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SOVIET GOLD PRODUCTION, RESERVES, AND EXPORTS THROUGH 1954

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SOVIET GOLD PRODUCTION, RESERVES, AND EXPORTS THROUGH 1954*

Summary

Soviet gold production in 1954 is estimated to have been about 4.8 million troy ounces** with a value of approximately US $170 million,*** or roughly 15 percent of world production. This level of production represents a fairly steady increase in the volume of Soviet gold production to a level about double the World War II low but only about one-half the level achieved in the late 1930's.

Soviet gold exports in the postwar years were small until 1953, when they suddenly jumped to the highest level since 1937-38. Total gold exports in 1953-54 may have amounted to about US $300 million. The main purpose of these exports appears to have been to balance trade under the "new course" following Stalin's death.

Soviet gold reserves at the end of 1954 amounted to about US $4 billion, or roughly four times the size of the gold reserves inherited from the Tsarist government, as is shown in the following tabulation:

* The estimates and conclusions contained in this report represent the best judgment of ORR as of 1 July 1955.

** Ounce figures are given in troy ounces of fine gold throughout this report.

*** Gold has been valued at US $35 per ounce throughout this report.

	Billion US Dollars	
	1920-40	1941-54
Reserves at beginning of period	0.9*	2.8
Production	2.7	1.9
Other acquisitions	0.9	0.0
Total disposable gold	4.5	4.7
Exports	1.6	0.6
Other uses	0.1	0.1
Total gold use	1.7	0.7
Reserves at end of period	2.8	4.0

The last Soviet announcement on gold reserves was in 1937 and on production, in 1940. These prewar announcements consisted of inconclusive percentage figures. Production estimates for World War II and subsequent years are based on inferences from indirect evidence. As a result, postwar production figures are subject to a range of error of plus or minus 25 percent. The estimate of 1954 gold reserves is subject to a range of error of plus or minus 40 percent.

The main purpose behind the Soviet production and accumulation of gold is to use the gold as an export commodity or balancing item in foreign trade. A comparison of Soviet trade balances and gold sales indicates a rough correlation between the two over a period of years but not on an annual basis. This correlation has been particularly striking during the past 2 years, when a substantial trade deficit has been accompanied by large gold sales. Between 1945 and 1953, however, the USSR appears to have limited the amount of gold exports because of expectations that the world gold price might increase.

* Inherited from the Tsarist government.

In addition to the small amounts which are hoarded, some gold is used in the USSR in industry and in the fine arts, but these amounts are difficult to estimate. An arbitrary 5 percent of production is deducted for domestic uses in the above tabulation of reserves.

Gold also has possible covert uses. Economic warfare through "dumping" gold, however, does not appear to be one of them -- disruption of the world gold markets is not in the interest of a large gold producer. The sparse data on other clandestine uses of gold (for example, financing foreign Communist parties) do not lend themselves to tabulation. Accordingly, no estimate for clandestine uses is included in calculating gold reserves in this report. The amounts involved are believed to be relatively small.

The ruble-gold parity, to which frequent reference is made by Soviet officials, is believed to be stressed primarily for propaganda reasons and probably does not play an important role in Soviet gold policy.

There are a number of reasons why postwar Soviet gold production should be so much below prewar production. In the first place, production costs were high in the 1930's and have increased considerably since that time. Remoteness and difficult working conditions in many of the deposits account in part for these high costs. In addition, costs are influenced by the probable depletion of the richest deposits. As a result, the output per Soviet gold miner is only slightly more than one-tenth that of a US gold miner. Furthermore, Soviet procurement prices may be considered to represent a heavy subsidy to the gold industry, representing a ruble-dollar ratio of more than 40 to 1, whereas the average ratio between internal Soviet prices and world prices is somewhere in the area of 10 to 1. In the second place, the purchasing power of gold in world markets has declined significantly to roughly one-half the prewar level. As a result, gold production in the rest of the world (excluding the Union of South Africa, where costs are reduced because uranium is obtained as a byproduct) has declined by 40 percent from 1938 to 1953. Finally, Soviet gold reserves at the end of World War II were already so substantial that the incentive to produce at any cost had disappeared.

As a result of this situation, Soviet gold production has risen since 1948 largely or entirely as a result of an increase in byproduct gold production (gold is a byproduct in the production of copper, lead, and zinc). It is reasonable to expect that any increase during the near future will be limited to a further increase from byproduct gold production.

The size of current Soviet gold reserves and the current volume of production provide a potential economic weapon of real value to the USSR. Current gold production alone is sufficient to pay for about one-third of Soviet imports from the West. If the USSR felt that a reserve level bearing the same relation to trade with the West as 1937 reserves bore to 1937 trade with the same countries were satisfactory, the USSR could finance with gold reserves additional imports of about US $200 million a year over a period of 10 years. Total annual gold exports would approach, and within a short period exceed, US $400 million, assuming that byproduct gold production continues to increase and that underground and placer gold production stays constant.

I. Gold in Soviet Policy.

A. Use in International Trade.

Soviet economic literature most often stresses the role of gold in international trade. Gold is referred to either as a balancing item or as an export commodity. Soviet gold reserves are also thought of as a store of value. In particular, gold reserves served during the prewar period as an emergency reserve against the possibility of war 1/* as well as a fund from which to pay for current trade deficits.

* For serially numbered [illegible] see Appendix I.

The fact that Soviet gold sales in the postwar period until late in 1953 were small may in part be owing to the fact that Soviet trade was relatively well balanced during this period. On the other hand, the recent rash of Soviet gold sales has undoubtedly been used in large part to offset unfavorable Soviet balances in trade with the West.

The proposition that the USSR generally uses gold as a means of balancing international payments to some extent begs the question. In the Soviet economy a sizable imbalance in payments is usually the result of a plan. This is the reason why gold is referred to in Soviet literature as an export commodity. It is probably more fruitful, therefore, to ask why gold exports are planned, rather than merely to point out that gold is exported when international payments exceed receipts. Large gold exports are thus significant as a reflection of a Soviet decision to plan an import surplus.

Soviet economic literature also indicates that world gold prices are an important consideration in the use of gold. This may well be the key to Soviet behavior in postwar gold sales. Since 1945 the USSR has obviously felt that gold prices were too low and were bound to increase. Typical of Soviet statements is a lecture to the Academy of Sciencies of the USSR in 1949 pointing out that:

> The policy of the USA aims at the acquisition of gold ... at the lowest possible price ... The impending economic crisis will put an end to the cheapness of gold. A devaluation of the dollar will be an inevitable result of the crisis

Similarly in 1953, Vishinsky denounced the US in a speech before the UN for "plundering its allies" by buying gold for a price three times cheaper than the price for which it sold its goods.

This interest in the world price of gold on the part of a large gold producer is to be expected. Similarly the Soviet government should be expected to compare the current purchasing power of gold in terms of goods which it can buy on world markets with its expectations of the future purchasing power of gold. If the prewar

ratio between gold prices and Soviet import prices is compared with a similar ratio in any postwar year, it is obvious that the USSR found it substantially more advantageous to export gold in the 1930's than it does today, in terms of what the gold would buy. (An index of the purchasing power of Soviet gold sold in the West for selected years, 1937-54, is given in Table 1.*) Table 1 makes this comparison on the assumption that the movement of British export prices is in line with the movement of international prices of the type of goods which the USSR has imported. This table indicates that the current purchasing power of Soviet gold is roughly one-half of its 1939 purchasing power. It has become relatively more advantageous (in economic terms), therefore, for the USSR to shift labor and capital from the production of gold to the production of other goods. This does not mean that production of gold has no economic advantage, for there are undoubtedly many low-cost mines. The point is that the production of gold is relatively less advantageous today than before World War II. It would appear, therefore, that, in view of the low current purchasing power of gold, the USSR would have been inclined in the postwar years to (1) hold at least part of its gold reserves in anticipation of better terms of trade and (2) put fewer resources into gold production.

In spite of the low purchasing power of gold, a sizable movement of gold from the USSR to the West started in October 1953 and continued through April 1954. These shipments are believed to have been from US $150 million to US $200 million in 1953 and from US $100 million to US $150 million in 1954. It may be concluded that during this period the marginal utility of gold to the USSR as an export was greater than its use as a store of value. It may be speculated that dimmer expectations of an increase in world gold prices, as well as requirements of the "new course," explain this shift in policy toward the use of gold.

* Table 1 follows on p. 7.

Table 1

Index of the Purchasing Power of Soviet Gold Sold in the West
Selected Years, 1937-54

1948 = 100

Year	Index of Export Prices (Great Britain) a/	Index of Price of Gold b/	Index of Purchasing Power of Gold c/
1937	48	82	170
1938	49	82	167
1939	46	82	178
1940	48	82	170
1946	81	82	101
1947	91	98	108
1948	100	100	100
1949	100	104	104
1950	76	93	122
1951	87	95	109
1952	91	88	97
1953	88	82	93
1954	88	82	93

a.

b. Before 1946, based upon US price; 1946-52, based upon Zurich price for gold ingots in US dollars per ounce; 1953-54, based upon London price in US dollars.

c. Figures derived by dividing column 2 by column 1.

B. Other Uses.

1. Domestic Consumption.

An appreciable quantity of gold is used in the USSR in industry and in the fine arts, and a small amount is hoarded, but these amounts are difficult to estimate.

A Soviet publication gives complete instructions for accounting for gold used for industrial purposes. These include:

> ... Gold as a raw material and in semi-finished products (in ingots, strips, alloys, solder), in laboratory and plant equipment and articles of all kinds, in electrolytes, reagents, salts, ... in scrap, factory wastes, cuttings, filing, spatters, slag, etc.

Attention is also called in this publication to a number of types of gold used for jewelry and dentistry. In addition, a number of forms are given which use as examples gold articles or pieces for art or industrial use weighing up to 5,000 grams. It may be concluded, therefore, that gold is used for a sizable variety of artistic and industrial purposes, sometimes in relatively large quantities.

According to two sources , Soviet uses of gold for jewelry, dental, military, and government (metals) purposes probably are as substantial or nearly as substantial as in Western countries. A recent report indicates that genuine gold is being used to gild St. Basil's Cathedral.

There is only sparse evidence of Soviet use of gold in industry or in the fine arts.

Gold is also apparently used for hoarding. Gold now is sold freely in "wafer-sized pieces" by state stores at a price of about 90 rubles per gram (about 2,800 rubles per ounce). This is about double the estimated Soviet cost of production and at the official exchange rate amounts to over US $700 per ounce. It is reported that

gold transactions in the Moscow black market in 1944–47 were so obvious that the government could not have been unaware of them. Although gold is ostensibly sold for dental purposes, and perhaps for jewelry making, the free sale at a high price would indicate that the major aim of the government is to reduce purchasing power in the hands of consumers.

In recent years, US gold production, which has amounted to an average of over US $100 million per year, has been fully consumed in industrial uses. About the same amount, possibly more, was consumed by industry in the rest of the world, excluding the USSR. Of a world production of about US $900 million in 1954, therefore, perhaps one-quarter went to industrial use.

Since no other information is available, an arbitrary assignment of 5 percent of Soviet production is assumed to have gone into other than monetary uses. As compared with world consumption, this is very conservative.

2. Clandestine Purposes.

The USSR is believed to smuggle gold into Western countries for clandestine purposes.

3. Economic Warfare.

It has often been suggested that the USSR may or will "dump" gold on the world market for economic reasons. Usually the Soviet aim is described as disrupting Western financial planning, although at best the purported aim is somewhat obscure.

The closest approximation to "dumping" of Soviet gold was the placing on the market in 1937 of some US $200 million in gold over a period of a few months. There is no question but that at that time the gold market was disrupted, but the stabilization funds and gold sterilization policies of the Western countries quite adequately took care of the situation.

There is no indication that the USSR ever intended to use its gold reserves as a weapon of economic warfare. Discussions in Soviet literature show that the USSR is primarily interested in obtaining a high price for its hard-won gold reserves. One Soviet economist says

> As concerns the sale of gold as an export commodity or as a means of balancing payments, such use of gold by the Soviet Union may be undesirable in those cases where the official price of gold in the capitalist countries is considerably below its actual value, as was the case following World War II.

It appears quite doubtful that the USSR would attempt to demoralize the Western economy by driving the price of gold down by means of "dumping" in view of (a) its limited gold stocks, (b) the ability of Western countries to insulate themselves from the effect of gold sales, and (c) the indicated Soviet desire to raise gold prices.

4. As Backing for the Ruble.

The Soviet government takes great pride in pointing out the backing of the "hard" ruble by gold. Several Soviet economists have claimed that the ruble is the only hard currenc

> ... It is well known that only gold can fulfill the role of an international money ... placing the ruble on a gold basis means that the ruble is the only currency in the world with a hard, gold content ....

This claim is in accord with the Soviet propaganda line that the gold ruble is predestined for the role of "the" international currency to which other currencies should be linked (as are most Satellite currencies). The Soviet government, however, neither stands ready to purchase gold abroad for the ruble nor does it provide for the sale of gold at a fixed price. There is also reason to doubt that the Soviet law regarding a 25-percent backing of gold, other precious metals, and foreign currency for the ruble is followed. Actually the Soviet ruble is a managed currency on an inconvertible paper standard, and its purported relationship to gold is of little interest for the purposes of this report.

II. History of the Industry.

The Russian Empire was the leading producer of gold in the world during the first half of the 19th century. Then came discoveries in Australia, North America, and South Africa which put these areas ahead of Russia. On the eve of World War I the Russian gold industry consisted of a large number of small enterprises working the placer deposits throughout the Empire, mostly by primitive hand methods. In 1913 there were 1,053 gold-mining establishments, and production was around 1.8 million to 2.0 million ounces. About the only currently important placer areas not contributing to this output were Yakutsk (Aldan) and Kolyma. Only the relatively rich deposits, however, were worked. The average gold content of ore worked in 1908 was 0.037 ounce per metric ton,* with about 90 percent of the output coming from placer workings. The average recovery of gold in US placer mining is about 0.003 ounce per ton.

World War II did not affect the gold industry to any major extent until the Revolution of 1917. In the ensuing Civil War, however, the industry virtually disintegrated. During the period of "War Communism" (1918-21) the Soviet government attempted to eliminate the use of money. Gold-mining enterprises were dismantled in order to use the equipment in other types of mining. Recorded production dropped by 1921 to about 5 percent of the prewar level, or to less than 100,000 ounces per year.

* Tonnages are given in metric tons throughout this report.

During this period of low gold production the gold reserves inherited from the Tsarist government were expended in order to pay for imports. Meanwhile, the Soviet government had failed in its attempts to substitute a labor unit of account for a monetary unit of account, with the result that it was threatened by total economic collapse because of inflation. The introduction of the New Economic Policy (NEP) placed the whole question of gold in a different perspective. The Ninth All-Russian Congress of Soviets, held late in 1921, instructed the People's Commissariat of Finance to assume the task of "restoring a sound monetary system of currency on a gold basis." Gold reserves were thus needed both to conduct foreign trade and to support the new currency.

The Soviet government immediately took steps to revive gold mining. A decree of 31 October 1921 extended to all citizens the right to prospect for gold. This decree was followed by others encouraging gold production, including one of 23 September 1924 that exempted gold enterprises, both state- and privately owned, from nearly all taxes. A number of state-operated trusts and many privately owned enterprises were established during the period of the NEP. (For the administrative structure and key personnel of the gold industry in the USSR at present, see Appendix A.)

The measures of the NEP for encouraging gold production yielded only relatively minor results. By 1927, production was still less than one-half the prewar peak of 1.8 million to 2.0 million ounces. At this point, Stalin appears to have taken a direct interest in gold mining. A new All-Union trust* brought the previously decentralized gold industry, as well as the platinum industry, under central control. The head of this new organization, A.P. Serebrovskiy, testified "that many conferences on gold were held in the office of Comrade Stalin."

