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Mineral Resources and Industry
in Yugoslavia

The highly productive and varied mineral wealth of Yugoslavia is also known to Moscow, and it has caused the Kremlin to place Yugoslavia in the role of a raw material supplier within the framework of the eastern bloc. Thus Yugoslavia delivered its ore etc. to Russia, Poland, Czechoslovakia, and the other eastern bloc states from 1945 on, and was supposed to receive badly needed machinery and other industrial products in return. However, particularly from Russia, these deliveries arrived in such small quantities and were of such inferior quality that Tito and his ambitious co-workers decided to stand on their own feet. The expansion program for Yugoslav heavy industry was drawn up in an ambitious and pompous Five-Year Plan, export of raw materials to eastern countries was curbed, and deliveries to the western countries' market started, which was an unpleasant blow to the economic plans of the Kremlin. This economic self-determination of Tito's was the cause of the dispute between Yugoslavia and the Soviet Union, and the Cominform.

The Slovenian Boris Kidric, as Minister for the Five-Year Plan, is responsible for the expansion and the functioning of Yugoslav industry. Paying utmost attention to the military aspects involved - evacuation of heavy industry to the mountainous interior of the country - very great emphasis was placed on the expansion of communications between ore-mining regions and individual industries; in addition to the founding of new industries. Thus the following railroad lines have been in Yugoslavia since 1945:

Brcko - Banovici, 92 km; Samac - Sarajevo, 242 km; Niksic - Titograd, narrow-gauge, 56 km; Titograd - Shkoder (connection with the Albanian railroads); Kursumlija - Pristina, 68 km; Ljubija - Bresicani, 15 km; Kreka - Tuzla, 4 km; Poljana - Kreka, 8.3 km; Kucavo - Brodice, 16 km (part of the planned line across the Danube River to Crajeva). The double-track main line between Belgrade and Novska,

destroyed by the Germans during their retreat, was repaired in 1945 to serve as a single-track line, while the second track from Ljmm to Strisivoja - Vrpolje was finished in fall of 1948. The Croatian connection to the Adriatic Sea, Bihac - Knin, 112 km, was put into operation in November 1948. The second track to Novska was added in April 1949, completing the double-track line between Belgrade and Zagreb.

The following lines are almost completed:

The Tuzla - Bijelina - Bosut line and the Tuzla - Lomnica - Banja Koviljaca - Sabac line, 80 km, connecting the important chemical combines Lukavac and Zorka (at Sabac). The Skoplje - Gostivar - Ohrid line, which is being converted from a narrow-gauge military railroad to a standard-gauge railroad for the exploitation of chrome mines in Macedonia. A standard-gauge railroad line connecting Kumanovo and Ovcje polje is under construction to serve the cotton region of Ovcje polje. All these lines are of greatest importance for Yugoslav industry and they were built by mobilized labor forces, youths, political prisoners, prisoners-of-war, and military personnel.

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The Zagreb - Belgrade Highway, main artery of the Yugoslav highway system, is under construction and is supposed to be completed in 1951.

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Yugoslav industry suffered comparatively little from the war. First of all, the Germans constructed new plants in Slovenia and they also undertook enlargements and improvements of existing factories in the interior of the country. E.g. the Strnise aluminum plant near Ptuf; the aircraft engine plant in Teane near Maribor (now an automobile factory); the Drava power plant at Dravograd and Mariborski otok, near Maribor; also the enlargement of the Bor Copper Mines in Serbia. One can see that the Germans were mainly interested in strategic metals, copper and aluminum, production of which is considered to have priority in Yugoslavia at present.

The Yugoslav government started to take over all industries immediately after the end of the war in 1945. They chose the simplest and cheapest way of doing it. They brought the owners into court and sentenced them to many years of forced labor and confiscation of property. They always found a reason for trying them; not being satisfied with finding political faults with the industrialists, they also tried and convicted them for collaboration, social offenses or income tax evasion, whatever they found suitable. The case was more difficult where foreign proprietors were concerned, since they made demands for compensation. However, without paying any attention to their demands, the state took over their factories, too. Until now, the only settlements made have been with Sweden, while negotiations with other countries have failed to come to any conclusion. Only the US was in the fortunate situation of having the gold of the Yugoslav National Bank in its possession and it was able to deduct the compensations before it recently returned the gold.

Since some of the directors, leading officials, and experts were removed from their posts by war events and the rest of them were removed by the new government, it became necessary to replace them with third-rate native laborers in order to get the individual plants into operation again. Here the German and Austrian prisoners of war, due to their greater technical training, played an important part. Other labor forces were drawn from persons sentenced to forced labor for political offenses, and the rest from mobilized labor sources (conscription for reconstruction) and youth. In the beginning of 1946, recruiting of specialists started in the Eastern Zone of Germany and Austria, with monthly wages up to 20,000 dinars. A great number of these specialists are still employed in Yugoslavia. The great lack of experts is the biggest bottleneck in the development of Yugoslav industry.

State-controlled Yugoslav newspapers actually idolize their native industry. They report every success, no matter how small; they tell

in their propaganda reports of the "udarniki" (shock workers), the "novators" and "rationalists" [efficiency experts], who improve and economize production. However, no mention whatsoever is ever made of factories whose products are used in any form by the Yugoslav army.

