently trained staff. The highly trained scientists have to work frequently in two, three



LIBRARY OF THE UKRAINIAN ACADEMY OF SCIENCE, KIEV

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or even four institutions, which prevents the full utilisation of their abilities and knowledge.

In spite of the difficulties and disabilities under which they have been labouring, the institutes have carried out valuable work during the past four years and have thus considerably facilitated the progress of various branches of national economy under the Five-Year Plan.

THE POSITION OF LABOUR

THE primary claim to success in the amelioration of the social conditions under the Five-Year Plan was the liquidation of unemployment in the towns and pauperism in the villages.

At the introduction of the Plan the U.S.S.R. had some 1,700,000 registered unemployed, but before the end of the planned period, every worker had a job and many important undertakings could not be proceeded with owing to the shortage of workers. The number of people employed in industry has been doubled during the four years. Private traders, merchants and middlemen have been almost completely eliminated from the field of trade. In the villages, what was formerly considered almost a normal condition—the division of the population into kulaks and poor peasants—has been eliminated by the introduction of collective farming. As a result of these changes we not only see in the Soviet Union the practically complete abolition of classes, but also the values of the old order entirely reversed. The worker who counted for nothing under the Tzar has now become everything. To be a worker is to belong to the privileged class and the greatest insult now is "You are no worker," for under the Soviet system the idle are despised and rejected.

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The workers firmly believe, and are proud in their belief, that they are engaged in begetting a new civilisation.

The New Privileged Class

Though the worker is now the privileged class in the Soviet Union, it would be wrong to assume that he has at his command the comfort and material advantages which the privileged classes of other countries enjoy at the present time. Far from it. In endeavouring to estimate the standard of living of the Soviet worker, like in many other things in life, it is impossible to speak in positive terms. Only a comparative method can be adopted to arrive at a fair valuation. It would be wrong, therefore, to compare the standard of living of a Russian worker with that of a British or American worker when in employment. It is fairer to compare it with the standard of living of the Russian working man before the war. If such a comparison is made, the hours of work, housing accommodation, amount of food, clothes and boots he could obtain then, and at the present time, we must admit that his standard of living has greatly improved. In addition to these advantages the worker in the Soviet Union now receives considerations which were outside the reach of his predecessor under the imperial régime. The Soviet worker not only works seven (and a maximum of eight) hours a day, but he receives from a fortnight to a month's holiday

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with pay each year in addition to recreational and social advantages which no other worker in the world enjoys.

Status of Working Men

The status of the Soviet working man is another material advantage in his position. It is certainly no small matter that he is constantly made to feel that he and his fellow workers are the most important people in the State, and that for them everything exists, that they are the "masters of the show." The consciousness of self-respect, or even superiority, which now permeates the Russian worker is manifest everywhere to everyone who comes in contact with Russian workers, whether in the theatre or on the sports field, in the street or in the factory. The worker knows that he is the master of the country, that he belongs to the ruling class of a great State and he makes no secret of it.

The worker may have to endure certain privations, but his difficulties are lessened by a number of considerations, not the least important of which is the consciousness that he is engaged in a great task, that he is building up a better system of society, that he is helping to establish socialism, and that plenty will succeed scarcity. And he knows that history is on his side, that he is approaching his goal, and that nothing can stop him in the consummation of his ideal.

The position of the worker is safeguarded in every possible way in the Soviet Union. The labour of

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persons who work for hire and their relations to those who hire them, are regulated by the Labour Code. All agreements and contracts made between persons who hire labour, and persons who sell their labour, which bring about conditions below the standards fixed by the Labour Code, are considered void.

The Labour Code decrees that the working day shall not exceed eight hours in each twenty-four. In the majority of industries they only work seven hours. The working day of miners from sixteen to eighteen years of age, of persons doing brain work not directly in conjunction with manual work, and of persons engaged in underground work, or in unhealthy occupations, shall not exceed six hours. For night work the normal working time is reduced by one hour. Overtime work is not permitted except in certain specified cases or with the sanction of the local labour inspector. The exceptions apply particularly to cases where danger or disaster is threatened. Persons under eighteen are not permitted to work overtime, in night shifts, to work underground or in dangerous or unhealthy trades. The working day of persons under sixteen must not exceed four hours. Special privileges are accorded to women workers and expectant mothers are given leave of absence before and after confinement, also assistance during confinement and child nursing.