* The name of this organization has changed several times but is currently and most often has been Glavzoloto (Glavnoye Upravleniye Zoloto-Platinovoy Promyshlennosti -- Chief Directorate of the Gold and Platinum Industry). This name for the trust is used throughout this report. (For the organization of Glavzoloto in 1941, see Appendix B.)

Serebrovskiy appears to have been under the direct supervision of Stalin until 1931, when Ordzhonikidze, the Chief of the Supreme Council of the National Economy, took over the general supervision of the gold industry.

The First Five Year Plan (1928-32) laid the basis for an expansion of the gold industry above the prewar levels, although production did not exceed the prewar level until 1932 or 1933. The first step was to import production techniques, technical skill, machinery, and equipment which were not available in the USSR. Serebrovskiy himself visited all the principal US gold-mining regions and was very outspoken in his admiration for US technology. He reports purchasing a great deal of equipment through the Amtorg Trading Corporation. Much of this equipment was later copied and manufactured in the USSR.

While in Alaska, Serebrovskiy hired John D. Littlepage, an outstanding US gold-mining engineer. Littlepage arrived in Moscow in 1928 and stayed as a high-level consultant to Serebrovskiy until 1937, when the latter was purged. At one time in the early 1930's there were as many as 175 US mining engineers and technicians working in the USSR.

As indicated by Stalin's direct interest, the gold industry in this period appears to have had a very high priority. Such a priority was quite rational because a considerable amount of gold was needed to help pay for essential imports under the First Five Year Plan. The effect of the depression upon the prices of other Soviet export commodities only reinforced the need for gold. The various devaluations -- particularly that of the US dollar in January 1934 -- also were a factor in increasing the purchasing power of gold at a time when the prices of the USSR's traditional exports were depressed. The need to accumulate gold to guarantee to the USSR the ability to purchase abroad in case of war became an additional factor in the middle 1930's. The gold industry was, therefore, in a position throughout the period before World War II to make an important contribution to the Soviet government and was given every incentive to do so. It is also possible that Stalin looked upon gold mining an

an impetus for the mass colonization of Siberia. Serebrovskiy reports discussions with Stalin in which the latter emphasized the role of the California gold discovery in the general development of the western part of the US.

Large sums were poured into the industry to develop gold-mining facilities, but specific data on the amounts are lacking. It has been reported only that "during these 5 years /1929-37/ immense amounts of money and energy had been poured into the industry." / One result of this investment is that for the first time the USSR began to mine underground gold deposits on a large scale. Lode gold had accounted for only 20 percent of gold production in 1926-27. During the First Five Year Plan a number of important gold mines in the Urals, Kazakhstan, and the Transbaykal came into production. Lode gold constituted 44 percent of gold production during the Second Five Year Plan (1933-37) and was planned to reach 60 percent of gold production by the end of the Third Five Year Plan, 1942. Substantial investment would be necessary to obtain these results as well as to mechanize part of the placer operations.

The result of this large expenditure of investment funds is described by the USSR in terms of an increase in the percent of gold output obtained by mechanized operations from 20 percent in 1913 / to 78 percent in 1935 and a planned 85 percent in 1937. It is uncertain, however, what the USSR meant by statements of this type. In 1940, D. A. Bochkov, Vice-Minister of the Ministry of Nonferrous Metallurgy, stated that placer mining was very backward and that only 20 percent of placer output was produced by means of mechanical equipment. On this basis, at least 40 percent of the total output of gold in 1940 was produced by manual labor. Another official speech in 1940 stated that the future of the gold industry largely depended upon the machine-building industry. The degree of mechanization in the Soviet gold industry is, therefore, quite certain.

Although increased production in the early 1930's was largely owing to investment in new underground mines, the increase in the middle 1930's was largely owing to placer mining. Part of this increase was the result of the success of the USSR in inducing a large influx of

of private prospectors into the gold industry. The rest was the result of the operation of Dal'stroy, an MVD organization set up in 1932 to exploit the mineral resources of northeastern Siberia with slave labor.

The position of the private prospectors had become ambiguous with the end of the NEP in 1927. On the one hand, they occupied somewhat the same place in industry as the individual farmers in agriculture. They were thus ideologically suspect. Many local officials were hostile toward this "capitalistic" method of mining. On the other hand, the Soviet government relied on these men for almost one-half of Soviet gold production and made a number of concessions to them during the 1928-32 period.

Because of this ambiguous position, production by individual prospectors remained stationary in the period from 1930 to 1932. In July 1933 an order from the Commissar of Heavy Industry called for the abolition of the uniform pay scale and in its place the establishment of premiums and special rewards to prospectors. This and previous concessions led to a large increase in gold production by prospectors in 1933, an increase of 47 percent as compared with an increase of 38 percent in the state-run enterprises.

In 1934 the Soviet government took the final steps necessary for stimulating the output of gold by individual prospectors. A law of 27 May 1934 provided the following:

1. The enterprise should supply housing and communal services to the prospectors and furnish consumer goods at prices and in conditions established for the workers of the enterprise.

2. The earnings of individual prospectors should be exempt from all state and local taxation.

3. The holdings of prospectors should be exempt from the agricultural tax and from labor and cartage liability of any kind.

4. In the event the prospector discovers a rich vein, he should receive a bonus and be granted the right to work it before it is turned over to the enterprise.

5. All workers of gold enterprises may prospect in their spare time.

At the XVII Party Congress in 1934 it was made clear that private prospectors were not to be denied their rights by hostile officials. One of the delegates illustrated this by the following example:

> In our region a certain queer fellow made himself conspicuous recently, a party organizer ... who advanced the "theory" that we want only socialist gold but not the "capitalist" gold produced by individual prospecting. We immediately gave such "leftist" views a rap on the knuckles.

In 1937 the expansion of the gold industry was interrupted by a widespread purge and charges of "wrecking" activities. Hundreds of arrests were made throughout the industry. Part of these "wrecking" activities may have represented resistance of workers to the Stakhanovite movement. Special brigades of workers from Glavzoloto were sent to the various districts in the third quarter of 1937 to help restore labor discipline.

One result -- or possibly one cause -- of trouble in the gold industry was a new policy toward private prospectors. In early 1938, Kaganovich stated that some of the private prospectors would be taken over by State trusts and that the rest would be better organized in order to make proper socialist enterprises out of them. Gold production declined in both 1938 and 1939.

In 1939, Bochkov, the new head of Glavzoloto, described this 1938 policy as follows:

> They tried to disorganize gold production by prospectors. Instead of rendering organizational and technical aid to prospectors and instead of improving their living and working conditions, these enemies of the people brought about the cessation of operations in districts exploited by prospectors and created all kinds of difficulties for prospectors.

In early 1940 the former privileges and rights of private prospectors were reaffirmed and new privileges granted, such as credits for building homes and for various types of work preparatory to mining. The prizes for the discovery of new deposits now ranged up to 200,000 rubles. These steps led to a large influx of private prospectors into the industry and a large increase in their production. In October 1940, trust managers were instructed to devote as much attention to providing the necessary conditions for a further increase in production by private diggers as to the work of state enterprises. Among these conditions was mechanization of the artels in order to increase their size and make them more efficient.

The shifting policy of the Soviet government toward private prospectors was thus a major factor in determining the level of gold production in the 1930's. The large investment program and the increase in lode mining was a second factor. The third factor was the discovery of extremely rich deposits in the Kolyma River Basin of northeastern Siberia and the exploitation of this area by Dal'stroy.

Numerous reports have been received that the Kolyma placer gold deposits are the richest ones in the USSR. These deposits are located too near the Arctic Circle and too far from settled areas to attract free labor. From the beginning, accordingly, mining in this area has depended upon slave labor. Mining processes consisted largely of the working of alluvial deposits by means of hand labor with a minimum of equipment. In spite of the primitive working and living conditions, large quantities of gold were being produced here by the mid-1930's. This fact, however, was not widely known, since the operation was controlled by the MVD.

Little is known about the wartime activities of the Soviet gold industry except that it was not shut down as was gold mining in many other parts of the world. It is believed, however, that part of the Dal'stroy gold-mining labor force was transferred to construction and other types of mining. Similarly, some of Glavzoloto's most important mines are reported to have been closed.

Since World War II the Soviet gold industry appears never to have regained its prewar level of production. This may be one reason for the virtually complete blackout on information about the gold industry. There have been no announcements of great successes or even of increases in output over the previous year. The production part of this report estimates that annual Soviet gold production is currently less than one-half the 1940 level.

III. Production.

A. Pre-World War II.

1. USSR as a Whole.

The USSR has released no official statistics on its gold production in terms of quantity since 1927, when it began to put new resources into the gold industry. Production in this year amounted to 809,987 ounces. Estimates made by various authorities for years since 1927 have been based largely on data which give the percentage of changes in production from previous years, as released periodically by Soviet sources. In addition, general statements indicating the approximate size of Soviet gold production have been made from time to time by Soviet authorities.

Reliance upon percentage data as the basis for estimating Soviet gold production led to discrepancies among estimates from the beginning, because the percentages were continually revised as later information became available to the Soviet authorities. Thus conflicting percentages were always available to trap the unwary researcher. In addition, neither the coverage of these statistics nor the absolute base on which the percentage changes were calculated was precisely known. The data thus gave a certain latitude for interpretation.

A study of the major pre-World War II estimates indicates that their chief limitation was a general failure to include production by Dal'stroy. The percentage figures upon which these estimates were based appear to have only covered production by Glavzoloto (Chief Directorate of the Gold and Platinum Industry). Quite often statements

spoke specifically of "production of the enterprises of Glavzoloto." However, the existence from 1932 on of another gold producer, Dal'stroy, was known to very few foreigners.

The study of pre-World War II estimates (see Appendix C) indicates that the most reliable ones appear to be those by the US Foreign Service: the American Legation at Riga, Latvia, for the years through 1938, and the American Embassy at Moscow for 1939 and 1940. Estimates of the Bureau of Mines, the Federal Reserve Board, and the Bureau of the Mint are based primarily on the Riga studies.

According to these studies, the major increase in Soviet gold production took place in the years 1933 to 1936. There were four major reasons for this increase. (1) The gold production season had been extended well into the fall by an order of 23 August 1933, and production in the fourth quarter of the year had considerably increased. (2) Newly discovered gold districts were starting to come into production. (For production of gold in the USSR, by districts, for selected years, 1927-38, see Appendix D.) In particular, new underground lode mines had come into operation in the Urals, Kazakhstan, and the Transbaykal. (3) The gold industry was becoming rapidly mechanized. According to Serebrovskiy, the amount of gold mechanically produced had increased from 32 percent in 1927-28 to 70 percent in 1934. (4) The labor force, and particularly the individual-prospector section, had increased greatly, from about 30,000 in 1925 to 600,000 in 1935. The 1937 purges stopped this rapid increase in gold production.

In 1938 an ambitious 5-year plan for Glavzoloto was promulgated whereby 1942 production was to be increased to 75 percent above that of 1937. Nevertheless, production appears to have declined in both 1938 and 1939. US Foreign Service estimates of a decline in production in these years were confirmed in 1940 by Sovetskaya zolotopromyshlennost', the official organ of Glavzoloto.

In March 1939, Glavzoloto was divided into Chief Directorates of the Eastern and the Western Gold Industries. Press statements indicate that the eastern districts, where most of the artels were located, fulfilled their plan for the first 10 months of 1939 by only 67.2 percent. Conversely, the production of underground gold in the western districts is reported to have "made new steps forward," and plans were fulfilled by many mines before the end of the year.

Production continued to lag during the first quarter of 1940. In April, Glavzoloto was again reorganized, becoming once again a unified chief directorate. Wages were increased, prizes were offered for the discovery of new deposits, and the privileges of private prospectors were reaffirmed and extended. Production, particularly in the private sector, recovered remarkably. By October 1940 the number of prospectors was 50 percent higher than in October 1939, and their production was 73.8 percent above that of October 1939. The prospector plan was completely fulfilled by 25 November 1940, and the industry plan, by 20 December "for the first time in a long period." Glavzoloto production in 1940 is estimated to have been about 1 million ounces above that of 1939.

The immediate future of the Soviet gold industry under Glavzoloto at the end of 1940 looked very promising. For the first time, ore reserves sufficient for operation of the industry for a year had been developed for extraction. The volume of prepared ores available at mines was 50 percent larger than at the end of 1939. Over 70 new gold deposits had been discovered in 1940. According to the head of the Chief Directorate of the Western Gold Industry, the total gold reserves of the USSR were the largest in the world, and their industry merely awaited adequate development of the reserves and greater mechanization. The high priority given this development is indicated by the fact that 40 percent of all the funds being expended for prospecting by the Ministry of Nonferrous Metallurgy in 1940 were allocated to gold, in contrast to only 11.5 percent for critically scarce tin.

Estimated production of gold in the USSR in 1927-40 is given in Table 2.* These estimates (except for Dal'stroy) are based primarily upon US Foreign Service studies. Byproduct gold production is shown separately on the basis of an estimate by US mining engineers who had worked in the chief Soviet copper, lead, and zinc mines. They reported that about 60 grams of byproduct gold is recovered for each ton of refined copper produced and about 61 grams for each ton of refined zinc and lead. Gold production from Dal'stroy is estimated in the following section and added to gold production from Glavzoloto in order to give total Soviet gold production. Gold production from Glavzoloto is believed to be accurate within a range of error of plus or minus 10 percent and from Dal'stroy, within plus 25 percent or minus 50 percent. Total gold production is thus accurate within a range of error of about plus 20 percent or minus 30 percent.

Confirmation within the estimated range of error of the production figures for 1937 and 1938 is provided by the preliminary results of a Soviet gold-bar study which indicates that gold refined in these years amounted to about 13 million ounces in 1937 and to between 9 and 10.8 million ounces in 1938. Gold refined, of course, might include other than current gold production. Gold ornaments, for example, might have been melted down. Gold imports also might have been refined. There were, however, no known gold imports with the possible exception of Spanish gold. Finally, there would be a gap between production and refining, and there is no assurance that the amount refined from new production in any year would correspond with the amount produced.

2. Dal'stroy.

There is considerable evidence to indicate that a major portion of the gold produced in the USSR during the last 15 or 20 years has come from the Kolyma region in northeastern Siberia. This evidence indicates rather conclusively that after 1932 Dal'stroy rapidly built up a large slave-labor force to exploit very rich deposits of gold. At the same time, production estimates vary widely. For

* Table 2 follows on p. 22.

Table 2

Estimated Production of Gold in the USSR a/
1927-40

Thousand Troy Ounces

Year	Glavzoloto: Lode and Placer	Glavzoloto: Byproduct	Dalstroy	Total
1927	810	b/		810
1928	850	50		900
1929	1,000	70		1,100
1930	1,300	100		1,400
1931	1,600	110		1,700
1932	1,900	120	310	2,300
1933	2,500	120	620	3,200
1934	3,400	190	1,200	4,800
1935	4,200	300	2,500	7,000
1936	4,900	380	5,000	10,000
1937	4,900	440	5,000	10,000
1938	4,800	470	5,000	10,000
1939	4,200	570	5,000	9,800
1940	5,200	580	5,000	11,000
Total production 1927-40				74,000 c/

a. All data have been rounded to two significant figures.
b. Included in lode and placer.
c. At US $35 per ounce = US $2.6 billion.

example, estimates for 1940 range from 3,215,000 to 12,860,000 ounces. / Although this range can be narrowed substantially, there is no satisfactory methodology for calculating gold production from

Dal'stroy without a considerable possible margin of error. Appendix E gives various estimates of gold production from Dal'stroy. The only official statement as to the size of gold production from Dal'stroy is an article entitled "The Kolyma Gold Field" in Pravda, 11 November 1936. This article states that "during the past 5 years the miners of the Kolyma ... have succeeded each year in doubling the amount of gold recovered." However, this statement covers only the initial period of Dal'stroy operations.

There are, however, some statements by Serebrovskiy on Soviet gold production which appear to anticipate a large Dal'stroy production. In 1935 he stated at different times that:

a. "Soviet Russia is going to reach first place in 1940."
b. "It is possible for us to take first place in 1937."
c. "We shall fulfill the promise given to Stalin and Ordzhonikidze to take first place in 1936."
d. "To quadruple production in 1939."
e. "We shall exceed the production of England in 1937."