The newer machinery in operation came from Hungary and Germany as reparation deliveries (some dismantled machine tool factories were brought to Yugoslavia from Schweinfurt and Braunschweig), were received as UNRRA deliveries, or were bought on the black market in the Eastern Zones of Germany and Austria. In the beginning this machinery could be paid for with Reichsmarks obtained from currency exchange. Owners of accounts in foreign countries were forced to turn them over to the state, which thus obtained foreign exchange. The state also obtained foreign currency from Yugoslav returnees from Argentina, the USA, and Canada. Their cash (in dollars) was taken from them on the ships and exchanged at the rate of 50 dinars for one dollar (the black market exchange is 300 dinars for one dollar). In 1946 and 1947 Yugoslavia obtained some foreign exchange by exporting copper, antimony, lead, zinc, cement, magnesite, mercury, various types of soda, wood, etc. to the world market via Trieste. This was then used to buy badly needed machinery and raw materials from Switzerland, England, Italy, Belgium and, despite American export curbs, from the USA, through go-betweens in South America and Italy. Machinery from the eastern states was paid for by compensatory deliveries of all kinds. Yugoslav needs for machinery of all kinds, technical articles, plumbing and electrical equipment, cotton, wool, tanning materials, hides, pharmaceuticals, and many other goods, are still great and their lack is another bottleneck for the development of Yugoslav industry.

The Bor Copper Mine

The founder of this most important copper mine in Europe was the Swabian Georg Neifert from Pancevo, who started work here under King Milan Obrenovic in or about 1890. Neifert was the owner of large breweries, owner and president of the Serbian National Bank, and the first Serbian industrialist of world fame. In 1900 the yearly production of copper at Bor amounted to 500 tons. Due to the close cultural and economic ties between Serbia and France the mines went into French ownership in 1906, and were called "Mines de Bor SA", with their central office in Paris. The French company continued copper mining, and, using the most up-to-date methods, they reached a yearly output of 42,300 tons of crude copper in 1938, making this the highest-yielding mine in Europe. A copper electrolysis installation to eliminate the gold and silver, which was contained in the ore up to one per mille, was built by Krupp under the Stojadinovic government, which in 1938 turned out 1,134 tons of pure electrolytic copper monthly. Under German occupation the annual yield of the metal went up to 100,000 tons in 1943. This was accomplished by using the most up-to-date methods and machinery and with the employment of thousands of Jewish forced laborers from Hungary and Rumania. Special barracks were built to house them. During the war Hermann Goering, through the German envoy Abetz in Paris, bought a great part of the "Mines de Bor" stock and thereby gained great influence in carrying on the business of the company, which caused some of the directors to move to New York.

The copper electrolysis installation was damaged during the Russian advance. The Russians, visibly impressed by the size and the yield of the mine, considered Bor as "German property" because of the great amount of stock owned by Germany and took possession of it as war booty. Even in 1945, Russian engineers arrived to resume operations, together with some of the former German experts, who were returned to Bor as prisoners of war. First the copper electrolysis installation was put

into operation again and then production was started in all the other sections. New methods, tested in Magnitogorsk and Kirovgrad, were used in the smelting plants. Because of heavy sulphurous smoke the vicinity of Bor has been unfertile for years, and now the Russians are trying to change this condition by using new methods. At present 20,000 men are employed at Bor, 80 per cent of them political prisoners sentenced to forced labor or prisoners of war; they are housed in the barracks used formerly by the Jewish forced laborers. Production has not yet reached the high level it attained in 1943 under the Germans. Electric power is supplied from the Mali Kostolac thermal power plant over the mine's own long-distance line, 125 kilometers in length. The power plant uses coal from the nearby open pit coal mines. In order to facilitate transportation to Russia, two sections of the mine were linked to the Danube by rail lines, namely the Bor - Crni Vrh sector, 21 km, and the Petrovac - Hladno Vode sector, 16 km. The whole Homolja massif, between the Morava and Timok river, contains copper (1 - 1½ per cent). The main vein at Bor has a length of 10 km, is 2 km wide and 30 meters deep, and has a copper content of 6 to 7 per cent, in addition to gold, silver, and sulphur deposits in smaller amounts.

Though all Yugoslav industries were taken over by the state, the ownership is not settled because of Russian demands. The Bor copper mine is Yugoslavia's greatest natural asset, an important factor in world copper production, and plays an important role in all decisions made by Yugoslavia.

Yugoslavia does not have any copper processing industry worth mentioning. The Impol Plant in Slovenska Bistrica, south of Maribor, for processing of copper, copper alloys, and aluminum, has only a small production capacity due to its lack of technical equipment and experts.

The Novikabel cable factory in Novi Sad employs Italian (Trieste) experts and produces copper cables with lead casing, telephone cables

with lead, paper, and silk insulation, manometer tubes, etc., particularly for the use of the Yugoslav army.

Aluminum Production

Half of the known bauxite deposits of the world are in Yugoslavia and Hungary. In 1939 the annual bauxite production amounted to 314,439 tons. Most of it was exported.

