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KARAGANDA, THE THIRD COAL BASE OF THE USSR

Discovery of Coal in Karaganda; Earliest Stages of Developing the Basin

Coal was first discovered in the Karaganda basin in 1833 by a shepherd, who had no idea what it was and who was completely surprised when a lump that had dropped into a campfire burned.

It was not until 1857 that the first mine working, called the Ivanovskiy pit, was constructed (Mine No 18 is now located at this spot). The part of the deposit being worked extended 1,000 meters along the strike of the seam and 150 meters along the dip. All the mines exploited the Shestifutovyy seam. The Verkhnyaya Marianna seam, the thickest in the basin, was being worked by an open pit, 4 meters deep, and by small boreholes.

All mining operations were carried out by manual labor. The working front was lighted by wax candles or small lamps which burned vegetable oil. Mine timbers were very expensive since they had to be transported thousands of kilometers from the Urals or from Siberia. For this reason coal was extracted exclusively from development workings; this procedure led to the loss of 80-85 percent of the fuel, that is, out of every 6 tons of coal, only one ton was removed and the other 5 tons remained in the ground.

In 1868, the first, sketchy report on Karaganda mines was published by an officer of the general staff named Krasnovskiy. Krasnovskiy stated that Karaganda coal was being mined at a depth of from 8 to 14 sagenes /one sagene equals 2.134 meters/ and that one pud /16.38 kilograms/ of Karaganda coal cost dealers from 2.5 to 10 Kopeks. This unusual range in the price level indicates the lack of stability in production costs and amounts of output.

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In 1859, 1,850 tons of coal were extracted in Karaganda mines; in 1860, only 444 tons less than one fourth as much. In 1861, the coal output began to rise again, reaching 4,978 tons in 1863. After this there was a sharp drop in coal output for several years.

In 1871, a mining engineer named Verner gave a detailed account in Gornyy Zhurnal of the enterprises of a company which had been formed to exploit Karaganda deposits. The coal deposits, he said, consisted of several seams. The length of the deposit being worked was 523 sagenes; the dip, 73 sagenes. The Vasil'yevskaya Mine was located at the farthest point of the coal seam and the Andreyevskaya Mine was nearest to the outcropping of the seam. In addition to these, two more underground mines were located at the far end of the bituminous coal workings and seven tunnels had been constructed from the surface. Thus, according to Verner, there were, at this time, a total of 11 workings in the Karaganda coal deposits, the largest working being the Vasil'yevskaya Mine, which was 5¼ arshins /one arshin equals 71.12 centimeters/ long, 3½ arshins wide, and 17 sagenes deep.

In 1867, Karaganda mines produced 4,300 tons of coal; in 1868, 5,300 tons; and in 1869, only 2,200 tons. During the first 30 years of the existence of the Karaganda coal mines (1857-1887) a total of 302,800 tons of coal were produced, or an average of 10,000 tons per year. However, in certain years only 1,000 tons were produced and one year the output was 26,000 tons.

Karaganda coal was transported 40 kilometers by camel to the Spasskiy Copper Plant, from which point copper bars were in turn transported by camel or ox hundreds of kilometers to Petropavlovsk. The transport of coal 40 kilometers and copper 600 kilometers by land sharply increased production costs and a profit could be made on Spasskiy copper only at the very highest market prices.

The Karaganda coal enterprises were inactive for the 11 years from 1887 to 1889. In 1886, there had been 200 Kazakhs and 10 Russian workers employed in the mines.

From 1899 to 1914, 620,000 tons of coal were extracted in Karaganda mines, an average of 41,400 tons per year. In 1899, 5,000 tons were produced; in 1900, 15,000 tons; and in 1906, 31,000 tons. The record year for the prerevolutionary era was 1913, when 72,000 tons were produced.

A narrow-gauge line was laid connecting Karaganda with the Spasskiy Copper Plant, a distance of 40 kilometers, and it took 2 years to build it.

Mining was mainly concentrated in two vertical mines, Karno, 70 meters deep, and Vasil'yevskaya, 36 meters deep. Coal was extracted from the Shestifutovyy seam. In 1917, a sloping mine called Dzhimmi was constructed in the Novyy seam and extended 210 meters along the slope.