These are the type of statements that might be made if a rich, new area were just coming into large-scale production but had not yet been adequately explored. Dal'stroy had not started operations until 1932, and only rough estimates of its resources could have been available by 1935. Even current-year plans must have been regarded as very tentative. (It might be mentioned that South African gold production had amounted to 10.48 million ounces in 1934. /) Production from Dal'stroy of about 5 million ounces per year is the only known possible explanation of the above statements, unless it is assumed that they were lies. Too much is known about Glavzoloto to allow an error of more than plus or minus 10 percent, or about 500,000 ounces, in estimating its production.

In March 1937, Serebrovskiy told the foreign editor of Business Week that 1936 gold production had exceeded 10.6 million ounces and that 1937 planned output was about 14 million ounces. Again production from Dal'stroy of almost 5 million ounces is implied.

Estimated production of gold from Dal'stroy in 1930-41 is given in Table 3.* This table lists the more authoritative estimates of Dal'stroy production. The engineer and geologists are Soviet defectors: two of them formerly free workers in the area, and the third had important friends there. Petrov was a former slave laborer in the area. Zamorski relied upon reports from a number of former slave laborers. Chellson based his estimates upon conversations with Littlepage, who is believed to have visited Kolyma. Another estimate, that by Dallin and Nicolaevsky, appears to be based on the same material as Zamorski's. Of the 6 sources, 5 support an estimate of 5 million ounces or more.

Zamorski and the engineer defector estimate a maximum prewar labor force of 300,000 engaged directly in gold mining and an over-all total of 450,000. Petrov estimates a maximum of 130,000 and 220,000, respectively. The estimated labor force for Glavzoloto in the same period is about 600,000. Although this Glavzoloto figure includes nonproductive workers, possibly one-third of the total, a comparison between the labor forces of Dal'stroy and Glavzoloto would indicate gold production from Dal'stroy to be less than that from Glavzoloto.

On the other hand, 5 independent reports on the richness of the ores worked in the Kolyma area indicate a minimum richness of 5 grams per cubic meter and a richness of 100 to 200 grams or more per cubic meter in some rather large deposits. This is to be compared with a richness of about 0.5 gram per cubic meter which can be profitably worked in the USSR without the use of dredges. It is reported that in the Kolyma area "the gold is plundered, only the ore with the highest gold content being washed and the rest being dumped." / Under these conditions, gold production from Dal'stroy might well have been over 5 million ounces, as implied by Serebrovskiy's statements.

* Table 3 follows on p. 25

Table 3

Estimated Production of Gold from Dal'stroy
1930-41

Thousand Troy Ounces

Year	Petrov	Chellsor	Zamorski	Engineer	Geologist	Geologist
1930		193				
1931		227				
1932		321	643			
1933		482	2,250			
1934		675	4,823			
1935		868	7,234			
1936	3,200	1,125	8,841			
1937	4,500		10,449		50 percent of Soviet output	50 percent of Soviet output
1938	6,400		11,253			
1939	5,600		10,449			
1940	4,800		12,860	6,430		
1941	3,200		12,066	7,073		

It is therefore concluded that gold production from Dal'stroy reached about 5 million ounces in 1936 and, in the absence of convincing evidence to the contrary, stayed at that level until the war. Gold production from Dal'stroy for previous years is based upon the Pravda statement that production had doubled each year through 1936.

3. Pre-World War II, by District.

Virtually all Soviet gold production has come from the Asiatic sector. In the 1920's the Lena placer gold fields in eastern Siberia were the main producing district in the USSR. Much of the remaining production has come from other eastern Siberian placers.

By 1932 the Yakutsk (Aldan), Transbaykal, Western Siberia, Amur, and Yenisey districts had all surpassed Lena, with Aldan the largest producer area in the USSR. In addition, the Kazakh, Altay, Primor'ye, and Ural districts were rapidly increasing output.

After 1932 the rate of increase in production from Aldan slowed down, and the Transbaykal area became the most important. Meanwhile, however, the Baley and Darasun mines had been separated from the Transbaykal Gold Trust (Zabaykalzoloto), leaving the Yakutsk Gold Trust (Yakutzoloto) as the largest single producer among Soviet gold trusts. Eastern Siberia still produced over one-half of the total, but the new lode mines in the Transbaykal area had become almost as important as the placer districts.

Estimated Soviet production of gold, by district, for selected years, 1927-38, is given in Table 4.* (For greater detail, see Appendix D.)

No information is available for the period after 1938 which would provide a basis for calculating the share of individual districts in total production. Some idea of the future of various districts, however, is given by the Third Five Year Plan (1938-42). This Plan called for the following new mines to produce

* Table 4 follows on p. 27.

Table 4

Estimated Production of Gold in the USSR, by District
Selected Years, 1927-38

District	Percent Total Output			
	1927	1932	1936	1938
Transbaykal a/	7.9	16.1	22.0	22.7
Baley b/			11.9	10.7
Darasun b/			7.6	9.3
Ural c/	10.4	11.2	18.0	17.8
Western Siberia d/	0.5	14.8	12.9	12.6
Yakutsk	23.1	18.9	13.0	11.2
Lena	41.0	7.7	9.0	8.2
Amur, including Upper Amur	4.1	8.1	7.2	8.1
Yenisey	7.1	8.5	6.6	7.1

a. Transbaykal, Barguzin, Baley, and Darasun districts.
b. Separated from Transbaykal after 1932.
c. Ural, Miass, Kochkar, Bash, Dzhetygar, and miscellaneous small districts.
d. Western Siberia, Khakass, and Minusa districts.

20 percent of the total Soviet gold production in 1942, as shown below:

Mine	Trust
Berezovsk	Uralzoloto
Maykain	Kazzoloto
Kommunar	Khakasszoloto
Zmeinogorsk	Zapsibzoloto

In addition, the Baley, Darasun, Miass, and Dzhetygar mines were scheduled to double their output by 1942, and two new major placer areas, one under the Lena Gold Trust (Lenzoloto) and the other under the Dzhugdzhur Gold Trust (Dzhugdzhurzoloto -- a new trust in eastern Siberia), were scheduled to come into operation. Underground lode-gold production was to amount to 60 percent of total production in 1942 as compared with 44 percent in 1937.

B. World War II and Post-World War II.

1. Glavzoloto.

a. 1949.

There is insufficient evidence to allow a valid judgment as to the size of Soviet gold production in 1941-48. [illegible]aterial is available for 1949, however, upon which to base estimates of the labor force and labor payments of Glavzoloto. These estimates can, in turn, be used as the basis for estimates of production by the gold industry. (It should be remembered that Glavzoloto also controls the much less important platinum industry.

Labor and wage limit allowances are available for 20 of the 30 gold trusts known to exist in 1949.* Based on these authorizations from the Chief Directorate of the Gold and Platinum Industry to the trusts, the 1949 labor force in "basic activity" is estimated to have been about 130,000, and wages to have been about 1.2 billion rubles. Labor in "basic activity" includes both industrial and nonindustrial workers on the payroll of a gold trust.

The estimate of wage payments to the labor force for "basic activity" can be used to estimate the ruble value of production of gold and platinum by calculating the ratio between wages and value of production. In the 1941 State Plan of the USSR, wages amounted to about 30 percent of the value of production for the

* See Appendix F.

nonferrous industry as a whole. This percentage would appear to be valid for the gold industry.

On the basis of these reports, wages are estimated at 30 percent of the value of production for the Yakutsk Gold Trust and 45 percent for the Dzhugdzhur Gold Trust in 1949. The Dzhugdzhur Gold Trust is believed to be less mechanized than the Yakutsk Gold Trust, which may account for its higher wage component. Both of these trusts, however, mine primarily placer deposits, so that the wage component of their costs probably would be higher than in underground mining, where the USSR uses considerably more machinery. Assuming the over-all wage component to be 30 percent, gold and platinum production by Glavzoloto amounted to about 4 billion rubles in 1949.

The value of platinum output has to be deducted from this total to obtain the value of gold output. Platinum production in the USSR is estimated to have been 120,000 ounces in 1949. / Most of this was produced in the Ural placer mines, where operating conditions are far superior to those in eastern Siberian gold placers. Even before World War II, virtually all Soviet platinum was produced with electric dredges. / It is probable, therefore, that production costs would be more in line with costs of other nonferrous metals than with gold costs. The unweighted average ruble-dollar price ratio for the 4 most important nonferrous metals (copper, lead, zinc, and aluminum), as of 1 January 1950, was 15 rubles to the dollar. With a world price of US $72 per ounce, the value of Soviet platinum production in 1949 can be estimated to have been roughly 130 million rubles, leaving 3.87 billion rubles as the value of gold production.

If the industry price* for gold were known, gold output by Glavzoloto could be easily calculated from the above estimate of value of output. Although the industry price is not available,

* Industry price, as used in this report, is equivalent to the average cost of production in Glavzoloto. In addition, procurement prices appear to be paid to individual production trusts on the basis of their actual costs.

considerable information is available on prices and unit costs in the gold industry. In the first place, two prices paid by the Ministry of Finance to the individual gold-producing trusts

Second, the ratio between 1926-27 and 1949 industry prices [illegible] Third, there is reliable information on unit costs in the 1930's, and 1949 unit costs can be estimated on the assumption that costs in the gold industry increased over this period by about the same amount as costs in other nonferrous industries.

The two prices are a price of 83.76 rubles per gram of fine gold / for the North Caucasus Gold Trust (Sevkavzoloto) and a price of 57.58 rubles for the Zabaykal Gold Prospecting Trust. Both of these prices are as of 1 January 1949. At this time, the official value of a gram of fine gold in the USSR was 5.63 rubles. The difference between Ministry of Finance procurement prices and the official value of a gram of fine gold can be considered to represent an indirect subsidy to the gold enterprises.

the value of Soviet production of gold and platinum in both 1926-27 and 1949 prices, indicates that prices of these metals increased 35.5 times during that period. This is to be compared with an increase in price of other items of gross production such as lumber and power of only about 10 times during the same period,
Assuming a 1926-27 planning price for gold of 1.29 rubles per gram, the official exchange rate at that time, the 1949 industry price would be 45.80 rubles per gram.

Information on 1936 and 1937 costs in the Soviet gold industry has been supplied by US mining engineers who worked in the USSR until 1937. Littlepage reports that the average cost of production was 3 rubles per gram of fine gold in 1928, 7 rubles in the early 1930's, and 15 rubles in 1935-36. / August Chopp states that the price of gold in early 1937 was 12.40 rubles per gram and that this price represented the average cost of production. / Chopp's statement was made in 1937 and for this reason may be more exact than Littlepage's postwar testimony. Another possibility is that the difference in costs as estimated by Littlepage and Chopp may be owing to a planned reduction in costs between 1936 and 1937.

Internal prices of nonferrous metals increased 4 times between 1936 and 1949, when a price reform brought costs and prices in line. (World prices of most nonferrous metals, with the notable exception of gold, more than doubled in the same period.) If costs in the gold industry had followed those in other Soviet nonferrous industries, the average cost in 1949 would have been somewhere between 50 and 60 rubles per gram.*

Other indications of the cost of gold are provided by report and the current retail price of gold in the USSR.

reports that the cost of mining gold probably is about 50 rubles per gram. Gold is currently sold at retail in Soviet jewelry stores at 90 rubles per gram of gold of 0.916 fineness, or about 98 rubles per gram of fine gold.

The above material suggests that the average price of gold in the USSR in 1949 was somewhere between 45 and 60 rubles per gram. The only indicator out of line with this range of possible prices is the price for the Sevkavzoloto Gold Trust. It would would appear, therefore, that this trust is probably a relatively high-cost producer. With a price between 45 and 60 rubles, gold production from Glavzoloto can be estimated to have been between 2.10 million and 2.80 million ounces in 1949.

* Another indication of costs in the gold industry is give or the months of March, April and May of 1954 from the Yakutzoloto Gold Trust. The lowest cost figure is 69.82 rubles per gram, and the average is abo rubles per gram. It should be recognized that the unit costs re for early months in the year, when unit costs would necessarily be high. The Yakutzoloto Gold Trust mines mostly placer deposits under sub-Arctic conditions, so that most of its production is in the warmer months.

A price of from 45 to 60 rubles per gram of fine gold is the equivalent of a ruble-dollar ratio of from 40 to 53.33 rubles to the US dollar. This compares with the following ruble-dollar ratios for selected nonferrous metals as of 1 January 1950

Aluminum	17.7	Mercury	47.2
Cobalt	103.4	Nickel	37.2
Copper	16.2	Tin	67.9
Lead	14.0	Zinc	11.8

, 1949 investment is estimated to have been 360 million rubles.* Amounting as it does to less than 10 percent of estimated production, this level of investment is not particularly high. In 1941, planned investment in the nonferrous metallurgical industry amounted to about 20 percent of planned production.

b. World War II.

Little is known about the wartime activities of the gold industry. Production in the first half of 1941 probably was about 2.5 million ounces, assuming that it continued at the 1940 rate. After the outbreak of hostilities the USSR did not shut down straight gold mining as did the US. The Soviet gold industry, nevertheless, was bound to suffer from the induction of miners into the armed services and other dislocations resulting from World War II. This is confirmed by a number of reports that particular gold mines were closed during the war. For example, it is reported that the Baley mine and most of the Berezov shafts were closed. These probably are the most important and the highest grade lode gold mines in the USSR.

The production of lode gold requires practically the same type of resources as any other underground mining. Consequently, the closing of lode mines like Baley would be a natural step in a program to convert the mining industry to the production of minerals necessary to fight the war. Although Henry Wallace

* See Appendix G.

was told on his visit to Dal'stroy that gold mining was a "preferred industry," / it is difficult to believe that strategic war materials would not have had preference over gold. ("Preferred," of course, may merely have meant that the industry was allowed to operate during the war.)

The USSR, in fact, had good reason not to waste its manpower and machinery on gold production during the war. Its imports consisted almost entirely of Lend-Lease goods. The limit to these deliveries was set by the capacity of the Allied convoys and the capacity of the transport facilities through Iran. Had the USSR attempted to buy large amounts of other imports, the total quantity of goods reaching her could not have been increased. Gold production, accordingly, could serve no purpose in fighting the war.

c. Other Post-World War II Years.

It is only possible to speculate as to the size of Soviet gold output in the postwar years before 1949. On the one hand, the industry suffered little physical damage, as most of its plants are located east of the areas which were overrun by the Germans. Unskilled labor should have been comparatively plentiful, with prisoners of war available in large numbers. By early 1950, according to Tass, 2.5 million prisoners of war had been returned. / On the other hand, there were several reasons why production may probably have been lower in the early postwar years.

One reason was the general economic dislocation in the USSR after a war in which much of the country had been overrun and much of the labor force mobilized in the armed forces. This dislocation is evident as late as 1949, when labor productivity was still below prewar levels in both the Baley and Darasun Gold Trusts, / the only trusts for which such information is available. According to mining leaders, "some of the causes for this lag are the insufficient improvement of output of workers, large loss of worker time from utilizing unskilled personnel on new machinery, and insufficient mechanization of labor-consuming processes." /

Still another reason why Soviet gold production may have been lower in the years immediately following World War II is the fact that proved reserves probably were exhausted during the war. During the war the emphasis was upon exploiting known resources, and geologists were put either in the army or on production.

It can thus be concluded that Soviet gold production in the early postwar years was less than 1949 production. Some confirmation of this conclusion is provided by a Soviet announcement in 1946 that the Lena Gold Trust, the largest at that time, would double production by 1950.

Only general indications ~~are~~ available on the trend in Soviet gold production after 1949. Significant factors in studying this trend are labor force, investment, availability and richness of reserves, and Soviet government policy.