The rich bauxite deposits (high-grade reddish bauxite) near Knin and Drnis, between Lika and Dalmatia, led to the foundation of the Dalmatian aluminum industry even before World War I. Altogether about 2,500 workers are employed in the Losovac and Siveric plants. Production is higher today than it was in 1940, and the greater part of it is exported as crude aluminum. The Losovac plant near Sibenik has been enlarged since 1945; a large hall with 14 smelting furnaces has been newly constructed. Electric power is supplied from the Gubavica hydroelectric plant located at the Krka waterfalls.

In spring 1942, the Germans started the construction of a huge aluminum plant in Strnisce near Ptuj, in the Slovenian Republic. The construction of this plant was within the framework of the "Ostplan" (plan for the east) of German industry, and experience gained in the nearby Hungarian aluminum industry was utilized. Bauxite for the Strnisce plant was supposed to be supplied by Hungary. In order to supply the required amount of electric power for this plant and for the aircraft plant in Tesno, which ^{was} constructed at the same time, construction was started on the Drava power plant on Mariborski Otok, near Maribor. Construction of another hydroelectric plant was started at Dravograd, while two more plants were planned at Vusenica and Ptuj. The plant is located on the Fragersko-Ptuj railroad line, with the work shops to the right and the administration and living quarters to the left. In addition to a great number of railroad tracks and the new Strnisce factory loading station, they built an

underground sewage conduit measuring one meter in diameter, alongside the railroad line to Ptuj running to the Drava; it was partly completed during the war. The Fram - Ptuj road, located north of the railroad line, was linked to the Pragerake - Ptuj road by a newly constructed road leading past the Strnisce plant and underneath the railroad line (large viaduct).

After the end of the war, the Yugoslavs started at once with the completion of the hydroelectric plant on Mariborski Otok, near Maribor, which is partly in operation at the present time. Also work on the Strnisce plant was continued with the aid of mobilized labor forces, since 1946 under the supervision of German and Hungarian engineers. Living quarters and administration buildings were completed, while the factory itself is supposed to be completed by 1951. Only then will the real production get under way. The 2,000 workers are kept busy mainly with construction work, while 17 brigades and 69 youths [sic] work according to the Stakhanovite-system [premium payment system]. The promising future of the Strnisce plant - due to its favorable location, great power supply, and adequate bauxite deposits within the country - is repeatedly mentioned in Yugoslav government circles. However, it is improbable that Yugoslavia will succeed in completing this huge and modern plant because Hungary cancelled its aluminum agreement with Yugoslavia after the conflict with the Cominform.

Total production of aluminum in Yugoslavia amounted to 1,700 tons in 1939, and is supposed to reach 13,000 tons in 1951 after the completion of the plant in Strnisce.

Yugoslavia has too few facilities for processing aluminum at the present time, and therefore she exports crude aluminum as well as bauxite.

Metals

Antimony, Lead, Zinc, Chromium, Molybdenum, Mercury, and Pyrite

Yugoslavia's annual production of antimony ore amounted to 15,000 tons in 1939. 880 tons of pure antimony metal were exported.

Antimony. Yugoslavia mines antimony in the Krupanj, Zajaca, and Bujanovac mines in the Drina region in Western Serbia. These mines were founded by French capital. The mines were enlarged during the German occupation, and in 1945 they were taken over by the Yugoslavs, almost undamaged. Production is higher today than it was in 1940. Yugoslavia owns another mine in Ivanica, near Usicka Posega, which, however, is not so profitable. Yugoslavia supplies antimony to all the eastern states, and this export factor plays an important role in their mutual trade.

Lead and Zinc. Annual lead production amounted to 11,000 tons and zinc production to 5,000 tons in 1939. Following the Five-Year Plan, lead production is supposed to be increased six-fold and zinc production four-fold.

The richest lead and zinc deposits are located in Trepcia, near Kosovska Mitrovica and near the historic Kosovo Polje. Founded by Rade Pasic, son of the well-known Serbian statesman Nikola Pasic, the mines soon passed into English ownership. English capital equipped the mines with modern machinery and built flotation and smelting plants, thereby raising production materially. The largest smelting plant is located in nearby Zvecan, while Zletovo, another mine in operation, is also not too distant. Until April 1941 the lead and zinc concentrates obtained (also pyrite) were delivered to the world market via Salonika. Trepcia was enlarged during the German occupation, and over-mined by using numerous forced laborers. The installations were not damaged during the war, and the Yugoslavs started to operate them immediately after the war, using mostly forced laborers. Production

is higher than it was in 1940. Shipments to Russia go via Kladovo, while shipments destined for Czechoslovakia and Poland are sent to Smederovo to be loaded onto tugboats. Deliveries to western states go via the harbors of Fiume, Trieste, or Metkovic.

Work on a new and little known lead mine was started in Suplja Stena, in the Plevlje district of Montenegro, in 1947. It is still under construction and a substantial rise in the total lead production is expected, since these deposits have a high lead content.