From 1915 to 1920, the Karaganda output ranged from 14,000 to 66,000 tons per year.

Exploratory Operations in Karaganda; Analysis of Karaganda Coal

On 23 February 1930, the first exploratory borehole was drilled in the Karaganda coal deposits. Later, the drilling of numerous small boreholes was undertaken. A geological party, under N.G. Kassin, made a survey of the region and drew up the first large-scale chart of the area. A geological group of the Coal Institute, headed by the geologist A.A. Gapeyev, participated actively in the work. (In 1920, Gapeyev had explored a small part of Karaganda but, as yet, no geological chart of the region had been made.)

In spring 1930, mines were started in the new Karaganda. The first to be constructed bears the name of A.M. Gor'kiy. Shortly afterward, three other sloping mines were completed. Mine No 1, going to a depth of 220 meters, was located in the Novyy seam, the thickness of which reaches 2 meters. Mine No 3, deepened during the course of the year to 165 meters, was constructed in the Verkhnyaya Marianna seam. A hoist in this mine was equipped with a 35-horsepower steam engine. Naklonnaya Mine No 4, 100 meters deep, exploited the Nizhniy seam, and Mine No 5, 80 meters deep, workes the Sredniy seam.

All four of these mines were of an exploratory-exploitational nature. They were to furnish data on the properties of specific coal seams, the quality of the coal, and proper conditions for exploiting the deposit.

Results exceeded all expectations. Investigations were carried out in an area five times as large as that studied by Gapeyev in 1920. Geologists extended the surveyed area of the Karaganda deposit to the south, west, and east. Then, according to the most careful estimates, the coal reserves of the region were put at double the 1920 estimates.

Simultaneously with geological and exploratory work, the quality of the coal was investigated, and experiments in coal cleaning and coking were conducted. These experiments and investigations were carried on under conditions somewhat similar to those in a plant in Kemerovo and also on plant scale in Magnitogorsk, in the Krivoy Rog rheolaveur, and in the Kerch' coke shops.

On 2 February 1931, the first train arrived in Karaganda from Akmolinsk over a temporary road.

By the end of 1932, surveyed reserves in Karaganda had increased another 80 percent. They then stood at almost four times the amount estimated by Gapeyev in 1920.

Analysis indicated that Karaganda coal is distinguished by its low sulfur content. Coal of the upper series, with rare exception, contains less than one percent of sulfur and, for the most part, only 0.3 percent. The phosphorus content in most of the seams ranges from 0.03 to 0.05 percent.

The low sulfur and phosphorus content of Karaganda coal makes it particularly valuable for the metallurgical industry. It is known that, in smelting pig iron, an increased amount of sulfur content requires an increased consumption of limestone and coke and hinders capacity exploitation of the blast furnaces. Each additional 0.1 percent of sulfur above one percent makes necessary an additional 18.2 kilograms of coke for every ton of pig iron.

Karaganda coal has one serious defect: a high ash content, amounting, in the top part of the productive series, to 8.6-19 percent. Coal containing 18-19 percent ash cannot be introduced into a coke oven in its natural form but must be subjected to a preliminary cleaning. This high ash content is the only point in which Karaganda coal is inferior to the well-known, high-grade Kuzbass coals.

In September 1932, the Magnitogorsk Combine conducted experiments in its coke ovens in coking Karaganda coal in the form of an additive to Kuzbass coal. A telegram from Magnitogorsk reported: "Coke obtained by adding 15 percent of Karaganda coal to a coking charge containing 60 percent Prokop'yevsk coal and 25 percent Leninskiy coal has exceptional physical properties. In toughness it exceeds the toughness of coke obtained from a charge of Kuzbass coal without a Karaganda additive."

Karaganda coal stands transport and long storage at the surface without oxidizing.

In 1932, a brigade of the Moscow Coal Chemistry Institute organized a chemical laboratory in Karaganda; this was the first scientific research establishment in the basin. The laboratory conducted extensive tests on Karaganda coals, and scientific workers collected large amounts of analytical material. A brigade of the Ugleobogashcheniye (Coal-Cleaning) Trust and workers of the Moscow Coal Chemistry Institute worked simultaneously in Karaganda. Experiments in coking were also carried out in the Urals, in Gubakha, where Karaganda coal was subjected to coking in the most varied combinations: separately, mixed with other coking coals, and both cleaned and uncleaned.