As far as labor force is concerned, there is evidence that the gold industry had a high priority. In February 1950 the Council of Ministers forbade mobilization of workers in the gold industry. There is evidence that this prohibition was not lifted until the second half of 1954. Although the coal and metallurgical industries had obtained similar exemptions in 1948, the nonferrous metallurgical industry in 1951 was able to obtain exemptions for only certain categories of workers. This high priority for gold, however, might be owing to a severe labor shortage in the gold industry, as it had depended heavily upon prisoners of war until 1949 or 1950, rather than a decision that gold should have higher priority than other nonferrous metals.

Nevertheless, the size of the labor force of the Soviet gold industry appears to have been stationary or to have declined between 1949 and 1954.* The amnesty of March 1953** is a probable reason for decline, since considerable slave labor is used in the gold industry. At least one gold trust, Dzhugdzhur, was denied slave labor by the MVD

* See Appendix F.

** Many slave laborers, generally criminals rather than political prisoners, were released at this time.

in 1954 and instructed to recruit local people. It is believed that, among gold trusts, Dzhugdzhur would have a relatively high priority in obtaining slave labor because of its location in a remote area in eastern Siberia and because of its reliance upon unskilled labor. Accordingly, denial of such labor to Dzhugdzhur would appear to be an indication that the gold industry, as might be expected, was affected by the amnesty.

As far as investment is concerned, 1954 Soviet investment is estimated to have been about 40 percent higher in constant prices than was 1949 investment.* No estimate for the years between is possible, although it is known that a number of dredges and plants were built. Still, without knowledge of the size of such units, no judgment as to the size of the investment program in these years is possible. Dredges, for example, may cost as little as 325,000 rubles, / or they may cost more than 8 million rubles.

The only information pertinent to the availability of deposits is provided by estimates of prospecting by Glavzoloto. These estimates show a more than fourfold increase in gold prospecting between 1949 and 1954.** This increase, however, is difficult to interpret, as it might represent increased difficulty in locating gold reserves, or, on the other hand, it might be evidence of an expanded scale of activity in the industry. There are, however, indications that particular gold trusts, including the largest, Lena, had run into difficulties because the richer deposits had been at least temporarily exhausted and new reserves had to be discovered. Littlepage, who was Deputy Chief Engineer of Glavzoloto until 1937, has estimated that depletion of Soviet gold reserves would start about 1950. There is, however, no basis for concluding that the over-all availability and richness of reserves declined between 1949 and 1954, as increased prospecting may have offset any tendency to decline.

* See Appendix G.

** See Appendix H.

The policy of the Soviet government toward gold production in the postwar years is discussed in C, below. In general, it is concluded that because of the present fixed world price of gold, the size of the Soviet reserves of gold bars and coins, the present level of gold output, and the high-cost nature of many of the mines, the Soviet government cannot be expected to give any priority to gold mining. These factors are pertinent to 1949 as well as 1954, so that there is no obvious reason why the Soviet government should have changed its policy toward gold mining after 1949.

It thus appears impossible to determine what the trend in gold production by the enterprises under Glavzoloto has been since 1949. Labor and investment inputs appear to have moved in opposite directions. The policy of the government may have remained the same. Nothing is known about changes in the availability and richness of reserves. The net effect of these factors upon production is impossible to estimate.

2. Dal'stroy.

There is no evidence that World War II forced any reduction in the over-all size of Dal'stroy. There does appear, however, to have been a substantial diversion of resources out of gold mining into tin mining and construction. A former slave laborer in the area reports that about 50 percent of the prisoners were sent to tin mines and road-building projects after the outbreak of the war. He estimates that 1942 gold production was 1,607,500 ounces (50 tons), or 25 percent of his estimate of peak production. ' Another defector reports that Dal'stroy began to construct military installations in the Chukotsk Peninsula in 1941 and by 1945 was employing 200,000 prisoners on this job. ' Extensive military installations are known to exist in the Dal'stroy area.

In the postwar years, Dal'stroy became more diversified in its mining efforts. Tungsten, cobalt, and uranium became important products, with the mining of uranium having priority over other activities The relative priority of Dal'stroy's other activities is possibly indicated by the fact that in 1951 a subsidy from

the state budget was paid on tin, cobalt, and tungsten production. The failure to pay a subsidy on gold production might be owing to the relative richness of the gold deposits compared with the richness of the deposits of other minerals, even though all the minerals are produced under the same unfavorable Arctic conditions. It might also indicate a lower priority for gold.

The over-all importance of Dal'stroy is indicated by a government decree of 29 October 1945 which states that "orders for Dal'stroy must in all circumstances be supplied in full." There are also several - the high priority given to supplies for Dal'stroy.

The slave labor force of Dal'stroy is estimated to be 400,000. The proportion engaged in gold production, or for that matter in mining, is not known. A considerable portion, however, must be engaged in construction, agriculture, fishing, processing of food, transportation, and other activities. In addition to forced labor, the metallurgical industry in the area employed 108,181 free workers in the last quarter of 1953. / A rough idea of the size of that part of the mining labor force which is engaged in production of gold is given by the ratio between the value of gold production and the total value of mineral production. It was estimated in 1953 that Dal'stroy received direct payments of about 700 million rubles for its gold production and 1,475 million for its total mineral production. These estimates are very rough and are based on scattered payments data. In addition to direct payments for its products, Dal'stroy receives subsidies on its tin, tungsten, and cobalt production. These subsidies can be estimated at 550 million based on the July 1951 subsidy rate and the estimated value of tin, tungsten, and cobalt production. Dal'stroy would thus have received slightly over 2 billion rubles for its mineral production. The labor force engaged in production of gold might, accordingly, be expected to be about one-third of the labor force of Dal'stroy engaged in mining. Assuming that one-half of the slave labor force of Dal'stroy were employed in mining, the labor force engaged in production of gold would amount to about 100,000 workers, both direct and indirect. This is to be compared with an estimated 450,000 workers in the prewar period.

Although Dal'stroy has received large investment funds in the postwar years, most of these are believed to be for purposes other than gold mining. Nevertheless, it appears that by 1952 mechanization of the various gold operations was being accelerated. A Soviet broadcast about the Northern Mining Directorate, an important gold producer, stated that in 1952 twice as much mining equipment would be in use as in 1951. / Another broadcast about the Northern Mining Directorate indicated that new implements had increased labor productivity by 38 percent between 1949 and 1951 and lowered the cost of sand-washing by 41 percent. / This broadcast further stated that electric drills had lowered the cost of digging by 11 rubles per cubic meter of gravel and that the number of drilling machines would be doubled in 1952. This one development alone would lower gold production costs by about 2 rubles per gram, assuming 5 grams per cubic meter.

Nothing is known about changes in the average richness of the ores that have been worked. It may be remembered that the extremely high degree of richness of the ore and the wasteful mining operations which exploited only the richest ore, rather than labor force or equipment, were the main reasons for the high prewar production. It appears that gold mining is concentrated in the same areas as in the period before World War II and that the new mining areas in the Kolyma region are being largely exploited for other minerals. It is reasonable to assume that the average richness of ore has declined because such huge quantities of gold were taken out of a rather limited area. In fact, the richness may have declined considerably. In the years 1936-41 alone, Dal'stroy is estimated to have mined as much gold as has been mined in Alaska from the earliest record to the present, an area with similar geological and climatic conditions /

The above estimate of the value of the gold production from Dal'stroy was based upon payments made by the Directorate of Precious Metals* to Dal'stroy

* Under the Ministry of Finance.

an average of 700 million rubles would appear to be reasonably accurate for the years covered, 1948-53.

The price paid to Dal'stroy for its gold production is not known. If it were the same as the industry price, which is estimated to have been between 45 and 60 rubles per gram, gold production could lie somewhere between 370,000 and 500,000 ounces. Such a large drop from prewar production would appear to be unlikely, even with the considerable shift of labor force to other mining activities. It seems probable, therefore, that Dal'stroy is not paid as much as the industry price, because most of its labor force is slave labor and paid only a nominal wage. With wages amounting to 45 percent of the total value of production in Dzhugdzhur, the gold trust most likely Dal'stroy, Dal'stroy's costs might be as low as 25 rubles per gram, other things being equal. At a price of 25 rubles, the gold production of Dal'stroy would amount to about 900,000 ounces.

These figures may, therefore, be the planned value and the 1955 price for the gold production of Dal'stroy. The volume of planned gold production indicated by these figures is over 900,000 ounces. The nature of this material, however, is such that conclusions based upon it are necessarily very tentative.*

3. Byproduct.

Byproduct gold has come to play an increasingly important role in Soviet gold production as the Soviet copper, lead, and zinc industries have expanded. By 1953 these industries were producing more than twice as much as in 1940 and were expanding at a faster rate than any other major industry with the exception of aluminum.

* Other estimates of production from Dal'stroy are given in Appendix E.

The methodology for estimating byproduct gold production has already been explained in the section on prewar production (A, above), and estimates for the years through 1940 have been included in that section. Soviet byproduct gold production from 1940 through 1954 is estimated as follows:

Year	Thousand Troy Ounces
1941	660
1942	570
1943	420
1944	500
1945	480
1946	530
1947	620
1948	700
1949	810
1950	880
1951	980
1952	1,200
1953	1,300
1954	1,500

The value of Soviet byproduct gold production in 1954 is thus estimated to have been about US $52.5 million. This amount would have been more than sufficient to pay for the Soviet merchandise trade deficit with the West in 1953 and would have paid for over 10 percent of total Soviet imports from the West in 1953.

4. Total World War II and Post-World War II.

The preceding sections on Soviet gold production demonstrate that with the sources of information available it has been impossible to estimate Soviet gold production year by year after 1940 with any degree of reliability. Estimates for 1949, however, and trends before and after 1949 probably are reasonable indications of the general level of production.

The various estimates indicate a total gold production in 1949 of possibly 4.1 million ounces. The internal procurement price of this production is estimated to have been about 5 billion rubles,* or US $140 million at world prices. If it is concluded that the USSR regards gold primarily as an international currency (and this appears to be the best conclusion), such a level would seem consistent with the level of Soviet gold sales to the West since World War II Even this level of production would have allowed additions to gold reserves at a time when the USSR was recovering from a devastating war.

Soviet byproduct gold production is estimated to have increased by about 700,000 ounces between 1949 and 1954. In the absence of any indication of increases in production from Dal'stroy or Glavzoloto, production in 1954 can be estimated to have been about 4.8 million ounces, or about US $170 million.

Soviet production in 1941 is estimated to have been roughly 3.5 million ounces from Glavzoloto, 660,000 ounces from byproducts, and 3.5 million ounces from Dal'stroy, or a total of 7.66 million ounces. With the full impact of World War II, production from Glavzoloto and Dal'stroy might be expected to decline drastically, and production from byproducts to vary with the output of copper, lead, and zinc.

In the early postwar years, gold production from Glavzoloto is estimated to have increased slowly to the 1949 level. Gold production from Dal'stroy, on the other hand, may have remained fairly constant or decreased as the result of the postwar emphasis on uranium and other new strategic ores. Estimated production of gold in the USSR in 1941-54 is given in Table 5.** These estimates are believed to be accurate within a range of error of plus or minus 25 percent.

* This figure is the result of adding an allowance for byproduct gold production to the ruble value of Glavzoloto and Dal'stroy production. It may be roughly estimated that the value of production in the years immediately before 1949 was somewhat less than 5 billion rubles and in the years after 1949 slightly, if any, greater.

** Table 5 follows on p. 42.

Table 5

Estimated Production of Gold in the USSR a/
1941-54

Thousand Troy Ounces

Year	Glavzoloto	Byproduct	Dal'stroy	Total
1941	3,500	660	3,500	7,700
1942	1,000	570	1,000	2,600
1943	1,000	420	1,000	2,400
1944	1,000	500	1,000	2,500
1945	1,000	480	1,000	2,500
1946	1,400	530	1,000	2,900
1947	1,800	620	1,000	3,400
1948	2,200	700	900	3,800
1949	2,400	810	900	4,100
1950	2,400	880	900	4,200
1951	2,400	980	900	4,300
1952	2,400	1,200	900	4,500
1953	2,400	1,300	900	4,600
1954	2,400	1,500	900	4,800
Total production 1941-54				54,000 b/

a. All data have been rounded to two significant figures.
b. At US $35 per ounce = US $1.9 billion.

5. Post-World War II, by District.

The best available indication of the share of individual districts in total postwar production is provided by the relative size of their labor forces in 1949. The size of the labor force, however, is only a rough indicator of Soviet gold production because the ratio between labor force and production varies with the level of mechanization, the richness of the ore, and other factors. In the US the size

of the labor force would be an excellent measure of production because production in both lode and placer mines is mechanized, with the result that a US miner produced about US $5,500 worth of gold in either placer or lode mines in 1948.* In the USSR, some trusts are mechanized and others rely primarily on hand labor. The Transbaykal Gold Trust, for example, has 34 [illegible] of the 149 dredges, whereas the Dzhugdzhur Gold Trust, probably a larger producer but located in eastern Siberia, has only 2 identified dredges. On other hand, trusts that primarily mine lode deposits are usually well mechanized.

Labor force figures indicate, subject to the above qualifications, that the more important trusts ranked approximately as follows in 1949:

Trust	1938 Position**
Lena	4
Dzhugdzhur	N.A.
Khakass	N.A.
Yenisey	7
Ural	8
Kazakh	11
Yakutsk	1
Amur	5

The leading position given to the Lena Gold Trust, which was based on the fact that its labor force in 1949 was one-half again as large as any other trust's, is confirmed by an announcement by the Soviet Home Service in 1946. In 1950, however, there is considerable evidence that the Lena Gold Trust was running out of high-grade ore. In February the Lena Gold Trust requested from Nigrizoloto*** additional geologists, salary increases for its

* Calculated from US Bureau of Mines figures on employment and production.

** See Appendix D.

*** Nigrizoloto (Nauchno-Issledovatel'skiy Geologo-Razvedochnyy Institut dlya Zoloto -- Scientific Research Geological Prospecting Institute for Gold) was a research organization under Glavzoloto,

management and technical workers on prospecting, and not less than 20 of the latest drilling machines capable of drilling bores to depths greater than 150 meters. The purpose was to uncover new and more profitable areas. Later it was reported that, because of the low grade of the deposits being worked and the strenuous prospecting schedule, production goals for the last half of 1950 would have to be lowered. The level of capital investment, meanwhile, was stepped up considerably, with capital expenditures in the first 11 months amounting to 45,686,000 rubles. This is to be compared with an estimated total of 32.5 million rubles in 1949.* The 1950 figure, deflated to 1949 prices and put on an annual basis, is about 90 percent higher than in 1949. The gold industry was thus pouring extensive resources into maintaining the gold production of the Lena Gold Trust.

The decline in gold production by the Yakutsk Gold Trust, the largest trust in the prewar period, is confirmed by the fact that the value of its commercial production was planned to amount to only 205 million rubles in 1949. The 1949 price of gold in the USSR has been estimated previously in this report to have been between 45 and 60 rubles per gram. On the basis of these prices, gold production from the Yakutsk Gold Trust would have been between 110,000 and 150,000 ounces. This production is to be compared with an estimated 600,000 ounces in 1938.**

The value of commercial production by the Dzhugdzhur Gold Trust was planned to amount to 167 million rubles in 1949. This production, on the basis of the estimated industry price, would be between 90,000 and 120,000 ounces. Prewar production is not known.

Wage figures for 1954 indicate that certain trusts expanded and others contracted in size between 1949 and 1954. The Ural and Amur Gold Trusts ranked second and third, respectively, while the Dzhugdzhur and Yenisey Gold Trusts dropped to sixth and ninth positions, respectively.***

working primarily on gold but sometimes on other minerals. For more details, see Appendix B, footnote n, p. 75, below.

* See Appendix G.