The lead mine of the Bleiburger Bergwerks-Union, which became Yugoslavian in 1920 and was acquired by the English firm "Europa Mines, Ltd," is located at Crna v Mesiski Dolini in Slovenia, near the Carinthian border. This mine, too, was not damaged during the war. Their lead smelting furnaces make it possible to obtain pure lead, while the zinc concentrates, which are obtained as by-products, are sent to the zinc works in Celje. There large smelting furnaces, rolling and grinding mills, permit quick processing of the zinc concentrates received. The pure zinc as well as the zinc oxide obtained satisfies the country's own needs and is also exported to the eastern states.

Chromium.

Yugoslavia also possesses chromium deposits in the vicinity of Skoplje, which were exploited by the Asco and Alatin firms before the war. Chrome ore was shipped via Salonika to the USA and England. This region was occupied by the Bulgarians during the war and the chrome ore obtained there was an important factor in the German-Bulgarian exchange, since the import of Turkish chrome ore encountered increasing transportation difficulties. Therefore, the exploitation of chrome ore was intensified by German experts during the war. Yugoslavia took over the undamaged installations, enlarged the "chromium railroad" between Skoplje and Gostivar (also to aid in supporting General Markos), and now supplies all the eastern states with chrome ore. The annual production amounted to 44,097 tons in 1939.

Molybdenum. German geologists discovered molybdenum deposits in southern Serbia during World War II. Exploitation was started at once, because molybdenum was of great importance to the German heavy industry. Yugoslavia continues the exploitation of molybdenum and is eager to find German experts to work on this job.

Mercury. As the result of World War II, the region of Idria in Slovenia with its mercury mine came into Yugoslavia's possession. This mine has been known since the Middle Ages, is one of the richest in the world, and supplies 20 percent of world production. Operation is normal at present (production is five times as much as USSR production), and the products are shipped via Trieste for transshipment to the world market, as far as they are not used for Yugoslavia's or the eastern states' military purposes. In addition, Yugoslavia has another smaller mercury mine in Rogatica, Bosnia, which is being enlarged at present.

Pyrite. Sulphur ore (pyrite) is obtained in great amounts in the Majdanpek mine in western Serbia, which was originally founded by German and Hungarian capital. Enlargements were made by the Germans during the war. Majdanpek is situated near the Danube River, which makes transportation to Russia and the eastern states easy. Their needs are almost fully covered by pyrite deliveries from Yugoslavia. Majdanpek's pyrite is also delivered to the Yugoslav chemical factories in Sabac, Krusevac, Celje, and Hrastnik. Pyrite also occurs as a by-product in the Trepca lead mines and the Bor copper mines. Annual production amounted to 127,039 tons in 1939.

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Iron and Steel Industry.

A) Mining of Iron and Manganese Ores.

Total production of iron ores amounted to 613,000 tons in 1939 and is to be raised 2½ times following the completion of the Five-Year Plan.

Iron ore is mined in the large Ljubija mines, known since the time of the Romans. Soon after the occupation of Bosnia in 1878 real exploitation of this

rich iron ore deposit was started. Today Ljubija is of great importance for Yugoslavia, and a 15-km railroad line, built recently, from Ljubija to Brezicani links it to the main line between Bihac and Banjaluka. Eighty labor brigades, who continuously complain about their poor rations, work in Ljubija. In spite of the greatest efforts made by the responsible authorities, a 30 percent shortage of workers still exists in Ljubija. All plants of the Yugoslav iron industry, except Zenica and Vares, which have their local iron ore deposits, are supplied with iron ore from Ljubija. Until the Cominform conflict all the iron ore not used in the country's own industry was sent to Hungary and Czechoslovakia.

Manganese is mined in Topusko, Croatia, which is used by the native industry and also exported. Within the Five-Year Plan it is intended to open up manganese deposits located in Macedonia. Annual production amounted to 4,000 tons in 1939 and is supposed to be raised to 46,000 tons.

B) Iron Processing Industry.

A total of 111,000 tons of crude iron and 235,000 tons of steel was available to the iron processing industry in 1939. By 1951 the production of crude iron is to increase five-fold and of steel three-fold.

The iron and steel plant at Jesenice employs about 5,000 workers - 280 labor brigades and 40 youth brigades. Here the former Krainer Industriegesellschaft, whose main stockholder, August Praprotnik, was killed by partisans in 1942, built modern blast furnaces, five open-hearth furnaces, electric smelting furnaces, rolling mills for heavy sheet iron, etc. They produced railroad tracks, railroad switches, and other railroad material, malleable and rolled iron, iron tubes, sheet iron, cable, nails, electrodes, welding wire, etc.

Another iron and steel plant is located in Gustanj, Slovenia, on the Maribor - Klagenfurt railroad line. This plant formerly belonged to Count von Thurn und Valsassina, and it produced mainly high-grade steels of all kinds. Recently this plant produced 250 tons of hardened steel parts for the new Maribor hydroelectric plant. Parts for small wagons and plain sheet iron are also produced here.

A smaller iron plant in Store near Celje produces primarily cast iron of all kinds.