Results of observations brought researchers to the conclusion that all coal seams in the Karaganda basin, at specific depths, contain coal capable of yielding tough coke, and that poor coking coal in some mines is to be explained by the fact that these mines are worked at shallow depths and in zones of oxidation. The coking properties of the coal improve in proportion to the deepening of the seam.

Experiments in coking cleaned coal were particularly important. They indicated that the Novyy, Verkhnyaya Marianna, Feliks, Zamechatel'nyy and Vyshesredniy seams yield a large amount of low-ash concentrate. With the average ash content of these seams ranging from 9 to 25 percent, a concentrate is obtained, after cleaning, with an ash content not exceeding 7 to 13 percent. This makes it possible to obtain metallurgical coke of the best quality, completely suitable for smelting pig iron in large blast furnaces.

At the instigation of Sergo Ordzhonikidze, People's Commissar of the Heavy Industry, an additive of 15 percent of uncleaned Karaganda coal was added to Prokop'yevsk coal in charges of Magnitogorsk coke ovens. From August 1933 on, coal from the Novyy, Zamechatel'nyy, and Vyshesredniy seams were used for this purpose. Numerous experiments and analyses have shown that, although this additive increases the ash content of the coke somewhat, it does not have a detrimental effect on its toughness.

By the end of the First-Year Plan, the Karaganda basin was playing an important role in the fuel balance of the East. Eight mines had already achieved 19.3 percent of their planned capacity. During 1932, 16.5 million rubles were invested in mine construction.

Coking Base Expanded; Increase in Mechanization and Labor Productivity

At first, only the low-ash coal from the Novyy and Zamechatel'nyy seams was utilized for coking. Before 1933, coal from the Verkhnyaya Marianna seam was deemed unsuitable for this purpose. However, this coal contains less ash, sulfur, and phosphorus than some other types of coal which are used in coke ovens and it was decided to experiment with it as fuel for blast furnaces in smelting plants of the Urals which used charcoal. In the experimental melts, 50 percent of the charcoal was replaced by large lump coal from the Verkhnyaya Marianna seam, and the results were satisfactory. The following year, 1934, trainloads of coal from the Verkhnyaya Marianna seam were shipped to the Urals.

Further experiments showed that if fines from the Verkhnyaya Marianna seam are mixed with uncleaned coal from the Vyshesredniy seam, which contains up to 25 percent of ash, in the proportion of one to one, a charge is obtained which, although ashy, cokes excellently. From such a charge, a tough, silver-colored coke is obtained which emits a bell-like sound when struck and which can be used advantageously in blast furnaces.

A mixture of coals from the Verkhnyaya Marianna and the Novyy seam also yields satisfactory coke, and very good coke can be produced from coal from the Shestifutovyy seam.

Great changes have taken place in coal production. The opening up of a central electric power station made it possible to increase the use of cutting machines and conveyers in the mines. In 1933, only 3.8 percent of the coal was mined by mechanized methods but, within 2 years, in 1935, mechanized coal extraction had reached 53 percent.

On 20 December 1935, a train from Karaganda arrived in Balkhash via a newly constructed railroad. This railroad ran through a semidesert; there was not a single village anywhere along the line. A new rail line was constructed to the west and was completed on 10 November 1937.

In 1936, Karagandinskaya Oblast was organized with its center the city of Karaganda.

By the end of 1936, more than 80 percent and, in 1937, 90 percent of the coal was extracted by machinery. In February 1935, the monthly productivity of the cutting machine reached 2,100 tons but, during the first months of the Stakhanovite movement such norms were upset. In December 1935, the average monthly productivity of cutting machines had risen to 4,076 tons. Some operators cut as much as 7,500-8.000 tons per month with their machines and, in September 1936, an operator of a cutting machine in Mine No 18 cut 10,000 tons of coal. Other outstanding Stakhanovites cut from 7,000 to 10,000 tons per month. In 1935, the average monthly productivity of cutting machines reached 3,100 tons; in the first quarter 1936, 5,123 tons; in the second quarter, 6,138 tons; and, in September 1936, a year after the origin of the Stakhanovite movement, it rose to 6,800 tons, a three fold increase over February 1935, and more than twice the 1935 average. At the end of 1936, the average for the basin was 7,200 tons.