** See Appendix E.

*** See Appendix F.

C. Potential.

A number of factors are pertinent in estimating the future of Soviet gold production. First, and possibly most important in the present and foreseeable future, is the current state of the world gold industry. Costs have been increasing steadily since World War II, while the legal price has remained fixed at US $35. Although gold demanded a considerable premium in black markets in the early postwar years, this premium ended in 1953 in the important European markets. A number of countries -- Canada, Australia, and the Philippines -- subsidize gold production. Most countries merely continue to operate those mines in which it is possible to cover current costs and close the rest. In the US the average productivity of labor in gold mining was only about US $5,500 in 1948.* Average productivity in copper mining, on the other hand, was US $22,000.

Only in the Union of South Africa has there been any major new investment, and this has been owing to the fact that uranium ore is obtained as a byproduct. This coincidence of rich gold and uranium ore on a large scale appears to be unique to the Union of South Africa. Gold production outside the USSR and the Union of South Africa dropped from about 23 million ounces in 1940 to 12 million ounces in 1953.

The opposite side of this coin is that the purchasing power of gold in world trade has declined as commodity prices have increased.

A second important factor is the relatively high cost of gold production in the USSR. Soviet gold mining appears to have been expensive even in the 1930's. Littlepage reported that in 1937 the average cost of gold production in the USSR was 15,000 rubles per kilogram. This gold could be sold in world markets at the official 1936 rate of exchange for only 5,900 rubles. An authority on the Soviet economy concluded the following from this and other facts:

> The continued use of large Russian resources in gold production is not derived from any strict calculus, but

* Calculated from Bureau of Mines figures on employment and production.

> is the result of arbitrary decisions based on a series of vague notions, such as fear of a repetition of the disastrous decline in terms of trade which was experienced in the Great Depression; and the repeatedly professed belief that the capitalist world economy cannot function except on the basis of gold.

Costs in Soviet gold mining probably have followed the trend in other nonferrous mining industries and more than tripled between 1936 and 1949. Of course, world prices of most nonferrous metals more than doubled in this same period, while the price of gold remained fixed. If world prices are taken into consideration, it is not profitable for the USSR to put resources into developing anything but very rich gold deposits. The USSR must take world prices into account because it uses gold mainly as an export commodity.

Possibly the main reasons for the high-cost nature of many of the Soviet gold deposits are their remoteness from industrial and agricultural centers, poor transport facilities, and climate.

Of total requirements of 40 million rubles, transportation costs accounted for 22 million rubles. For such items as ferrous metals and fuel oil, transportation costs were twice the industry price of the material. Other factors leading to high cost are numerous subsidies and pay differentials amounting to 100 percent or more to compensate for remote areas. For example, workers beyond the Arctic Circle are given free food, free housing, and municipal services. Possibly no other Soviet industry, with the possible exception of uranium mining, operates under such generally disadvantageous conditions.

Another factor influencing costs in Soviet gold mining is the probable depletion of the richest deposits. With the exception of the 1920's, the USSR has been producing at least 1 million ounces of gold per year since 1870. In the 1930's, production was greatly increased.

Over one-half of the production in the 1930's came from placer deposits, which are usually exhausted in a comparatively short period of time. It was only natural that the increased output should have come primarily from placer deposits because they are more easily exploited and require little investment as long as they are rich enough to be worked by hand. The Soviet placer deposits were rich, and the Soviet government did everything it could to encourage its citizens to mine them. In addition, it used hundreds of thousands of slave laborers in gold mining. Statements by officials of Glavzoloto indicate that the gold content of ores mined dropped 24 percent between 1935 and 1940 and that the gold content of sands declined steadily but at an unstated rate.

The extent of gold resources remaining in the ground at the end of this period is not known. In announcing the Third Five Year Plan in 1937, a Soviet source spoke of reserves sufficient to last at least 12 years. Littlepage estimated that depletion would start about 1950, and so did another US citizen who served as an advisor to Glavzoloto. These estimates are very inconclusive, particularly in connection with lode deposits, because it is difficult to anticipate new discoveries.

A number of other factors are also pertinent in estimating the future of the Soviet gold industry. There is a need for miners in other mining industries. The uranium and nonferrous metal industries, in particular, have been and will continue to be expanded at an extremely rapid rate. At the same time, the gold reserves of the USSR probably are about US $4 billion, or a level about 8 times the usual annual Soviet imports from the West. Even the US does not have such a favorable ratio between gold reserves and imports. The USSR can no longer look upon this reserve as a war chest, to be used if it were invaded by a specific country, because any major war probably would find most of the West aligned against it. Finally, byproduct gold production, probably the lowest-cost production, now amounts to about 1.5 million ounces a year and can be expected to continue to increase. This amount of byproduct gold by itself would have sufficed to pay for the Soviet trade deficit in most years. Under these conditions it would appear

that the Soviet government would not attempt to expand the gold industry and might allow a further contraction in gold production.

IV. Exports and Reserves.

A. Pre-World War II.

During 1920-40 the USSR exported about 45.5 million ounces of gold to the West.* At the current price, these exports would be valued at about US $1.6 billion. During this period, gold was the chief source of foreign exchange for the USSR. During the same period the USSR is estimated to have augmented its gold reserves by about 54 million ounces (US $1.9 billion). These reserves were estimated to have amounted to about 25 million ounces (US $0.9 billion) just after the Revolution of 1917. Thus Soviet gold reserves at the end of 1940 probably were about 78 million ounces (US $2.8 billion).

1. Reserves, 1920.

According to a report by A. Baikalov, the Bolsheviks inherited about 24.9 million ounces (US $872 million) of gold from the Tsarist regime. This amount included 3 million ounces (US $0.1 billion) of Rumanian gold held in "safe keeping" and never returned, reserves captured from the provisional government of Admiral Kolchak, and gold received from the isolated Czechoslovak army in Siberia.

Baikalov's data are supported by a US Senate inquiry made in 1935. The US Senate report concluded that the Bolsheviks had retained between US $780 million and US $870 million in gold from

* This figure does not take into account unrecorded shipments to the Near or Far East, but the possibility of such shipments in any sizable amount is considered to be highly unlikely. According to one report of gold imports, by countries, in the early 1930's, the only sizable gold import which could not be accounted for during the period reviewed was US $17.9 million into Italy in 1931. There was no reason, however, to believe that this came from the USSR.

the old Tsarist reserves. Both reports relied heavily on the data prepared by an official who was prominent in the Imperial State Bank before 1920. The size of the Russian Central Bank reserves at the end of 191[illegible] (32 million ounces -- US $1,120 million) would indicate that the Baikalov and Senate data probably were reasonable.

Starting with the estimated Soviet reserves in 1920, the reserves in 1940 may be calculated by adding production and other acquisitions and deducting exports and internal uses.

2. Acquisitions, 1918-40.*

During 1918-40 the USSR is estimated to have obtained gold from the following sources:

Source	Thousand Troy Ounces	Million US Dollars
Production**	77,000	2,700
Recovered from the population	10,000	350
Conquered Baltic countries	1,000	30
Spain	14,900	522
Total	102,900	3,602

Gold was recovered from the population in a number of ways. Baikalov estimates that the Soviet government received gold from the population by the beginning of 1934 in the following amounts :

Source	Thousand Troy Ounces	Million US Dollars
Tsarist coins from private hoards	3,750	131
Confiscation of church and private treasure	2,500	88
From Torgsin** stores	3,750	131
Total	10,000	350

* Includes about 3 million ounces produced before 1927.

** A special state trading organization which existed from 1932 to 1935.

In addition to these acquisitions, it is reported that the Soviet government received gold as ransom in return for safe exit from the USSR as well as through remittances from abroad.* Acquisitions from the population after 1934 (the date of Baikalov's estimate) are believed to have been small.

A great deal of the gold from the population came from the operations of a special state trading organization, Torgsin, selling consumer goods within the country for gold, foreign banknotes, jewelry, and similar articles. Torgsin was established in 1932 and liquidated in 1935. claims that

> As a result of the development of the gold industry and "Torgsin," gold receipts within the USSR increased sixfold over a period of four years (1932-1935).

During the Spanish Civil War (1936-39) the Republican government is reported to have sent about US $522 million in gold from Cartagena to the USSR. / Del Vayo, former Spanish Republican Minister of Foreign Affairs, states that "something more than half" of the Spanish gold reserves was sent to Moscow and then expended for purchases abroad. Similarly, another former Republican Minister reports that "the largest part of the reserves of the Bank of Spain" was sent to the USSR. Recent reports from Europe indicate that the USSR is selling gold bars with Spanish marking and characteristics. The Franco government of Spain has put in a claim for this gold.**

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* The USSR imported some gold during this period. Such imports were deducted from exports, which are considered later.

** It is known that prerevolutionary and Spanish gold reserves amounted to about US $700 million, and it is known that about US $500 million of this unaccountably disappeared. It could have gone to three destinations: the Axis powers, the West, or the USSR. The Tripartite Commission dealing with looted gold never discovered the Spanish reserves in Axis lands -- indeed, there was never any speculation that the Axis powers could have obtained it. Since the pre-World

Gold reserves in Latvia, Lithuania, Estonia, and Poland on the eve of World War II amounted to about US $123 million, as is shown in the following tabulation :

Country	Date	Million US Dollars
Estonia	May 1940	12.9
Latvia	July 1940	14.0
Lithuania	August 1940	11.3
Poland	July 1939	84.3
Total		122.5

The Polish gold was protected by being sent outside the country, a substantial amount being held in the US. The disposition of the reserves of the other three countries cannot be determined except for a part held in the US, but it is likely that they could have fallen into Soviet hands. For purposes of this report, it is assumed that gold worth about US $30 million was taken over by the USSR.

In addition to these sources of gold, it is conceivable that the USSR received gold as a balancing item during those periods in the 1930's when it had favorable balances of payments. Such a possibility is not supported by studies of world gold flows in the 1930's, however, and is consequently not considered in arriving at total Soviet gold acquisitions.

It appears likely from the above estimates that during the first 20 years of its existence the USSR managed to procure about US $0.9 billion in gold from sources other than new production. This figure is about 4 or 5 times the estimated current annual production.

War II black market in gold was thin or nonexistent, it may be concluded that the gold was not disposed of clandestinely. It may also be concluded that the only Western markets capable of handling the gold -- the British, the French, and the Dutch -- did not dispose of the bulk of the gold, even though some sales were made in France. This leaves the Soviet government as the only party willing and able to handle such a sizable amount of gold.

3. Exports, 1920-40.

Official statistics of major gold importing countries* indicate that total known Soviet exports of gold in 1920-40 amounted to about 45.6 million ounces, or US $1.6 billion. In addition, it is believed that minor amounts of gold were shipped from the USSR to France and Switzerland during this period.

4. Reserves, 1940.

On the basis of the computations made above, Soviet gold reserves at the end of 1940 are estimated to have been about US $2.8 billion, as is shown in the following tabulation:

Changes, 1920-40	Million Troy Ounces	Billion US Dollars**
Reserves at beginning of period	24.9	0.9
Production	77.0	2.7
Other acquisitions	25.9	0.9
Increases in gold reserves	102.9	3.6
Total disposable gold	127.8	4.5
Exports	45.5	1.6
Other uses***	3.8	0.1
Total gold use	49.3	1.7
Net increase in gold reserves in period	53.6	1.9
Reserves at end of period	78.5	2.8

* Sweden, Germany, the UK, and the US.

** At US $35 an ounce. It should be recognized that the export value figures will not correspond to actual receipts, because part of the gold was sold at US $20.67 per ounce.

*** Five percent of current production.

5. Calculation of Official Reserves as of 1 January 1937.

From 1922 to 1932 the State Bank published gold reserves figures regularly. From 1932 until 1935, such publication was irregular. In the course of the devaluation of the ruble in April 1936, however, the Gosbank gold reserve was revalued.* Gold equal in value to the book profit of 20.28 million ounces on devaluation was transferred to the People's Commissariat of Finance. Thus the reported gold holdings of Gosbank on 1 April 1936 were 7.92 million ounces as compared with 21.26 million ounces at the beginning of the year. Gosbank holdings as of 1 January 1937 were probably 10.89 million ounces. Total reserves as of 1 January 1937 may be estimated at 31.17 million ounces valued at US $1,091 million. This figure is derived by adding the 20.28 million ounces transferred to the People's Commissariat of Finance to that gold held in Gosbank. It is possible, however, that the People's Commissariat of Finance held reserves in addition to those received at the time of the devaluation. In any event, reserves calculated on the basis of the data in this report could not differ significantly from the estimated combined holdings of Gosbank and the People's Commissariat of Finance on the same date.

On the other hand, another observer claims that Serebrovskiy, head of the Soviet gold industry, until 1937, boasted of a gold reserve at the end of 1936 of US $7 billion. This figure seems all out or proportion; it does not, for example, correspond with Serebrovskiy's announced production figures during the 1930's.

6. Commentary on Soviet Gold Reserves.

The calculation of Soviet gold reserves as of the end of 1940 is based on certain tenuous data: (a) available statistics on official Soviet gold exports are somewhat incomplete, (b) the information concerning Spanish gold is uncertain, (c) the production data

* By a decree of 29 February 1936 the ruble changed from 0.774385 to 0.184536 gram of fine gold, or 23.8 percent of its former value. Surplus gold created by this devaluation (in excess of 25 percent of the note circulation) was transferred to the People's Commissariat of Finance.

are estimated, (d) the amount of gold going into industrial uses is uncertain, and (e) it is probable that some gold left the country for clandestine purposes.

The figure for gold reserves may be questioned on another basis. At a time (1935) when gold reserves were stated by Gosbank to be US $839 million, the USSR was trying hard to get credits and loans abroad. Rather than seeking credits, which had previously been granted at only a very high interest rate, the USSR could have sold more gold. It is likely, however, that the Soviet government felt a large reserve had to be kept for such unpredictable expenses as war or the expenditures of the Comintern or Third International. If gold, as Soviet officials often say, is merely another commodity, it is difficult to account for the large increase in reserves in the 1930's by any other reason than national security.

B. World War II and Post-World War II

1. Acquisitions, 1941-54.

In addition to current production, the USSR could have acquired gold from a number of other sources during 1941-54. It is possible that reserves of certain European Satellites came under Soviet control at the end of World War II. One source places receipts from certain European Satellites at US $552 million, and another estimates that the USSR received gold worth US $150 million to US $200 million from East Germany and an additional US $100 million from the other European Satellites. These acquisitions have never been confirmed, and there has been no mention in reparations reports of gold exports to the USSR. Reliable evidence based on Tripartite Commission investigations indicates that very little unaccounted-for gold existed in East Germany immediately after World War II.

It is known that several of the European Satellite countries (Rumania, Hungary, and Czechoslovakia, as well as Poland) shipped gold to the West in the immediate postwar years. that the amounts involved were much too large to have come from current production. It must be concluded, therefore, that

except for Poland, which is known to have sold gold received from the USSR, the shipments were taken from reserves. It is also believed that European Satellite gold reserves in 1953 amounted to over US $250 million -- a substantial part of which must have come from prewar reserves. In view of this, it is probable that the Satellite governments could have lost only part, and perhaps none, of their prewar gold reserves to the USSR.

It has been reported that the USSR appropriates current European Satellite gold production amounting to over US $10 million annually. Although this may have taken place, particularly during the immediately postwar years, such acquisitions have never been confirmed. that the small production by Bulgaria is retined in the USSR. Because of low production by the European Satellites, relatively high sales to the West, and lack of firm evidence on Soviet acquisitions of European Satellite gold, no gold from this source has been considered in calculating Soviet reserves.

The USSR could have received gold from Communist China during the past few years. Annual gold production by Communist China was valued at about US $10 million to US $15 million before World War II. It is known that the Chinese Communists shipped gold to the USSR in 1951, insuring these shipments with a Western company. Because nothing is known of the size of possible receipts from Communist China, they are not considered in arriving at Soviet reserves.

North Korean gold is currently reaching the USSR. The amounts involved are believed to have totaled about US $28 million since 1946, but it is possible that shipments have been larger. North Korea has not sold gold on the world market, so far as is known, and it is assumed that all the current production of North Korea goes to augment Soviet reserves.