Because of the extensive local ore deposits in Vares, the Austro-Hungarian finance minister Kallay founded the iron industry of Zenica and Vares soon after 1878. These iron plants were in operation until the end of World War I, as land-owned plants of Bosnia and Herzegovina. They are situated on the narrow-gauge Bos. Brod - Sarajevo railroad line, and now, in addition, on the standard-gauge Samac - Sarajevo railroad line, which was constructed this year. Engineers from the Krupp works modernized the plant during the Stojadinovic government. The plant was not damaged during the war. Using partly domestic materials, a new open-hearth furnace was built after 1945. Tool steel, fire and high-temperature resistant steel (made according to German patents), machines for small rolling mills, steel for the electrical industry, magnetized steel, dynamo sheet-iron, etc., were produced in their large smelters and smelting furnaces, rolling mills, and other modern installations, under the supervision of German engineers and prisoner-of-war experts. The total number of workers employed here is about 4,000.

Sartid in Smederovo is another large iron plant with its own smelters and foundries, formerly a subsidiary plant of the Rumanian Reschitza works. It produces tools and equipment made of iron and steel.

The Sisak iron plant in Croatia, with its several blast furnaces, must contribute materially to Yugoslavia's iron production. The blast furnaces of Topusko on the Glina, predecessor of this plant, were completely destroyed by the partisans.

In 1945, after the end of the war, the new central foundry in Zemun was constructed within a short time by forced laborers and conscripted civilians. Technical shortcomings in its construction led to the collapse of the large factory hall in 1947. The head engineer, Milan Sekulic, a well-known architect in Yugoslavia, was held responsible for this incident and sentenced to 20 years of forced labor. The foundry's production capacity is very great, and pig iron castings, steel castings, cast iron, and alloy castings are produced in several cupola furnaces. Most of the production is supplied to the nearby "Ivo-Lola-Ribar" machine factory, near Belgrade. This heavy machine-tool factory is 10

kilometers distant from Belgrade, situated on the right bank of the Sava - opposite Valjevo - and linked to the capital by its own railroad. This factory, too, was built in great haste, since 1946, by forced laborers, mobilized workers, and youths, and ground water indicates that its construction also is technically faulty. The factory has been partly in operation for one year. Machines were delivered from Hungary, Schweinfurt, and Braunschweig, as reparation deliveries. Its products consist of heavy machine tools and presses for the light metal and iron industry, shears for sheet iron and steel sheets, and artillery equipment. About 5,000 workers are employed here.

The Prvomajska machine-tool factory, constructed by the Germans during the war, is located in Zagreb, and produces machine tools, e.g., turning lathes, milling, drilling, grinding, and cutting machines.

The large Litostroji factory in Ljubljana was newly constructed since 1947, and it employs about 2,500 workers. Products consist of machine tools for the wood industry, cranes, cross-bars, agricultural machinery, all types of hydraulic machinery, Kaplan turbines, etc. The plant has its own foundry and a branch in Muta.

The former Siemens-workshop in Zagreb has been enlarged. It is now called Rade Koncar and employs over 3,000 people. After it is completed and all equipment is installed, it will employ 10,000. Products are generators for hydroelectric plants (Maribor power station), transformers, switchboards, telephones, and 800-hp electric motors, type A 120/asynchronous.

The Iskra (Funke) Plant in Krenj, a subsidiary of the Rade Koncar factory, produces electric meters, electrical parts, voltmeters and ammeters, electric drilling machines, etc. This factory was erected as an armament plant by the Germans during the war.

A factory for general structural iron (Splosna), located in Maribor, was enlarged by the Germans during the war and now specializes in materials for bridge construction. It has a large factory hall, large cranes, its own sidings, and also produces propellers of all dimensions.

The machine factory and foundry in Osijek, employing 500 workers, produces agricultural machinery of all kinds. Formerly it belonged to the

1st Croatian Savings Bank combine, like the Titan subsidiary in Kamenik, which is independent now and produces chinaware and other household articles.

The machine factory and foundry in Daruvar, Croatia, produces light machine tools, revolving presses, stone grinders, and machinery for the building trade.

The Rakovica engine factory, in the Belgrade suburb of the same name, is under the supervision of German engineers and produces gasoline engines for fire-trucks, and for use in other capacities, engine parts, aircraft engines, and parts for automobile engines. This factory, built by Czech experts (Skoda) in prewar Yugoslavia, with the support of the war ministry, continues to serve mainly military purposes.

The VDM aircraft plant in Tozno, near Maribor, built by the Germans during the war, is today called Tvrnica Automobilov Maribor, or T.A.M. There are more than 150 machines (mostly revolving lathes) in the halls of the plant, which covers a large area. There are also two underground work-rooms, which at present serve as fuel storage places. Due to a lack of technical material, it has not been possible to start mass production, and work is done in one shift. The products consist of small automobile parts and valves for motorcycles. The announced automobile production consisted of assembling several automobiles, while the parts were supplied by Czechoslovakia. These deliveries have now stopped, so that the 1948 quota was only 30 percent fulfilled, a fact that had to be admitted by Yugoslav officials.

Located in Slav. Brod is a factory for locomotives, machinery, and bridge construction parts, which formerly belonged to the 1st Croatian Savings Bank and now is a state-owned factory bearing the name of party secretary Djura Djakovic. This plant was almost completely destroyed during the war and was rebuilt and put into operation again with the aid of numerous forced laborers. At present it mainly repairs locomotives and railroad cars, and produces bridge construction parts and drills for the oil industry. The production of locomotives in this plant is also provided for within the Five-Year Plan.