Wages of Karaganda coal miners increased as follows: taking 1931 as 100 percent, then the average monthly wages were 212 percent in 1934, 288 percent in 1935, and 374 percent in 1937.

The number of mines continued to increase. In 1938, a vertical mine was put into operation which in size considerably surpassed the little mines constructed during the first years after organization of the basin. Its extensive concrete shaft bottom was provided with electric lights, and each of its five faces was equipped with a cutting machine. Coal haulage was carried out entirely by electric locomotive. All the most modern techniques were employed at the surface of the new mine, and all phases of loading coal onto railroad cars were mechanized.

In 1938, 95 percent of all coal mined in Karaganda was extracted by cutting machines, and still further increases in the productivity of these machines were achieved. In 1939, it was 6,279 tons per month; in the first half of 1940, 7,104 tons; in December 1940, 8,156 tons; and the average for 1940 was 7,500 tons. By the end of 1940, there were 24 operators who were cutting 10,000 tons or more of coal per month.

In 1939, the coal output for the basin was 20 percent above 1938, and in 1940 it was 24.7 percent above 1939. The Karagandaugol' Trust had the highest increase in output of any trust of the People's Commissariat of the

Coal Industry USSR. Efforts to step up the quantity of the coal output were combined with efforts to improve its quality. In January 1941, consumer enterprises paid the basin 62,000 rubles extra for coal with a decreased ash content.

Wartime Importance and Development of the Karaganda Basin

In fall 1941, the first trainloads of Donbass miners arrived in Karaganda, bringing with them everything possible: cutting and underground machines, electric locomotives, pneumatic drills, and electric equipment. The Coal Machine-Building Plant imeni Parkhomenko was evacuated from the Donbass to Karaganda, and the Mining Institute in Moscow, one of the largest institutes of the country, was also evacuated to Karaganda with all its scientific workers, instructors, and students.

During the war, Karaganda miners went to unusual lengths to increase the coal output. Some of their accomplishments are cited below.

The fourth section of the Mine imeni Kirov assumed the task of extracting coal in old workings. For 1½ months the miners worked in low, narrow passages, on their knees, lying flat, advancing step by step. Overcoming many obstacles, they succeeded in extracting several tens of thousands of tons of high-grade coal from these old, abandoned workings. While they were completing this achievement, the miners at the same time straightened the line of the face and assured in this way a further increase in extraction.

In Mine No 31, a brigade of development workers set a record unprecedented in the entire history of the basin: In July /1941/ it cut 149 meters of a sloping crosscut and restored 15 meters of passageway.

In Mine No 20, two cutting machine operators and their two assistants pledged that they would do the work of 20 persons and fulfill their norms 480-500 percent; they succeeded in keeping their word.

Faces in the Verkhnyaya Marianna seam were usually propped with timbers 2.5-2.8 meters long. Formerly, these timbers were left in the worked-out area, but at this time they were used a second time in thinner seams and after that they served as fuel.

Instructions were given in the basin on methods of repairing chutes and lengthening their period of service. One local industrial combine made nails from scraps of sheet iron. Metal girders were also made from scrap metal.

In the Mine imeni Kalinin, two large faces were put into operation. The mine workers provided these faces with cutting machines, chutes, and power lines which they had obtained by restoring and assembling old parts, long discarded as useless. The central machine shops of Karaganda began to produce not only spare parts but also machines as complicated as pumps.

The effort to save materials prompted a number of bold innovations in the practice of mining operations. Thus, in Mine No 18 a double undercutting of the seam was achieved by adding a second cutting bar to an ordinary cutting machine. The double cutting reduced the consumption of scarce explosives 40 percent and, at the same time, reduced drilling time and increased labor productivity.

By 1 January 1942, Mine No 1 had achieved its planned capacity and, shortly afterward, a number of other mines followed suit.