That the position of the workers has improved under the operation of the Plan can be seen from the fact that

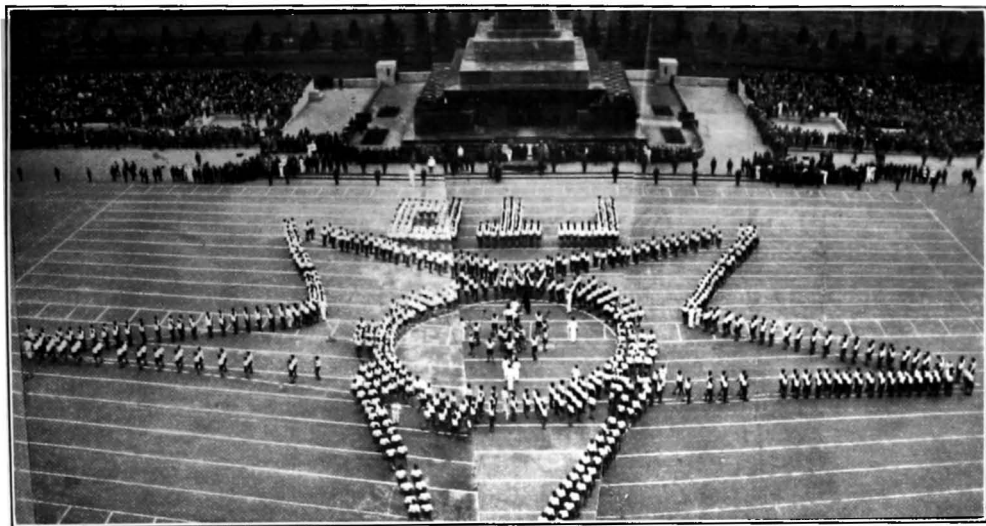
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the wage fund has risen from 8,000 million roubles in 1928 to 30,000 million roubles in 1932, while the goods turnover per head of the population at 1926-27 prices, is estimated to have increased during the same period two-and-a-half times.

The Workers' Responsibility

There can, however, be no privileges without responsibilities. The Bolshevik revolution which gave the workers control over the economic system of the country, released an enormous value of energy, while at the same time relaxing discipline to a considerable extent. This has resulted often that more time was spent on meetings to discuss the question of production than on the actual process of production, with the consequent diminution in output. This lack of discipline was one of the most serious causes of waste in the Soviet industrial system.

It was early realised that it would be necessary to see to it that the seven or eight-hour working day is well utilised if the Plan was to be carried out in full. It is manifest that it was an impossible task to educate all the Russian workers in a spirit of socialist co-operation in such a short space of time. All the more so considering that every year hundreds of thousands of newcomers from the villages had to be absorbed in the industrial system. The introduction of shock brigades and of socialist competition between various factories and between different shops of the same factory, were some



SPORTS SOCIETIES' DEMONSTRATION IN THE RED SQUARE, MOSCOW

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of the means by which the sporting spirit was initiated into industry. This, however, proved no stimulus to those who had no desire to play the game. Hence the necessity to introduce the system of payment by results. The fight against absenteeism, and for the increase of labour productivity still remain to be faced, though much has already been achieved in these respects.

The programme for 1933 provides for an increase in industrial output by 16.5 per cent., while the number of workers and employees is to augment by only 2 per cent. The estimated increase in industrial output is therefore to be accomplished only if productivity of labour will grow correspondingly. For industry as a whole, labour productivity is estimated to increase in 1933 by some 14 per cent.

Increased Productivity

Amongst the main conditions for such an increase is an assured and regular supply of fuel, raw materials and the other requirements for production. Another essential condition is an educational and cultural advance of the workers. Serious measures are, therefore, being taken to secure these essential conditions for industrial progress. Greater attention is being paid to the utilisation of existing factories and works instead of concentrating on the building of new enterprises. This will simplify the problem of supply, while the educational and cultural advancement is now

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proceeding at such a rate that results are anticipated in the very near future.

The attainment of increased productivity of 14 per cent. in one year is a difficult task considering that during the whole period of the first Plan the increase amounted to only 40 per cent. A special effort will, nevertheless, be made to achieve this objective considering that an increase in labour productivity of each one per cent. represents a gain of 290 million roubles.

Increased productivity will also be aimed at in order to reduce the production costs by 3.9 per cent. In respect of reduced costs the estimates of the first Plan were not realised. In 1932, while industrial output has increased by 8½ per cent. the respective wage fund increased considerably more.

Trade Unions

With the change in the economic conditions of the country, and the workers' status, the functions of the workers' organisations—the trade unions—have been completely modified, as compared with those in capitalist countries. Not only are practically all who work for a salary or wage, members of trade unions, but these organisations enjoy a status and membership which has no analogy in any other country. Their membership in 1932 of 17 millions remains certainly unrivalled. Trade unionism differs in the Soviet Union both in structure and in functions from that in other countries, where it is essentially a fighting organisation struggling

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to maintain or improve wages and the standard of living of its members against employers' organisations. In the U.S.S.R. the private employer of industrial labour has been eliminated.

All salary or wage-earners in the Soviet Union are organised in forty-six trade unions, which extend to every part of the country. The kind or grade of the worker, his craft or special contribution, whether he works by hand or by brain, the method or the amount of his remuneration, his sex, age, race, creed, all these questions are entirely ignored. The rule is, one enterprise one union. Every person over eighteen employed in any way, in or about one industrial undertaking or establishment, one educational, medical or other institution can belong only to the trade union to which this unit predominantly belongs. Thus all the workers engaged in the Rostov agricultural machinery plant, including the managers, clerks, bookkeepers, cleaners, woodworkers and so on, are all members of the Machine Workers' Trade Union. When a bookkeeper leaves this factory and enters the employment of one of the Commissariats he becomes a member of the State Employees' Trade Union, and so on. In this manner the interests of every employed person are concentrated, not on his own specific trade, or profession, but on the services rendered to the whole community by the enterprise in which he is engaged. He learns, therefore, to appreciate not his specific interests as a carpenter, bricklayer, engineer or clerk, but his part in

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relation to the general development of the country.