The Jasenica factory in Smederevska Palanka produces new types of passenger railroad cars, baggage and mail cars, and street cars. Also, captured German and Italian railroad cars are being repaired so that they can be used for shipment of fish and poultry.

Machines from the Kraljevo railroad car factory were removed by the Germans during the war. Now new machines from Germany (reparation deliveries) are being set up and put into operation. Products consist of locomotives for narrow-gauge railroads. Recently production of railroad cars was started, but lack of materials causes interruptions in production.

Located in Krusevac, Serbia, is a smaller railroad car factory, named "14 October," doing mainly repair work on railroad cars. War damage has not yet been completely repaired.

To date, Yugoslavia has not produced locomotives for narrow-gauge railroads but has obtained them from Hungary as reparation deliveries. Other large railroad repair shops are located in Maribor, Zagreb, Sarajevo, Nis, Rijeka, Subotica, Indjija, and Zrenjanin (Vel. Backerek).

The iron foundry and machine factory in Petrovaradin, near Novi Sad, produces hemp and linen-processing machines as well as concrete mixers. They also carry out repair work on tanks and trucks for the army. Machinery in operation was imported from Russia in 1947.

The former Vistad machine factory in Valjevo, Serbia, was badly damaged during the war. However, because of its importance for the Yugoslav army it was put into operation again soon after 1945. Even in the old Yugoslavia, this factory produced weapon parts for the army arsenal in Kragujevac. Yugoslav newspapers never mention the Vistad factory.

The Yugoslav army arsenal in Kragujevac was almost completely destroyed during the war and its machinery removed by the Germans. Reparation deliveries and Russian aid have made it possible to put it partly in operation again; it now does mainly repair work. Iron and steel came from Russia and Czechoslovakia at first, but now part of these requirements are met from domestic production.

The Kotor-Tivat naval arsenal was occupied by the Italians during the war and was returned to Yugoslav possession without any damage. There, too, only repair work is being done at the present time.

An ammunition factory has been under construction since 1946, mainly by forced laborers, in Vogosce, near Sarajevo. It will employ 1,000 workers and will produce mainly shells. Its machinery came from Czechoslovakia and Russia.

A powder factory, dating from old Austria, is located in Kamnik; it is now in normal operation.

Yugoslav shipyards are located in Rijeka, Pula, Split, and Kraljevica. Raw material is supplied by the domestic iron and steel industry as well as imported from Czechoslovakia, Poland, and Russia.

The Yugoslav aircraft industry is in its infancy. Available for it are the Kogozarski factory in Belgrade, and the Ikarus and Zmaj factories in Zemun. The Germans placed this factory under the Wiener Neustadt aircraft plant and produced parts for aircraft. The factory was enlarged and new machines were installed, all of which came undamaged into Yugoslav possession. The former Kraljevo aircraft factory was dismantled by the Germans, because of its unsafe location in partisan territory, and only now has it been put into operation again. All the shops are doing mainly repair work; mass production of aircraft is out of the question.

The Sutjeska precision instrument factory in Belgrade produces navigation instruments, manometers, etc., for military purposes. Also medical instruments are being mass-produced, and the production of X-ray apparatus was undertaken recently.

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The Chemical Industry

The Yugoslav chemical industry, too, must overcome great difficulties. A sufficient amount of raw material is available, but there is a lack of machinery, since deliveries from Czechoslovakia and Hungary have decreased substantially. A lack of experts is also noticeable.

The electro-iron plant in Sibenik (metallurgical combine) produces ferro-manganese, ferro-molybdenum, and amorphous electrodes. Electric power is supplied from the power plant at the Krkafalls.

The Ruse pri Mariboru nitrogen plant in Maria Rest, near Maribor, formerly founded by Austrian capital, produces calcium cyanamide which is exported in great amounts. The plant continued operations during the war and was not damaged. At present five electric furnaces are in operation and production consists of calcium carbide, oxygen, nitrates, nitrogen, sulphur dioxide, acetylene gas in acetone solution, nitrous oxide, ammonium sulphate, ammonium nitrate, calcium cyanamide, recently also corundum for the abrasives industry, ferro-manganese, etc. The plant is considered a very important one, and in 1947 and 1948 large new laboratories and an industrial school for young workers were constructed. Electric power is supplied over the plant's own line from the nearby Fala Drava power station. The total number of workers is about 1,800.

The Dalmaoija factory in Split produces carbide, cyanamide, and crude calcium cyanamide, partly for use in Yugoslavia and partly for export to the Near East and South America, via Trieste. Electric power is supplied by the "Tito" hydroelectric plant in Katuni.

The Ruse and Dalmaoija factories produced 64,000 tons of calcium carbide in 1940. Production is supposed to be raised 100 percent by 1951.

The Merima chemical factory in Krusevac, rather small factory, produces only blue vitriol and sulphuric acid.

The Elektrobosna enterprise in Jajce, founded with Austrian capital, obtains its electric power from the well-known Jajce waterfalls. It was producing ferro-silicon even before the war, and production of this item is being continued at present. The production of corrosive sublimate is planned within the Five-Year Plan, and the necessary equipment has already been installed; the same is true of sodium hydroxide and hydrochloric acid.