As the Karaganda coal output rose, the number of consumers rose too. At the end of 1941 and in 1942, Karaganda coal went not only to the Urals, to the coke ovens of the Magnitogorsk Combine, but also to the Volga area down to the Caspian. On 2 April 1942, miners of the basin shipped to Moscow a trainload of coal above the plan. The train was pulled by two locomotives run by the best operators of the Karaganda Department of the Karaganda Railroad System.

The requirements for Karaganda coal were rising every day, and new ways to step up extraction had to be found. A brigade from the Academy of Sciences, USSR, led by Academician A. A. Skochinskiy, arrived in Karaganda to study the situation and make recommendations. The brigade included very great Soviet scholars -- V.N. Obratsov and L.D. Shevyakov, active members of the Academy of Sciences, and Chizhikov and Antipin, corresponding members of the Academy of Sciences -- and a number of other noted specialists in mining and geology. With the active participation of the miners of the basin, the scholars worked out a program to assure further rapid growth of coal output.

The scholars put forward a new, bold system for working the Verkhnyaya Marianna seam. Coal from the central layer of this seam contains very little ash and can be shipped for coking without being cleaned. However, because of the method of mining prevailing in this seam, only 2 of every 5 tons of coal were recovered and the remaining 3 tons were lost. The brigade recommended converting the Verkhnyaya Marianna seam to triple slicing, with separate delivery from the mine of the middle layer. The new system reduces losses of coal in the middle layer to 18 percent. The brigade also recommended a number of well thought-out technical measures which would help to reduce these losses further.

The People's Commissar of the Coal Industry, V. V. Vakhrushev, ordered all faces in one mine to convert to the system of working by triple slicing. He charged the directorship of the basin to introduce the new system in other mines also when the system was mastered.

On 20 June 1942, it was decided to reorganize the Karagandaugol' Trust as a combine. The mine administrations under the former trust were converted into trusts.

Workers of the Plant imeni Parkhomenko mastered the production of conveyer drives, surface and mine face conveyers, mine cars, and transport chutes. They began to manufacture entire aggregates of equipment for new coal deposit levels.

Numerous observations indicated that the best length for a coal face in the Verkhnyaya Marianna seam is 130-150 meters. For thinner seams the most efficient length is 120-130 meters, and, for the Novyy seam which dips at a slight angle, the most advantageous length is 150-180 meters.

The many new mines which were being constructed at this time were mostly medium-sized or small because enterprises of such a size could be put in operation more rapidly. Each of the mines produced relatively little coal but played an important role in the total production.

In spring 1942, the All-Union Socialist Competition of Coal Miners developed, and in April 1943 the Karaganda basin won a first place. On 5 May A. F. Zasyad'ko, Deputy Commissar of the Coal Industry, presented the Stalinugol' Trust with the Transferable Red Banner of the State Defense Committee. The coal-cleaning plant also did well in the All-Union Socialist

Competition. This plant was now working at an even pace, regularly fulfilling or exceeding its quota. The workers had far outstripped the planned capacity of the enterprise and were shipping coal in a steady stream to the Magnitogorsk Combine.

Starting in 1944, open-pit mining developed rapidly in the Karaganda basin where the coal was located close to the surface. The practice of Korkino miners (Chelyabinskaya Oblast) showed the high effectiveness of the method, which requires far less capital outlay per ton of coal extracted, assures higher labor productivity, and decreases considerably production costs of the fuel.

Before 1940, lignite deposits were worked by small sloping mines. In 1940, a group of miners joined energetically to organize mining by the open-pit method and constructed open pit No 1. In mid 1941, the first excavators appeared in the pit, and by the end of 1941 twice as much coal was being produced by the open-pit method as was produced by a sloping mine. Karaganda miners went to the southern Urals to familiarize themselves with open-pit exploitation as practiced by Korkino miners.

In fall 1942, pit No 2, a large, new open pit, was constructed and after this pit No 4 was put in operation. This open pit was constructed in 10 months, during which time 2.4 million cubic meters of earth were removed, 17,000 square meters of living quarters built, 28 kilometers of railroad line laid, and a permanent locomotive station erected.

A systematic and complete mechanization of all processes was carried out in open-pit mining. Powerful excavators removed rock, which was then transported by rail to the dumps in mechanically discharging dump cars. The coal was loaded onto 60-ton flatcars delivered to the coal seam. Thus, the many operations between the extractive of the coal and its loading onto railroad cars were eliminated.