The USSR also received the gold production of Sinkiang, which has possibly amounted to US $6 million since World War II. In addition, the bulk of the gold production of Mongolia is believed to be

Soviet controlled. Production of Mongolia in 1950 was estimated at 50,000 ounces. If it is assumed that the USSR has received about 50,000 ounces per year since the end of World War II, the amount involved is about US $16 million.

Total acquisitions from sources other than new production are thus estimated at US $50 million.

2. Exports, 1941-54.

Soviet gold exports in 1941-54 probably have amounted to about US $557 million (16 million ounces). These exports are estimated to have been distributed as follows:

Destination	Million US Dollars
US	113
Western Europe	410
Poland	29
Finland	5
Total	557

These figures do not include clandestine exports, sold through unofficial channels, for support of covert activities. Such exports are known to have been made, but information is inadequate to estimate the amount.

To a great extent, all world gold movements, especially those made through the premium markets, are conducted with close secrecy. Because of this, it is possible that the figures on gold exports in this section should be 10 percent lower or 25 percent higher. Certain specific export data, however, as explained in the text, are believed to be firmer. Annual shipments exceeding a 25-percent error in years when shipments are large probably would come to the attention of Western gold experts. (For methods of sales of Soviet gold, see Appendix I.)

From the beginning of World War II until 1947, official statistics show the USSR exported a substantial amount of gold to the US. During much of this period, only the US had resources to sell, and, in addition, shipments to the traditional Western European markets were made hazardous by war. US Department of Commerce figures show that in 1941-48 about US $113 million in Soviet gold was sold in the US. During this same period the Bank for International Settlements estimated that US $110 million in Soviet gold was sold in Western Europe -- a total of US $223 million. Most of the gold imported by the US went to the Federal Reserve Bank of New York, and a large part of it remains in its vaults.

For 1949-52 there were no reliable reports of Soviet shipments, although there were a great number of unconfirmed rumors of such shipments. One source estimates that US $140 million of Soviet gold was sold through black market channels in 1949 alone. During this 4-year period, however, the European Satellites probably exported gold worth approximately US $150 million to US $300 million. Of these exports, only one was reported to consist of Soviet bars, but the shipment concerned was from Poland which received the gold in the form of a Soviet credit. The reports of European Satellites shipments during this period were, in many cases, confirmed [redacted] In no case could a Soviet shipment be so confirmed, with the possible exception of a Hungarian request for a price on gold to be used for industrial purposes. [redacted] In addition, a source which appeared to be well informed concerning Soviet Bloc gold shipments during the period 1949-52 indicated no gold shipments originating in the USSR during that period. [redacted] Supporting this, the Bank for International Settlements claimed that in 1950 there was "none but the flimsiest evidence of any appreciable sales of Russian origin." [redacted] It might also be added that, during this period, the USSR had no great need to export gold for purposes of balancing trade.

For the years 1953 and 1954 a sizable amount of information has been accumulated concerning gold shipments from the USSR to the West, primarily to the UK, the Netherlands, France, and Switzerland. These gold shipments are believed to have amounted

to from US $150 million to US $200 million in 1953 and from US $100 million to US $150 million in 1954. [illegible] / In this report the midpoints of these figures are used for calculating withdrawals from Soviet reserves. These shipments were concentrated in a 6-month period -- October 1953 to April 1954. Since that time, there has been no indication of other than minor shipments.

In addition to the known or suspected Soviet shipments of gold to the West, there have been announcements or rumors of Soviet shipments of gold to Finland, Iran, and the European Satellite countries in the following amounts:

Destination	Year	Million US Dollars
Finland	1954	5
Iran	1955	12
Poland	1947	29
Czechoslovakia	1947-48	120*

In March 1947, US $29 million in gold was made available to Poland as a credit to be repaid by shipments of raw materials. Somewhat later, some of this gold entered the US.

In March 1947 a US $200 million credit was rumored to have been granted by the USSR to Czechoslovakia. This was to be made 60 percent in gold, with the remainder in hard currencies. There is no indication that this credit was ever implemented or even actually contemplated. A gold loan was announced in December 1948, for which the USSR was to receive oil-drilling and coal-mining equipment. [illegible] / The amount concerned was never divulged. Although Czechoslovak gold has appeared on Western markets, it has not been practicable to determine whether it was of Soviet origin. Consequently, although the Polish gold receipts are deducted from the Soviet reserves, this has not been done in the case of Czechoslovakia.

* The existence of such a credit in the amount of US $120 million has never been confirmed.

Finland has made three agreements with the USSR providing for gold shipments or credits. In February 1954 the Soviet government agreed to pay a portion of the outstanding favorable 1954 Finnish-Soviet trade balance in gold and hard currencies. In June 1954, deliveries of gold amounting to about US $5 million were made under this agreement. It was rumored, but denied by Finland, that gold delivered under this agreement was of Spanish origin. Two Soviet gold or hard-currency loans to Finland totaling US $20 million have also been agreed upon, but neither has been utilized at this time.

During World War II, Iran made advances in rials totaling about US $20 million to the USSR. Agreement has been reached to make delivery of US $12 million in Soviet gold to liquidate this claim. Delivery took place in June 1955.

3. Reserves, 1954.

On the basis of the above data, Soviet gold reserves at the end of 1954 are estimated to have been about US $4 billion, as is shown in the following tabulation*:

Changes, 1941-54	Million Troy Ounces	Billion US Dollars
Reserves at beginning of period	78.5	2.8
Production	54.0	1.9
Other acquisitions	1.4	
Increases in gold reserves	55.4	1.9
Total disposable gold	133.9	4.7
Exports	15.9	0.6
Other uses	2.7	0.1
Total gold use	18.6	0.7

* The figure for net reserves probably is reliable within a range of error of plus or minus 40 percent.

Changes, 1941-54	Million Troy Ounces	Billion US Dollars
Net increase in gold reserves in period	36.8	1.2
Reserves at end of period	115.3	4.0

Although reserves of this level would appear large for a country with foreign trade the size of that of the USSR, it should be remembered that (a) almost three-fourths of this reserve has accumulated since the beginning of 1937, (b) the USSR was able to obtain the bulk of its wartime imports without payment, (c) Soviet leaders have repeatedly announced since World War II that they felt international gold prices were too low for profitable selling and should be increased, and (d) current production is estimated to be less than one-half the prewar peak.

C. Potential.

Estimated reserves are now at a level sufficient to allow the USSR to double its current rate* of imports from the West for a period of about 8 years, financing the increase through export of gold alone. There are no indications, however, that the USSR has determined to liquidate its gold holdings. Furthermore, it is not known what the USSR considers to be a satisfactory level of reserves. If the USSR felt a reserve level bearing the same relation to the current level of imports from the West as 1937 reserves bore to 1937 imports -- that is, a ratio of 4 to 1 -- were adequate, the USSR could increase imports by about US $200 million a year for a period of 10 years, financing this increase from "excess" reserves alone.

* Average, 1951-54.

There have been indications in official Soviet statements that the USSR has limited its gold exports in much of the postwar period because it felt the world price of gold would increase. There appears to be no reason, however, why the USSR should currently expect such a price increase. Announced US policy, on which any foreseeable gold price increase depends, has consistently favored maintenance of the current US $35 price, and rumors, which were rampant after World War II, that the US would increase its gold purchase price have now almost died down.

It is possible, accordingly, that the USSR may increase imports to the level suggested by its gold reserves and export substantial quantities of gold for a number of years. The indications are that the USSR has the capabilities for this action whenever it chooses.

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APPENDIX A

ADMINISTRATIVE STRUCTURE AND KEY PERSONNEL OF THE GOLD INDUSTRY OF THE USSR

Organizations, Locations, and Personalities.

1. Glavzoloto /Chief Directorate of the Gold and Platinum Industry/, Moscow

Chief:
Kharitonov, F.P., Lt Gen 1847 (later replaced by)
Vorob'yev, K.V.*

Deputy Chiefs:
Dorokhov, M.G.**
Yegorov, Maj Gen
Shemyakin, N.I.***
Ignat'yev

Chief Geologist:
Rozhkov, I.S.

Chief Engineer:
Cribin, Col

Chief Mechanical Engineer:
Rogov

Chief Accountant:
Sibrin (probably replaced by)
Kulikov

* Appointed Acting Chief in
** Chief of the Personnel Department.
*** Former Chief of the Primorskiy Gold Trust.

2. Zolototekhsnab /All-Union Gold Technical Supply Trust/, Moscow

Chief:
Komarov, Maj Gen (later replaced by)
Beketov

Deputy Chiefs:
Korotkin
Poddereg...
Sokolovskiy

3. Zolotoprodsnab /All-Union Gold Food Supply Trust/, Moscow

Chief:
Kargopolov, I.G., Col

Deputy Chief:
Leont'yev, Col

Chief Accountant:
Yermakov

Chief of Personnel Department:
Moskalenko

4. Zolototrans /All-Union Gold Transport Trust/, Moscow

Chief:
Korsakov, Maj Gen (later replaced by)
Kirpichnikov, V.S., Col

Chief of Planning Department:
Gorbunov

5. Zolotorazvedka /All-Union Gold Prospecting Trust/, Moscow

Chief:
Boguslavskiy

Chief Account:
Podlyaschuk

6. Giprozoloto /State Institute for Planning for the Gold Industry/, Moscow

Chief:
Pakhomov

7. Altayzoloto /Altay Gold Trust/, Semipalatinsk, Kazakh SSR

Chief:
Ksenofontov, A. (later replaced by)
Kuzmin

Deputy Chief:
Yakovlev

Chief Geologist:
Kulikov

Geologist:
Vasil'yev

Chief Engineer:
Yakovlev

8. Amurzoloto /Amur Gold Trust/, Svobodniy, Amur Oblast

Chief:
Andreyev (later replaced by)
Lukinskiy*

Chief Inspector:
Pichugin

* Former Chief of the Kazakh Gold Trust and later Chief of the Berezovsk Gold Trust. In 1952 he was transferred to the Lena Gold Trust.

Chief of the Political Department:
Fedorov, N. D.

9. Baykalzoloto /Baykal Gold Combine/, Irkutsk

Chief:
Kuz'yan

Chief Engineer:
Tikhomirov

10. Baleyzoloto /Baley Gold Trust/, Baley

Chief:
Vitkovskiy

Chief Geologist:
Terent'yev

11. Barguzinzoloto /Barguzin Gold Trust/, Tsipikan, Buryat-Mongol ASSR

Chief:
Lozovskiy (probably replaced by)
Grigor'yev

Accountant:
Bogdarinskiy

12. Bashzoloto /Bashkir Gold Trust/, Ufa, Bashkir ASSR

Chief:
Kozlovskiy, Lt Col

13. Berezovzoloto /Berezovskiy Gold Combine/, Berezovskiy, Sverdlovsk Oblast

Chief:
Livshits (replaced by)
Lukinskiy* (probably replaced by)
Korobeynikov

14. Chkalovzoloto /Chkalov Gold Trust/, Kumak, Chkalov Oblast

Chief:
Prutkovskiy

15. Darasunzoloto /Darasun Gold Trust/, Vershina Darasuna, Chita Oblast

Chief:
Barabanshchikov

Chief Engineer:
Ovcharenko

16. Dzhetygarzoloto /Dzhetygar Gold Combine/, Dzhetygara, Kazakh SSR

Chief:
Voskresenskiy

17. Dzhugdzhurzoloto /Dzhugdzhur Gold Trust/, Yakutsk

Chief:
Sobko, V. A., Lt Col (replaced by)
Podgayevskiy, V. V. (replaced by)
Sitnikov

Deputy Chief:
Shokhtin, P. A.

Chief Accountant:
Ivanov

* Transferred in 1952 to Lena Gold Trust.

18. Yeniseyzoloto /Yenisey Gold Trust/, Krasnoyarsk

Chief:
Korolev (probably later replaced by)
Sheykin

19. Gornoaltayzoloto* /Gornyy Altay Gold Trust/, Biysk

Chief:
Lazovnikov

20. Gruzzoloto /Georgia Gold Combine/, Tiflis

Chief:
Yelidzharashvil

21. Kazzoloto /Kazakh Gold Trust/, Stepnyak

Chief:
Lukinskiy (later replaced by)
Sinitskiy

22. Khakasszoloto /Khakass Gold Trust/, Abakan

Chief:
Beylin

Geologist:
Avdeyev

23. Kochkarzoloto /Kochkar Gold Combine/, Plast

Chief:
Stepanov (later replaced by)
Semenenko

* Formerly Oyrotzoloto /Oyrot Gold Trust/

Chief Geologist:
Danilov

24. Lenzoloto /Lena Gold Trust/, Bodaybo

Chief:
Chuguyev, Lt Col (later replaced by)
Lukinskiy

Deputy Chief:
Stepanov

Chief Engineer:
Zherdev
Aleksandrov, N.N.

Chief Accountant:
Troitskiy

25. Maykainzoloto /Maykain Gold Trust/, Maykain

Chief:
Trifonov

Chief Geologist:
Nikitin

Accountant:
Kaumenev

26. Miasszoloto /Miass Gold Trust/, Miass

Chief:
Polyanskiy

27. Minusazoloto /Minusa Gold Combine/, Artemovsk

Chief:
Kuz'min *

28. Primorzoloto /Primorskiy Gold Trust/, Khabarovsk

Chief:
Shemyakin, N.I. (later replaced by)
Shevtsov

Deputy Chief:
Gritsun, A.I.

Chief Engineer:
Stolbov

Chief Accountant:
Vilenskiy

29. Sevkavzoloto /North Caucasus Gold Trust/, Labinsk

Chief:
Demenyuk

30. Tadzhikzoloto /Tadzhik Gold Trust/, Stalinabad, Tadzhik SSR

Officials not identified.

31. Tuvzoloto /Tuva Gold Trust/, Kyzyl, Tuva Autonomous Oblast

Chief:
Tatarinov (later replaced by)
Kononenko

* Probably later transferred to the Altay Gold Trust.

32. Uralalmaz /Urals Diamond Trust/, Kusya, Molotov Oblast

Chief:
Vecherkin

33. Uralzoloto /Ural Gold Trust/, Sverdlovsk

Chief:
Senatov, A.P.

34. Verkhamurzoloto /Upper Amur Gold Trust/, Mogocha, Chita Oblast

Chief:
Ufimtsev

35. Yakutzoloto /Yakutsk Gold Trust/, Aldan

Chief:
Mal'tsev (later replaced by)
Zaikin

Chief Accountant:
Okladnikov

Chief Engineer:
Kolesov

Geologist:
Gaskarov
Shatrov

36. Zabaykalzoloto /Transbaykal Gold Trust/, Chita Oblast

Chief:
Mekhanoshin (later replaced by)
Tatarinov*

* Former Chief of the Tuva Gold Trust.