The large Zorka chemical factory was evacuated from Subotica, near the Hungarian border, to Sabac, in the interior of the country, upon the demand of the Yugoslav army high command in 1933 and 1934. Only a small part of the factory remained in Subotica, and this part is still in operation. Zorka is considered the largest chemical factory in the Balkans and is situated east of Sabac. Covering a wide area, with its own railroad sidings and loading ramps, the Zorka factory obtains sulphur pyrites---its most important raw material---from Majdanpek. In 1940 it produced 14,000 tons of sulphuric acid and the same amount of blue vitriol. These two products are exported throughout the Balkans and to Turkey. Other products are: superphosphate, cyanamide, sodium sulphide, aluminum alum, barium sulphate, barium carbonate, carbon disulphide, and several types of plant sprays. The plant employs about 3,000 workers and is guarded by the ENOJ. The two largest departments of the plant are equipped for the production of hydrochloric acid and sulphuric acid.

The largest soda factory in the Balkans, a Belgian foundation of the Solvay group, is located in Lukavac near Tuzla, Bosnia. The factory produced 15,000 tons of caustic soda and 23,000 tons of ammoniac soda in 1940. The plant was not damaged during the war, and it now produces all kinds of soda, soda lye, hydrochloric acid, Glauber salts, etc. There are 2,000 workers employed in the factory. Like all other chemical factories, the one in Lukavac is guarded by the ENOJ. A great part of the production is destined for export to the Balkans. Because of the importance of railroad connections for

the Lukavac and Zorka (Sabac) chemical combines, priority was given to the construction of the Tuzla-Iosnica-Sanja Kuviljace-Sabac railroad line and, thanks to the aid in construction given by the army, the railroad line has been almost completed. Also, construction has been started on the Tuzla-Bjelina-Mokout line, to aid in supplying raw materials and fuels for the plants.

A fairly large chemical factory is located in Celje, with a plant in Hrastnik. The celje factory is supplied by the Celje zinc works and produces lead oxide, red lead, zinc white, lead white, lithopone, naphthalene, barium sulphide, barium chloride, water glass, and recently radio-active barium, and hydrochloric acid. Hrastnik has its own rotary furnaces and produces sulphuric acid and superphosphate. Both factories obtain their electric power supply from the Fala Drava power station, via the Tueffer transformer near Celje.

The only photographic chemical factory is the Fotokemija in Zagreb, which produces photographic paper and blueprint paper of poor quality.

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Miscellaneous Industries

Yugoslavia's glass industry is fairly well equipped, since the most important raw materials for it, quartz and soda, are available in the country in adequate quantities. The large plate-glass factory in Pancevo exports plate glass to the Balkans and to the Near East. In addition there are glass factories in Paracin, Hrastnik, Roguzka Shtina, and others.

The Saturnus factory in Ljubljana produces metal boxes and fancy goods made of sheet metal. It suffers from lack of machinery.

The Bobek iron foundry in Zrenjanin (formerly Beckerek) was changed into a machine factory during the war and now produces agricultural machinery.

A chain factory in Kikinda, formerly founded by the Swiss, was converted into an iron foundry.

There are small iron and metal industries in all larger Yugoslav towns, doing mainly repair work on agricultural machinery and automobiles.

Also worth mentioning is the Gorica chinaware factory (formerly Arko) in Zagreb, which uses a new method for the production of enamel, and another chinaware factory in Celje (formerly Westen).

The Yugodont factory was founded in Novi Sad for the production of medical instruments, mainly dental instruments; however, only simple instruments are being manufactured.

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Export of Ores and Metals

Yugoslav exports of ores and metals to the eastern states in 1948.

Of the materials destined for export, the following percentages were exported to the USSR and the Eastern States:

Crude copper	72 %
Electrolytic copper	77.7 %
Crude zinc	97.3 %
Lead	59.5 %
Antimony	62.1 %
Mercury	72 %
Lead concentrate	85.2 %
Zinc concentrate	57.1 %
Pyrite concentrate	94.1 %
Pyrite	96.1 %
Iron ore	100 %
Ferrocchrome	62.1 %

In December 1948 and January 1949, after the Cominform conflict, Yugoslavia exported to the USA electrolytic copper, zinc, antimony, mercury, and chrome ores, to a total value of \$3,767,000.

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Non-metals

Magnesite Large magnesite deposits are located in Yugoslavia. Goleš, the largest plant, is located in the Kosmet province (south-west Serbia), and is already in operation. Others are in Poinja and near Vučitrn. Due to the lack of machinery, experts, and experience, Yugoslavia is not yet capable of producing sintered magnesite. It is therefore imported from Czechoslovakia and Austria, and raw magnesite and calcined magnesite are exported in exchange. The annual production of raw magnesite amounted to 33,000 tons in 1959 and is supposed to be increased four-fold.

Asbestos There are asbestos deposits near Milosevo, Serbia, and near Petrovo-selo which had led to the founding of the Yugoslav Asbest Company before the war. Yugoslav asbestos has short fibre and has only few possible uses. Its main use is for insulating material. Yugoslavia imports high-grade asbestos from the USSR.