In February 1944, a notable record was established in the construction of sloping Mine No 60. During the month, the miners drilled 112 meters of the main shaft, cutting up to 7 meters on specific days. Mining operations and construction at the surface were also carried out by high-speed methods.

Despite the load imposed on machine-building enterprises by war orders, the output of mining machinery kept increasing and the basin's supply of cutting machines and conveying devices increased every month. The new machines were used not only for supplying new mines but also for replacing low-production, worn-out machines with more powerful, improved machinery. Mechanized underground haulage as well as mechanized haulage at the surface increased considerably.

In 1941, the Donbass miner Semenovich Makarov was evacuted to Karaganda, where he was made chief mechanic of Mine No 31. Although this was a big job, Makarov still found time to design and direct the construction of a coal mining combine. At the beginning of 1945, the first combine was let down into the mine. The machine had three cutting bars and cut simultaneously along the floor of the face, the middle of the seam, and the roof.

The new machine was tested and some improvements were made in its design. After the improved machine had been submitted to strict tests, it was put into series production at one of the plants.

On 1 January 1945, the first ferrous metallurgical plant of Kazakhstan was constructed in the industrial center of Karagandinskaya Oblast. The plant is supplied with electric power by the Karagadinskiy Rayon Electric Power Station and with coal from the Karaganda basin. Thus, the organization of the third USSR coal basin was a necessary prerequisite for the creation of the ferrous metallurgical industry of Kazakhstan.

Postwar Development of the Karaganda Basin

In the First Five-Year Plan (1928-1932), the USSR coal industry showed an increase without precedent. The amount extracted per year rose by an average of 7 million tons. In the Second Five-Year Plan (1933-1937), the yearly increase amounted to 13 million tons. In the Fourth Five-Year Plan, the coal industry was faced with the task of bringing the annual rise in coal extraction almost up to the total yearly increase of the two prewar five-year plans.

In the construction of new mines, the gathering of coal and rock by manual labor consumed considerable time. The introduction of the S-153 improved coal-loading machine helped to mechanize these processes. Mine constructors gave a high rating to the BCh-1 pneumatic loader, an excellent machine developed by Ya. I Balbachan and A. F. Chugunov. A special four-blade device grips the rock, as if with claws, and loads it into the bucket. The machine is compact and fits into a very small space. In the drilling of the shaft this property is very important. Two other machines important for the loading of rock are the UMP-1 and the PML-5.

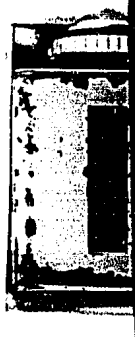
After the war only vertical mines were constructed in the Karaganda basin, and here the sinking of the shaft took up 60 percent of the time necessary for the carrying out of all mining operations. This made it particularly important to find methods for speeding up shaft sinking. Formerly, the deepening and reinforcing of a shaft were carried out consecutively. It was found that by conducting these two operations simultaneously, the rate in shaft sinking could be stepped up considerably.

In July 1948, Karaganda miners completed 61.7 meters of shaft during the month in sinking shaft No 3 of Vertikal'naya Mine No 1. The previous record for shaft sinking, held by Kadiyevka miners in the Donbass, was 60 meters in a month.

In May 1945, a development work brigade working in Mine No 33-34 finished 13 meters of a passage in a day. The work of the brigade was so organized that all the members possessed two or three skills and then, when one type of work was not required, they could be switched to some other type.

During the war the first Makarov combines appeared in Karaganda mines. They were constructed on the base of the now outmoded GTK-3 cutting machine. In 1947, the combine was mounted on the powerful KMP-1 cutting machine, manufactured by the Kopeysk Plant.

The Makarov combine could be used only in coal seams from 1.35 to 2.2 meters thick. Finally Makarov designed a superior power-driven cutting and loading machine in which a cutting machine with a loading unit was mounted on a caterpiller tread. It could be used in seams from 1.2 to 3 meters thick and was simple, dependable, and compact. The miners called it the "underground tankette."