Chief Engineer:
Kozhevir

37. Zapsibzoloto /West Siberia Gold Trust/, Novosibirsk

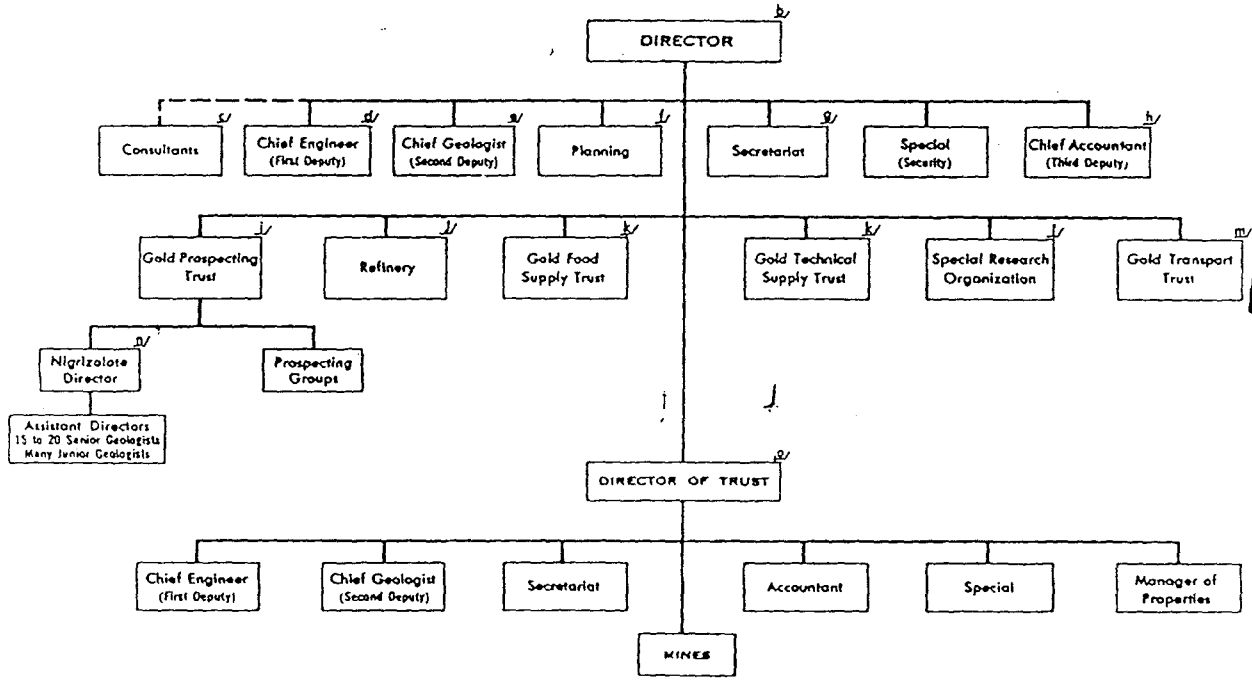
Chief:
Latyshev

Chief Engineer:

Medvedev

Organization of The Chief Directorate of The Gold and Platinum Industry (Glavzoloto)[a/*]

1941



*Footnotes for Appendix B follow on page 74.

ORGANIZATION OF THE CHIEF DIRECTORATE
OF THE GOLD AND PLATINUM INDUSTRY (GLAVZOLOTO)
1941
(Continued)

b. The director is always a Communist Party member.
c. These were high-level consultants from geological institutions. The relationship with these people also came through Nigrizoloto.
d. Functions here are specialized by plants, types of machinery, and so forth. Over-all duties are supervisory or of an inspection nature: for example, engineers from this department carry on inspections when the plan is not met. "Officially they are there to help the trusts -- actually to report on them."
e. A number of geologists, drillers, and so forth are employed here. Their activities are similar to those of chief engineers: that is, they synthesize reports (using reports from the trusts), check on fulfillment of the plan, and so forth.
f. Develops plans for all trusts, all related production, and other activities.
g. Has certain administrative functions.
h. It is not certain whether the chief accountant is a 3d deputy. It is believed that there were 40 to 50 men on the accounting staff.
i. The Gold Prospecting Trust has its own equipment and works primarily in discovered areas. One of its primary jobs is geological mapping. For example, it would probably know of the existence of a vein, which it would then explore, take samples from, and conduct chemical analysis. A man from this organization generally worked in Moscow in the winter (writing up the trust's findings) and in the field in the summer. In 1941 the same person, Prosnyakov, held the position of head of the Gold Prospecting Trust and that of Chief Geologist (2d Deputy). This was not, however, the rule.
j. During World War II the refinery moved to Novosibirsk.
k. It has been reported that all supply comes directly under Moscow.
l. One project was development of substitutes for diamond drills.

ORGANIZATION OF THE CHIEF DIRECTORATE
OF THE GOLD AND PLATINUM INDUSTRY (GLAVZOLOTO)
1941
(Continued)

m. It is reported that organizations having these functions exist, but their place on the organization chart is uncertain.

n. It was reported that the Director of Nigrizoloto was always a member of the Communist Party -- a manager who did not necessarily know mining or geology. It was also reported at another time, however, that the director was a professor at the (Moscow) Geological Institute. The assistant directors, of which there were three, were all highly competent professors and/or geologists. The function of Nigrizoloto was research on geology, mineralogy, location of deposits, and geological mapping on or below the surface. This work was primarily connected with gold -- but sometimes other minerals. Geologists here worked on theoretical problems, such as methods of estimating deposit size, methods of sampling, or methods of chemical analysis. The activity of Nigrizoloto is well described by the papers published in "Proceedings of Nigrizoloto." The nature of this activity is more theoretical than that of the prospecting groups, which also report to the head of the gold prospecting trust.

o. Fifteen to twenty trusts were known to the source. The organization is a sample one, but all trusts known to the source had essentially similar organizations.

Theoretically, the Director of the trust reports to the Director of Glavzoloto. Actually he is responsible to all of the departments on the level below the Director. In addition, it was believed that the relations of the staff positions at the trust level to those on the Glavzoloto level were close: for example, the geologist at the trust level dealt with the Gold Prospecting Trust and the 2d Deputy Geologist at the Glavzoloto level. Reports were frequently forwarded through this channel.

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APPENDIX C

COMPARISON AND EVALUATION OF ESTIMATES OF PRODUCTION OF GOLD IN THE USSR

Various estimates of production of gold in the USSR in 1927-53 are given in Table 6.*

The most important estimates of Soviet gold output are those by the American Legation at Riga, Latvia. An important part of the Legation's reporting program from 1932 until Soviet occupation in 1939 was an annual report on Soviet gold production. These reports are the most comprehensive available and represent a continuing research program to obtain and collate all available information. Each report revises estimates for the previous several years in the light of new information. The estimates of the US Bureau of Mines, the Bureau of the Mint, and the Federal Reserve Board are based on these reports.

The chief limitations to these reports result from the source material. After 1927, gold production was a state secret, and all employees in the industry were bound to secrecy. There are, however, different figures even for pre-1914 production. The Mining Department, the Council of Congresses of the Gold Producers, and the state refineries published quite different figures. There was uncertainty as to whether given series contained such items as byproduct gold, gold refined abroad, and secondary metals and whether the figures represented pure gold or primary gold concentrates. Similar confusions exist in regard to figures released after World War I.

The original estimates of the Legation at Riga for the years 1928-31 and the estimates of the Bureau of Mines were based upon an index series given in Pravda. The 1932 estimate was based upon a statement in the Moscow Economic Life of 30 November 1932 that

* Table 6 follows on p. 82.

Soviet gold production increased in 1932 by 17 percent over 1931. The Legation at Riga later revised its estimates for these years.

For 1933 through 1938, the estimates of the Bureau of the Mines are the same as the last estimates by the Legation at Riga. The most reliable estimate appears to be that for 1933, when Soviet officials announced that the USSR had become the second largest gold producer. The head of the industry first stated that in 1933 Soviet production was greater than Canadian, which he estimated at 84,000 kilograms (kg). When Canadian production proved to be 91,700 kg, he backed down and announced that the USSR had gained second position in 1934. There appears to be no reason to doubt the truth of this second statement. It is thus obvious that official preliminary estimates of 1933 Soviet production were above 84,000 kg and that later estimates were below 91,700 kg.

The history of the 1933 estimate is illustrative of the difficulties in working with Soviet data. At least two sets of conflicting percentage figures on 1933 production were published in 1934. The first figure would have allowed an estimate of Soviet gold production in 1933 of 87,568 kg, in line with Serebrovskiy's statement. This, incidentally, would indicate that the method of estimating physical output on the basis of percentage data had proved to be reasonably accurate for the years up to 1934. By the time the Legation at Riga made its first report of production for 1933 in February 1935, another set of percentages had been released, and the Legation concluded that Serebrovskiy's statement and earlier percentages had been based upon preliminary data. Accordingly, the Legation estimated 1933 production at 82,958 kg, or 2,677,100 ounces. Later statements by Soviet authorities in 1935 led the Legation to revise its estimate in its next report. In 1936, N. Oparin, Assistant to the Chief of Glavzoloto (Chief Directorate of the Gold and Platinum Industry), gave still another percentage figure for 1933 production, and the Legation again revised its estimate. Each revision, of course, forced the Legation to revise its estimates of output in subsequent years.

After 1933, the Legation at Riga found it increasingly difficult to estimate Soviet gold production. In 1936, the Legation reported its difficulties as follows [illegible]:

> Never before have so many conflicting statements been published than in 1935. It further became evident in the course of that year that percentage figures ... were inaccurate and can no longer be regarded as a reliable basis for such calculations.

In spite of the frustrations of the Legation over conflicting reports, its estimates for 1934, 1935, and 1936 are based upon considerable evidence. With certain exceptions, the contradictions among statements appear to be the result of revisions as later figures became available. The information generally took the form of announcements of percentage increases over previous years. There were usually four types of such percentages for a given year: the planned percentage increase, the preliminary estimate, the "first final" estimate, and the "second final" estimate. The latter estimates became available only over a period of years. Such information was also available for individual trusts, which gave the Legation a second basis for its calculations.

After 1936 the only official announcement on total gold production giving other than the percentage of fulfillment of the plan was an article in Izvestiya / stating that "the gold production of the USSR in 1937 was more than twice as large as that in 1933." This statement is in line with the estimates of the Legation at Riga for 1937 based primarily upon a study of announced results in various districts. Thus estimates of the Legation appear to be reasonably reliable. However, the estimate of the Legation for 1938 is the last.

The American Embassy in Moscow was assigned responsibility for continuing the annual reports on Soviet gold production. Most other estimates of Soviet gold production in 1939 and 1940 appear to be merely projections of estimates for previous years.

The year 1938 is thus the best year for comparing the numerous estimates of prewar Soviet gold production to give some idea of the range of error resulting from the use of percentage figures. This comparison indicates that the margin of error because of this factor is rather small, possibly less than 5 percent. Most estimates of 1938 production are in the range from 5 million to 5.3 million ounces. The main exceptions to this are a German estimate / of 1938 production at 8,037,500 ounces and an estimate by Davidoff, a French gold expert, in the Revue economique et sociale of 8,039,000 ounces. These two appear to be based upon similar methods, because for the 9 years through 1938 they differed by more than a fraction of 1 percent only in 1937.

Although the methodology of the German estimate is not available, Davidoff's methods are indicated in his article. Over one-half of the difference between the estimates of the Bureau of Mines and Davidoff is because of the use of a different 1927 figure. Davidoff bases his 1927 estimate on a statement by the People's Commissariat of Finance that gold production in 1926-27 reached 47 percent of production before the war, which according to Davidoff amounted to 60 tons. According to / however, the 60-ton figure does not represent pure gold, and the maximum prewar production was only about 54 tons. Forty-seven percent of this figure would be close to the Bureau of Mines estimate for 1927 of slightly more than 25 tons. Other differences between the estimates of Davidoff and of the Legation at Riga through 1936 are primarily because of Davidoff's use of figures which the Legation rejected as preliminary: for example, his estimates for both 1933 and 1936 are based upon percentage figures released in December of the year being estimated. Davidoff does not document his estimates for 1937-39 except for a statement from Industriya that 1937 production was more than twice that of 1933. His 1937 estimate is 2-1/3 times his 1933 estimate. The estimate of the Legation, on the other hand, is 201 percent of its 1933 estimate.

Considerably more important than the difficulties of working with percentage data in calculating an output series is the fact that the coverage of the data used by the Legation at Riga is uncertain.

It is believed that the data include only production by enterprises under Glavzoloto. Production in the Kolyma area by Dal'stroy was not under Glavzoloto. It is doubtful that statements by officials of Glavzoloto about progress in their industry would include Dal'stroy. Some statements specifically speak of "production of the enterprises of Glavzoloto." The fact that the estimates of the Legation based on statements on total production agree rather closely with those based on progress in the various districts under Glavzoloto is another indication that Dal'stroy is not included in total figures.

It is also possible that byproduct gold is not included in the estimates of the Legation at Riga. This gold is produced by the copper, lead, and zinc industries rather than Glavzoloto, although part of the ore is mined by Glavzoloto and then sent to base-metal refineries. The Foreign Service, however, assumed that the estimates of the Legation included byproduct gold.

The estimates of the Legation at Riga of gold production in the various districts are based upon a diagram in Sovetskaya zolotopromyshlennost', which showed the share of the various districts in the total gold production of the USSR in 1933. For 1934 the increases in production over the previous year are well documented; for 1935, less well documented; for 1936 on, only rough guesses.

In spite of these limitations, there is considerable testimony that the estimates of the Legation at Riga are the best available, and they have been widely used by both US and foreign analysts. According to who worked in Glavzoloto and supposedly knew how much was produced by Glavzoloto, the estimates of the Legation were closer to the truth than any others which he had seen

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TABLE 6

Various Estimates of Production of Gold in the USSR
1927-1953

YEAR	Bureau of Mines Minerals Yearbook	American Legation at Riga 100/	Federal Reserve Board 101/	Bureau of the Mint 102/	Union Corporation of South Africa 103/	Captured German Document 104/	Societe Minerals et Metaux 105/	Imperial Institute, London 106/	Davidoff 107/	Prokopovich 108/	Bank for International Settlements 110/	National Advisory Council on International Monetary and Financial Problems	Northern Miner 111/	Ferdinand Friedensburg 112/	Sherover 114/	B. Mora (Kolyma only) 113/
1927	810	638	689	1,061	810				965	849	810					
1928	899	386	386	1,200	899		1,202		1,158	942	899					
1929	1,085	707	707	1,000	1,085		1,299		1,383	1,138	1,085					
1930	1,434	1,480	1,501	1,434	1,434	1,704	1,300		1,704	1,505	1,501					
1931	1,701	1,776	1,656	1,701	1,750	2,025	1,700		2,026	1,784	1,656					643
1932	1,990	1,938	1,938	1,990	1,950	2,349	1,990		2,347	1,971	1,938					2,250
1933	2,660	2,662	2,700	2,489	2,450	3,376	2,814		3,376	2,701	2,700			3,215		4,822
1934	3,633	3,633	3,858	4,263	3,800	4,861	4,200		4,855	3,864	3,858			4,180	6,429	7,234
1935	4,547	4,547	4,784	4,784	4,500	6,012	4,790		6,013	4,713	4,500		4,272	5,144	9,571	8,841
1936	5,327	5,327	5,173	5,240	5,400	7,587	5,176	5,500	7,588	5,935	5,280		4,620	4,983	14,286	10,448
1937	5,359	5,359	5,359	4,969	5,000	8,038	5,080	5,000	7,878	5,401	5,000		4,786	5,241		11,252
1938	5,236	5,236	5,236	5,234	5,000	8,038	4,967	5,300	8,039		4,500		4,676	4,501		10,448
1939	5,200		5,100	5,000	4,500	8,038	4,999	4,800	8,842		4,500		3,569	3,858		12,860
1940	4,000		4,000	4,000	4,000	8,038	4,147	6,200			4,000			2,894		12,066
1941	4,000			N.A.	3,500		3,858	3,000			4,000			1,929		9,645
1942	4,000			N.A.	3,000		4,501	3,000			4,000			1,929		8,038
1943	4,000			4,000	2,000		4,501	3,000			4,000			1,929		8,038
1944	4,000			4,000	2,000			3,000			4,000	6,000		2,572		8,841
1945	5,000			5,000	2,000		4,823	5,000			4,000	6,000		3,215		9,645
1946	6,000			6,000	2,000		5,788	5,500			4,000	6,000		3,858		
1947	7,000			7,000	2,000		6,752	6,000			4,000		1,800	4,180		
1948	7,000			7,000	2,000		6,752				4,000		1,800	4,501		
1949	7,000			7,000	2,000		6,752				4,000		1,800	4,822		
1950	8,000			8,000	2,000		6,752									
1951	9,500			9,500	2,000											
1952	9,500				2,000											
1953	9,500				2,000											

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APPENDIX D

ESTIMATED PRODUCTION OF GOLD IN THE USSR, BY DISTRICT a/
SELECTED YEARS, 1927-38

Table 7

Fine Kilograms

	1927		1932		1936		1938	
	Kilograms	Percent	Kilograms	Percent	Kilograms	Percent	Kilograms	Percent
Eastern Siberia								
Zabaykalzoloto	1,778	7.9	9,765	16.1	4,088	2.5	4,497	2.7
Barguzinzoloto b/					19,772	11.9	17,468	10.7
Baleyzoloto b/					12,622	7.6	15,197	9.3
Darasunzoloto b/					21,509	13.0	18,390	11.2
Yakutzoloto	5,204	23.1	11,453	18.9	14,954	9.0	13,459	8.2
Lenzoloto	9,249	41.0	4,660	7.7	12,000	7.2	13,200	8.1
Amurzoloto	914	4.1	4,883	8.1				
Verkhamurzoloto b/					7,656	4.6	9,646	5.9
Primorzoloto	128	0.6	3,014	5.0				
Urals and Caucasus								
Uralzoloto	261	1.2	4,038	6.7	10,600	6.4	10,700	6.5
Miasszoloto b/					4,755	2.9	4,292	2.6
Kochkarzoloto b/					1,408	0.8	1,405	0.9
Bashzoloto	1,735	7.7	1,628	2.7	5,730	3.5	5,444	3.3
Dzhetygarzoloto	c/		c/		5,306	3.2	5,187	3.2
Other	336	1.5	1,084	1.8	2,000	1.2	2,000	1.2

* Footnotes for Table 7 follow on p. 82.