Fireclay Deposits of fireclay are located near Arandjelovac. A chamotte factory is under construction there. A factory in Mladenovac produces chamotte bricks and linings for iron and steel smelting furnaces. According to the Five-Year Plan, Yugoslav iron and steel plants are to be supplied with clay and chamotte from Arandjelovac.

Kaolin A porcelain factory, which will produce mainly insulators, is under construction in Prijedor. Kaolin deposits in its vicinity are equal in quality to Czech kaolin.

Barite Barite is found in several places in Yugoslavia, mainly in Bosnia and in Croatia, in the vicinity of Topusko. Production covers domestic needs and barite is also exported to Hungary and Rumania.

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Cement

Yugoslav cement production amounted to 660,000 tons in 1939, and since then it has gone up to 1,000,000 tons. This is due mainly to the Anhovo cement factory near Gorica, which came into Yugoslav possession after 1945. Other large cement factories are located in Beccin in Srem, Trbovlje, and Podused in Croatia, and there are also several factories in Dalmatia. Fulfillment of the 1948 production plan was short 30 percent, since exports slowed down, and production had to be curbed because the storage facilities were full. Therefore, the Dalmatian cement factories near Solin, which because of their locations on the sea coast produce mainly for export, exported only 250,000 tons instead of the planned 500,000 tons. Exports are influenced by the small amount of shipping tonnage available and the poor markets in the Near East and South America (Argentina and Brasil), which can absorb only small amounts of cement.

Cement exports amounted to 154,812 tons in 1939.

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Coal

Total production of all kinds of coal in Yugoslavia amounted to 6,068,000 tons in 1939. This amount is to be raised to 18 million tons within the Five-Year Plan.

Black coal is mined in the following mines:

In Rasa, Istria (formerly Italy), which at present counts as the largest Yugoslav mine and since 1945 employs about 7,000 workers.

Several mines in the Timok region of Serbia, the best-known of which is Bogovina, and the Ibar-Basin mines, which have just been opened up.

Brown coal:

Brown coal is mined in the Trbovlje mine in Slovenia, in the Zagorje, Hrastnik, Lasko, Reichenburg and Koevje pits. In Central Bosnia there are the Tito mines in Banovici; also the Kakanj and

Bresa pits, as well as the Mostar pits in the Hercegovina. Others include the Bara and Kavana Reka mines in the Senj Basin, Serbia; in the Aleksinac Basin the Kosava, Kitanj, Aleksinac, and Tresibaba-Podvis mines; and the Baikan and Jelasica mines near Nis.

Lignite:

Lignite is mined in the Kreka mines in Bosnia, in Kostolac near Smederevo, Serbia, in the Vrdnik (Srem) mine, in the Kolubara region, around Kosovo, and in Slovenia and Croatia in the Velenje, Konjescina, Ladanje, Golubovac, and Peklenica mines.

Yugoslavia has enough lignite and brown coal to satisfy her demands of railroad and house fuel. However, her industry depends on the import of black coal, coke, and anthracite, which until now has imported from Czechoslovakia, Poland (Silesia), and the USSR. Yugoslavia also received coal from Bulgaria (Pernik) and Hungary (Mohacs) as reparation deliveries.

It has already become doubtful whether the high coal output planned within the Five-Year Plan can be attained, because of Yugoslavia's catastrophic lack of regular miners. Yugoslavia at present lacks about 30 percent of the required number of mine workers.

Coal imports amounted to 395,595 tons in 1939.

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Yugoslavia's Oil Production

Yugoslav oil deposits were discovered along time ago, and the first drillings took place on the Mur island near Salnica and Peklenica at the end of the last century. However, Yugoslavia's annual production amounted to only 1,000 tons in 1939.

Rational exploitation was started by the Germans, who built modern installations after their successful experimental drillings in Dolnja Lendava and Golja during the war. Annual production rose during the German occupation to 150,000 tons in 1944.

At present the Yugoslav government attaches great importance to oil exploitation. They are striving to increase exploitation of oil

from present deposits and new experimental drillings are being made constantly. The Dolnja Lendava combine delivers 30 railroad cars daily, Golja near Kutina, Croatia, delivers 10, and the new oil wells near Mosti, Kris, Oselkovo, and Lepavina, together another 10 railroad cars daily. Yugoslavia's annual oil production amounts to about 180,000 tons at present. Great difficulties are encountered in further increasing Yugoslavia's oil-drilling operations, since no more drilling equipment was being supplied by the eastern states since the Cominform conflict. Therefore, it is doubtful whether the annual production of 450,000 tons for 1951, as planned in the Five-Year Plan, will be reached. Production of drilling equipment domestically (in Slavonski Brod) has not been very satisfactory to date.

Yugoslavia imported 142,100 tons of naphtha and 154,691 tons of petroleum in 1939. The difference between Yugoslavia's own production and her needs was met by imports from the USSR, Rumania, and Albania, until the Cominform conflict; now England delivers it from the Near East.

Refineries are located in Caprag-Sicak, Smederevo, Rijeka (formerly ROMSA), and Maribor.

Bituminous slate deposits are located near Prljak, in the vicinity of Aleksinac, Serbia (experimental production of oil), also near Leskovac, Serbia, and in Montenegro.

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