Chief Yegorov of Mine No 31 constructed a loading machine of original design, the coal-loading plow, which was particularly effective in thin seams containing tough coal.

In 1950, the Donbass combine arrived in Karaganda.

Karaganda miners have been working on replacing wooden mine props with metal ones, a very important development for Karaganda because of its location, thousands of kilometers from the forest regions. More than 10 kilometers of main development workings in Karaganda mines are propped with metal frames of different shapes. Conversation to metal props has reduced labor considerably for repair and maintenance of workings. In the first half of 1950 alone, it was 22 percent below the beginner of 1949. The use of metal props is doing away with another traditional profession -- the timberman.

In 1946 alone, 39 storage areas were arranged in the mines, equipped with 2-ton scraper winches with a productivity of 40 tons each. During the same year, 49 spotting winches were set up to pull railroad cars to coal-loading points. The winches have been converted to remote control. At the surface of the mines mechanical structures are being built to unload timbers and separate out rock.

At the end of the third quarter 1950, the proportion of mechanized loading at the mine face reached 30 percent, 2½ times that of the first quarter. From January to July 1950, the number of cutting and loading personnel in Karaganda mines decreased 23 percent and, at the same time, underground coal extraction increased 10 percent.

In 1948, rails were transferred by manual labor in open pit No 4. Mechanization raised the volume of overburden removed and decreased the staff of workers in the first quarter 1950. Pit No 4 delivers the least expensive coal in the country. Production costs of fuel from this pit are only two sevenths of the average production costs for the basin.

Underground trolleys operate in Mines No 104, No 106, No 3-bis, No 18-bis, and seven others and convey the miners to and from work.

In more than 80 percent of the mines, coal is extracted, broken up, and hauled during two shifts and the third shift is used for repair and development work.

Miners' wages were already very high in 1947. By the end of the Fourth Five-Year Plan they were even higher. In 1949, the average pay of Mikhail Zolotykh, operator of a cutting machine in the Mine imeni Zhdanov, was 6,400 rubles.

The third coal base of the country has considerably outstripped the rate of development for fuel extraction provided for by the Fourth Five-Year Plan. The level planned for the end of 1950 was achieved very early. Many trainloads of coal above the plan, including coking coal, were shipped, and, particularly important, miners of the basin met qualitative as well as quantitative requirements.

In Mine No 17-bis, the use of the cutting and loading machine reduced the number of cutting and loading personnel by half. During recent years, 700 workers were freed for other work in Mine No 20 imeni Zhdanov and, at the same time, coal extration in the mine rose. In August 1949, section No 5

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of Mine No 17-bis produced 156 tons of coal in 24 hours. In August 1950, after the introduction of the cutting and loading machine, 261 tons of coal were being produced /in a day/ by a reduced number of personnel. As a result, production costs of a ton of coal dropped 3 rubles 81 kopeks.

From the beginning of 1950, the majority of Karaganda mines fulfilled their quotas regularly day after day and week after week. In the first quarter, the number of mines exceeding the plan increased to 1½ times the previous number.

In March 1950, elections were held to the Supreme Soviet USSR; Nikolay Il'ich Mal'tsev, chief of the Mine imeni Zhdanov, the largest mine of the basin, was elected from the city of Karaganda. Before the Revolution, Mal'tsev had held a minor position in one of the Donbass mines. The Revolution made it possible for him to receive an education. In 1937, he was promoted to leadership and became chief of a mine, first in the Donbass, and later in Karaganda.

The Mine imeni Zhdanov, of which Mal'tsev is chief, delivered the last coal on its Fourth Five-Year Plan quota in April 1950, completing the plan in 4 years and 4 months. Afterwards, other outstanding mines of the basin completed the Five-Year Plan ahead of schedule.

In the first half of 1950, labor productivity in the Karaganda basin rose 21.8 percent over the same period of 1949. By Miner's Day, August 1950, the miners had completed the obligations for above-plan coal extraction which they had assumed for the entire year of 1950.

On 17 October 1950, the Karaganda basin as a whole completed the Fourth Five-Year Plan. During the last 2½ months of 1950, miners were delivering coal on their 1951 quotas. One thousand five hundred former cutting and loading personnel had discarded their shovels and had begun to operate machines.

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