, Table 7

(Continued)

Fine Kilograms

	1927		1932		1936		1938	
	Kilograms	Percent	Kilograms	Percent	Kilograms	Percent	Kilograms	Percent
Western Siberia and Kazakhstan								
Zapsibzoloto	104	.5	8,981	14.8	12,937	7.8	12,937	7.9
Khakasszoloto b/					8,530	5.1	7,677	4.7
Minusazoloto b/	1,104	4.9	4,642	7.7	7,052	4.3	7,034	4.3
Kazzoloto	129	.6	1,326	2.2	3,780	2.3	3,402	2.1
Altayzoloto	1,591	7.1	5,125	8.5	11,000	6.6	11,550	7.1
Yeniseyzoloto								
Total d/	22,553	100.0	60,599	100.0	165,699	100.0	163,485	100.0

a. Totals, except for 1936, differ slightly from the final estimate of the Legation at Riga.
b. Originally part of trusts to which they are subordinated in this table.
c. Included in Kazzoloto.
d. Dal'stroy not included.

APPENDIX E

VARIOUS ESTIMATES OF GOLD PRODUCTION FROM DAL'STROY
1930-53

Table 8

Thousand Troy Ounces

Year	Petrov a/	Zamorak b/	Engineer	CIA Source	Lipper	Geologist	Geologist	Prisoner of War	Dallin and Nicolaevsky	Chellson d/	Engineer e/
1930										193	
1931										227	
1932		643								321	
1933		2,250								482	
1934		4,823								675	
1935		7,234								868	
1936	3,200	8,841								1,125	
1937	4,500	10,449				50 percent of total Soviet production	50 percent of total Soviet production				
1938	6,400	11,253									
1939	5,600	10,449	3,215								6,43
1940	4,800	12,860							11,000		7,07
1941	3,200	12,066									
1942	1,600	9,645									
1943		8,038									
1944		8,038									
1945		8,841							16,000 to 18,000		
1946		9,645									
1947											
1948											
1949				3,858							
1950					12,860						
1951											
1952								12,860			
1953											

* Footnotes for Table 8 follow on p. 86.

Table 8
(Continued)

a. Petrov spent 6 years (1936-41) in the Kolyma area as a political prisoner. His assignments included clerical work in a mine administration as well as manual work in a box factory and in the mines. His estimate of Dal'stroy production is based on two separate methodologies. First, he claims to know the number and capacity of wooden boxes manufactured in the factory in which he worked and used for packing the gold produced in the Kolyma area for shipment to Moscow. Second, his clerical position and mining experience supposedly gave him a basis for estimating total labor force and daily output per worker.

b. Zamorski's estimates are also based upon labor force and productivity estimates. His acknowledged sources are 62 Po[illegible] prisoners who were in the area for various periods between May 1940 and July 1942. As a result, his output estimates for the 1930's are suspect. In addition, he appears to underestimate the difficulties which have to be overcome before productive operations are possible in the Arctic. Zamorski estimates that 65 percent of the labor force assigned to the gold-producing regions was engaged directly in gold mining throughout the period of his estimates (1932-46). This could not have been true in the first few years. The bulk of the labor force in these years must have been engaged in building towns, camps, roads, airfields, and storage and port facilities as well as in exploratory operations and preliminary work in the gold fields.

[illegible]

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c. Oneilson is a reputable US mining engineer who spent 2 years (1930-32) in the Soviet gold industry, mostly in Kazakhstan. His estimate of production from Dal'stroy is based upon conversations with John Littlepage, who is believed to have visited Kolyma.

k. A [illegible]ner contract employee of Dal'stroy before World War II. His estimates supposedly are based upon access to actual figures. It is not likely, however, that information on total gold production from Dal'stroy would be available to any one except top officials. Under the conditions it must be assumed that these figures represent an "educated guess," although it is possible that the engineer may have had access to official records or had friends with such access.

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APPENDIX F

PERSONNEL AND WAGE ALLOCATIONS TO THE GOLD INDUSTRY OF THE USSR

The estimated labor force and wage payments in the gold industry of the USSR are given in Table 9.* The personnel and wage allocations for 30 gold trusts and combines in 1949 is estimated at a total of 130,000 employees and 1.2 billion rubles. These figures include 111,561 employees and 1,028,644,600 rubles for 20 gold enterprises

* Table 9 follows on p. 89.

The personnel are categorized as follows:

1. Laborers
2. Trainees
3. Engineering-technical workers
4. Office workers
5. Junior assistants
6. Armed security guard
7. Fire guard
8. Technical school personnel
9. Capital repair personnel
10. Other

* Table 10 follows on p. 91.

Table 9

Estimated Labor Force and Wage Payments
in the Gold Industry of the USSR
1949

Name of Enterprise	Number of Employees	Wages (Thousand Current Rubles)	Average Wage
Altay	3,027	22,088	7,297
Amur	6,135	62,440	10,178
Baykal	449	3,507	7,811
Baley	5,516	47,340	8,582
Barguzin	708	6,460	9,124
Berezov	4,602	36,932	8,025

Table 9

Estimated Labor Force and Wage Payments
in the Gold Industry of the USSR
1949
(Continued)

Name of Enterprise	Number of Employees	Wages (Thousand Current Rubles)	Average Wage
Darasun	2,334	21,072	9,028
Dzhugdzhur	10,446	128,384	12,290
Yenisey	9,288	74,662	8,039
Kazakh	7,632	59,987	7,860
Khakass	10,006	88,888	8,883
Lena	16,354	163,092	9,973
Maykain	2,820	19,392	6,877
Minusa	3,686	27,940	7,580
Primorskiy	4,877	48,816	10,009
Tuva	414	3,063	7,399
Ural	8,702	73,136	8,405
Verkhamur	2,230	16,512	7,404
Yakutsk	6,299	77,532	12,309
Zapsib	6,036	47,422	7,857
Total	111,561	1,028,665	9,220
Estimated total for other gold enterprises	20,000	180,000	
Grand total	130,000	1,200,000	

Table 10

Estimated Wage Allocations to Fourteen Gold Trusts in the USSR
1949 and 1954

Thousand Current Rubles

	1949	1954
Altay	22,088	29,000
Amur	62,440	122,000
Barguzin	6,460	16,000
Bashkir		
Dzhetygar		
Dzhugdzhur	128,384	94,000
Yenisey	74,662	82,000
Kazakh	59,987	107,000
Khakass	88,888	116,000
Lena	163,092	193,000
Maykain	19,392	25,000
Primorskiy	48,816	80,000
Tuva	3,063	9,000
Ural	73,136	146,000
Yakutsk	77,532	93,000
Zabaykal		
Zapsib	47,422	90,000
Total	875,362	1,202,000

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APPENDIX G

CAPITAL INVESTMENT ALLOCATIONS TO THE GOLD INDUSTRY OF THE USSR

A study of the postwar [redacted] information on allocations for capital investment in the Soviet gold industry reveals that it is possible to estimate total investment for 1949 and 1954.

broken down into categories as follows:

1. Construction-installation
2. Equipment, including equipment requiring installation
3. Planning of current construction
4. Planning of future construction
5. Capital geological prospecting
6. Other (not identified any further)

* Table 11 follows on p. 95.

b. Investment figures for 1954, however, are in 1 July 1950 prices; so they must be deflated in order to be compared to 1949 figures.

Table 11

Estimated Capital Investment
in the Gold Industry of the USSR
1949 and 1954

Thousand Current Rubles

Name of Enterprise	1949	1954
Altay	5,500	
Amur	22,000	31,000
Baley	16,500	
Barguzin	3,500	2,000
Bashkir	2,500	
Baykal	1,000	
Berezovsk	24,500	
Chkalov	3,500	
Darasun	10,500	
Dzhugdzhur	8,000	13,500
Kazakh	31,500	
Khakass	16,500	11,500
Kochkar	4,500	
Lena	32,500	47,000
Maykain	10,000	
Minusa	4,500	
Primorskiy	9,500	6,500
Tuva	1,500	1,100
Ural	23,000	
Verkhamur	15,000	

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Table 11

Estimated Capital Investment
in the Gold Industry of the USSR
1949 and 1954
(Continued)

	Thousand Current Rubles	
Name of Enterprise	1949	1954
Yakutsk	18,000	11,500
Yenisey	9,500	
Zapsib	7,500	
Estimated total for other gold enterprises	80,000	280,000
Total	360,000	404,100
Total in 1949 rubles	360,000	500,000

APPENDIX H

OPERATIONAL GEOLOGICAL PROSPECTING IN THE GOLD INDUSTRY OF THE USSR

Allocations to the gold industry for operational prospecting in 1949 are estimated at a total of 100 million rubles. This figure includes 76 million rubles for the 23 gold enterprises for which some information is available and 24 million rubles for the other 7 enterprises. The methodology for this estimate is the same as that used in estimating capital investment in Appendix B.

Estimated allocations for operational geological prospecting in the gold industry in the USSR in 1949 and 1954 are given in Table 12.*

* Table 12 follows on p. 98.

Table 12

Estimated Allocations for Operational Geological Prospecting
in the Gold Industry of the USSR
1949 and 1954

Thousand Current Rubles

Name of Enterprise	1949	1954
Altay	3,000	4,000
Amur	7,200	19,500
Baley	5,500	
Barguzin	2,000	4,500
Bashkir	1,400	6,000
Baykal	600	
Berezovsk	2,200	
Chkalov	1,200	
Darasun	2,400	
Dzhugdzhur	4,700	17,500
Kazakh	2,000	8,500
Khakass	2,700	17,500
Kochkar	1,600	
Lena	6,000	31,000
Maykain	700	7,500
Minusa	3,400	
Primorskiy	5,000	18,000
Tuva	1,200	4,000
Ural	4,800	21,000
Verkhamur	1,100	
Yakutsk	8,000	19,000
Yenisey	5,000	12,500
Zapsib	4,300	17,000
Estimated total for other gold enterprises	24,000	149,500
Total	100,000	357,000
Total in 1949 rubles	100,000	446,000

APPENDIX I

SOVIET METHODS OF SELLING GOLD

All operations in gold are concentrated in the hands of the State Bank (Gosbank) and form a part of the over-all financial plan of the USSR. All offers and sales emanate as directives of the Gosbank, and the proceeds, for the most part, become part of the receipts of the Gosbank or its correspondent agencies abroad.

If the sale of gold is intended as the sale of a commodity, it differs little from that of a lumber or grain sale. The Soviet foreign trade corporation involved would be Soyuzpromeksport. (Vsesoyuznoye Gosudarstvennoye Ob"yedineniye Po Eksportu Promyshlennykh Tovarov -- All-Union Association for the Export of Manufactured Goods). The quantity and price at which the gold is be sold are controlled factors and constitute a part of the export plan.

The greatest volume of gold trading is done with standard bars, bars weighing about 12.5 kilograms and 995/1000 fine. Soviet gold bars qualify as "good delivery." The seals of a certain group of refiners immediately qualifies their bars for delivery as fulfillment of contracts, and the stamps of Soviet refineries are included in this group.

It cannot be conclusively stated that all Soviet gold is shipped in standard bars, nor that it bears the mark of the hammer and sickle. Shipments of Soviet bars weighing 1 kilogram and not bearing the Soviet

emblem purportedly were received in Paris. It is quite likely that the standard bars were remolded upon their receipt into the smaller bars and the hammer and sickle effaced.

Almost all international precious metal shipments move by air because the insurance costs on gold shipments vary directly with the number of days the gold is in transit and the ease of protection of the shipment. The general route followed seems to be from Moscow and Prague to London or Amsterdam. Transshipments have been made via points in Scandinavia and Amsterdam. Gold frequently reaches Paris and Zurich.

In the West the gold market is controlled more or less by relatively few companies. In the UK, Samuel Montagu and Company and N. M. Rothschild and Sons predominate the market. In Switzerland the Union Bank of Switzerland, and Dreyfus Soehne and Company are the primary dealers in gold. Three main buying organizations exist. One consists of Baker, Samuel Montagu and Company, and Johnson Matthey and Company. This group controls the gold coming from the Union of South Africa. The second organization is known as the Syndicato Cangallo, an informal association of gold brokerage firms including Lazard Freres, Dreyfus Soehne and Company, Samuel Montagu and Company, and the Union Bank of Switzerland, and Mocatta and Goldsmid. The syndicate's function is to eliminate competition between the member firms in the purchase of gold; it does not rule out sales competition. It is not a legal entity although it has appointed purchasing agents in the major gold markets. The third group, of most importance to this report, is the Samuel Montagu and Company and the Union Bank of Switzerland consortium for the purpose of purchasing precious metals from the USSR.

Gold does arrive directly from the USSR without the aid of intermediaries. Consignments have been direct to the Moscow Narodnyy Bank in London, the correspondent agency of the Gosbank in Moscow, and then sold to the Bank of England for the Exchange Equalization Account. A shipment of gold was also received at the Union Bank of Switzerland direct from Prague.

Amsterdam plays an important role in Soviet sales of precious metals, notably gold. Most of the gold shipped has gone from Prague to Amsterdam by KLM (Royal Dutch Airlines). There the gold has been (1) immediately transshipped to its ultimate destination (2) retained for varying periods of time by banks of private gold traders in the Netherlands and then sold to various purchasers; (3) transformed in some manner (such as being recast to remove Soviet markings or converted to a more suitable form) before moving on to other markets; or (4) added to holdings within the Netherlands From Amsterdam much of the gold has gone to Paris, Zurich, London, or Tangier. Gold has also been shipped from Switzerland to Amsterdam and then to other markets.

In addition, gold has reportedly moved from Moscow to Leningrad to points in Scandinavia, where it has been transshipped to London.

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APPENDIX J

METHODOLOGY

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APPENDIX K

GAPS IN INTELLIGENCE

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APPENDIX L

SOURCE REFERENCES

materials gained from a series of personal interviews provided good background and filled some specific gaps. German and Japanese documents were fruitful sources on pre-war production, the latter providing excellent background material for Soviet Far Eastern gold production.

Evaluations, following the classification entry and designated "Eval.," have the following significance:

Source of Information	Information
Doc. - Documentary	1 - Confirmed by other sources
A - Completely reliable	2 - Probably true
B - Usually reliable	3 - Possibly true
C - Fairly reliable	4 - Doubtful
D - Not usually reliable	5 - Probably false
E - Not reliable	6 - Cannot be judged
F - Cannot be judged	

"Documentary" refers to original documents of foreign governments and organizations; copies or translations of such documents by a staff

officer, or information extracted from such documents by staff officer, all of which may carry the field evaluation "Documentary."

Evaluations not otherwise designated are those appearing on the cited document; those designated "RR" are by the author of this report. No "RR" evaluation is given when the author agrees with the evaluation on the cited document.

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