Soviet trade unions are therefore of the greatest assistance to the Government both in helping to train the workers, as well as by assisting them to overcome the apathy inherent in the Russian peasants who now flock to the factories.

As socialism is not yet an accomplished fact in the Soviet Union, trade unionism takes up the work of increasing production, assisting in every way in the management of industry and helping to bring the Socialist State into being. About 60 per cent. of the trade union budget, which amounted in 1932 to some 1,000 million roubles, was used in that year for educational purposes.

The Soviet Trade Union Official

It is part of the duties of trade union officials to take up any suggestion of work improvement, and to investigate complaints. Where satisfaction cannot be obtained locally the points in the dispute are referred to the central body. The trade union official will intervene on behalf of individual workers who think their piecework rate is inadequate, or have suffered some wrong, or desire improvements in the factory for additional facilities to be provided. They will complain to the managers of the factory if they consider that the health or comfort of the workers suffers from defective arrangements. In all these matters the representative of the trade union, together

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with the managing director and a representative of the Communist Party cell, form what is called the "Triangle" in whom the highest authority is vested.

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WHAT makes the Plan so remarkable is not only the speed with which it has been carried out, the vastness of the amount of energy demanded and liberated, and the enormous scope of its application, but that an entirely new technique had to be evolved and a new spirit aroused in the minds and aspirations of the people.

In addition to the economic transformation, the Soviet Union is attempting the establishment of a new system of society, in which a metamorphosis is taking place, comprising more than a hundred different nationalities at varying stages of development and culture.

General Aspects of the Plan

The distinctively Russian feature of the Plan was to make the Soviet Union independent of capitalist countries. Outside this the aim was to build up a classless society, a planned industry with centralised direction and to produce not for profits for individuals but for the benefit of the whole nation. The Plan succeeded in the main, because every man, woman and child engaged in it knew that the result intended was not that a small group of people should live in

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idleness and luxury, but that the standard of living of the whole population should be raised.

The education and health of the people were placed in the forefront of the Plan and amongst the first essentials in every new building scheme was the erection of schools, hospitals, sanatoria and so on.

It was very fortunate for the Soviet Union that the people who conceived the Plan remained in office while it was being carried out and the country had the benefit of having the original enthusiasts to ensure the success of the enterprise.

The collapse of the Soviet system has been announced to the world at regular intervals since October, 1917. However, those who go to Russia to examine conditions for themselves, whether friendly or not, must admit that the downfall so confidently prophesied in and out of season, is further away than ever. Instead of collapse we see the industrial revolution making great headway and a cultural transformation in progress which is bound to have a far-reaching influence on the general advancement and enlightenment of mankind.

In spite of the achievements under the first Plan, the Soviet are well aware that the U.S.S.R. is still considerably below the level of advanced capitalist countries in the total amount of its material wealth, in industrial and agricultural output per person, and in the standard of living of the people, the goal they are aiming at is not only to raise themselves to that level, but to exceed it. It is now clear that the Soviet Union will

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go much further in this direction under the second Plan than under the first, for industry has already been placed on a firm basis for future development.

Unemployment

Another important achievement of the first Five-Year Plan is that it has removed the menace of unemployment from the workers. Also it is rapidly spreading education amongst one of the most illiterate communities in Europe. It has stimulated to greater activity a nation normally indolent and fatalistic, and this was accomplished at a time when the rest of the world was showing signs of inertia and weariness.

In the domain of industry the results, as we have seen, are far from being insignificant. The special effort made in the past four years has brought the Soviet Union alongside the principal industrial countries of the world. In respect of coal output the U.S.S.R. has advanced from sixth place, which she held in 1928, to third in 1932; the production of pig-iron advanced during the period from sixth to second place; oil output from third to second; machine building from fourth to second; and electric power production from eighth to third place.

Remarkable Achievements

These facts clearly show that in so far as the growth of large-scale industry is concerned, the achievements have been truly remarkable, the industrial output as a

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whole having doubled in four years, an outstanding performance which bears testimony to the successful effort of the Government and nation. What this transformation has meant to Russia it is difficult to conceive. Not only was the whole face of the country changed in four years, but the relative importance of industry and agriculture in the national economy underwent a similar transformation causing the economic centre of gravity to swing from the village to the town. Whilst industry accounted in 1928 for only 48 per cent. of the total national production, in 1932 its share rose to 70 per cent.

We have endeavoured to give a comprehensive description of the Plan, though omitting some of the difficulties encountered during its realisation. That such an important transformation could not be carried out without serious defects can be well understood. It is even of greater significance that in spite of such hindrances as inadequate foreign support, lack of technical skill, excessive mobility of labour and insufficient transport facilities, the results should have been of such magnitude. This is a good augury for the second Plan which should further help the U.S.S.R. to attain its final goal, the establishment of a classless society.

