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ECONOMIC INTELLIGENCE REPORT

THE ECONOMY OF THE SOVIET BLOC
PRODUCTION TRENDS AND 1957 POTENTIAL

CIA/RR 23
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CENTRAL INTELLIGENCE AGENCY

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FOREWORD

The fundamental objective of this report is to estimate the economic position of the Soviet Bloc in 1957. The first four sections of the report, however, deal entirely with the USSR, and only the fifth, and last, section deals with the Soviet Bloc as a whole. There are several reasons for organizing this report in this way. In the first place, the USSR is the heart of Soviet Bloc economic activity, and Soviet production is by far the largest component of Soviet Bloc production of most commodities and services. In the second place, ORR research is more advanced for the USSR than for the Satellites. Primarily for this reason, estimates of production trends are less reliable for the Soviet Bloc than for the USSR, though not so much less reliable as to invalidate the major conclusions of this report. In the third place, historical trends for the Soviet Bloc are rather artificial. The Soviet Bloc as it now exists is a very recent creation. It is somewhat artificial to estimate historical trends even for the postwar period, since it involves the inclusion of data for Czechoslovakia and Communist China, although the former entered the Soviet Bloc only in 1948 and the latter only in 1949. It is also artificial to generalize the diverse trends in different countries into a unified pattern and to include with the well-established trends in the USSR the relatively more confused situation in the Satellite economies. This is not to say, however, that estimates of Soviet Bloc production trends are without meaning. Future Soviet Bloc trends, in particular, represent the development of what may for many purposes be considered to be a single integrated economy.

At the time the basic statistics were gathered and the analysis for this report was prepared, no change in the Soviet leadership was anticipated. Consequently, there is no provision in the estimate for alterations in fundamental economic trends which may result from this change. It must be assumed, therefore, that the new administration will not act so as to disrupt the economic trends described in this report.

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THE ECONOMY OF THE SOVIET BLOC: PRODUCTION TRENDS AND 1957 POTENTIAL*

Summary and Conclusions

From 1948 to 1951, gross national product of the USSR grew at an average annual rate of 10 to 11 percent, as compared with a rate of about 5 percent in the US. It is estimated that from 1951 to 1957 gross national product of the USSR will rise by 35 to 50 percent, or at an average annual rate of 5 to 7 percent, to a level nearly double the prewar level.

From 1951 to 1957 the Soviet policy of diverting an ever larger share of resources to investment and defense will continue, with consumption probably increasing by about one-quarter, investment by one-half to two-thirds, and resources allocated to military uses by at least three-quarters.

From 1948 to 1951, industrial output in the USSR rose by about 60 percent, an average annual rate of growth of about 17 percent as compared with a US industrial rate of growth of 4.5 percent. It is estimated that from 1951 to 1957 industrial output in the USSR will rise by nearly two-thirds, or at an average annual rate of 8 to 9 percent, to a level more than 2-1/2 times the 1948 level.

Defense production in the USSR increased from 1948 to 1951 at an accelerating rate until it comprised about one-fourth of the total Soviet industrial output in 1951. It is estimated that the value of defense production in 1957 will be about 230 billion rubles (1948 prices), probably the equivalent of between $16 billion and $32 billion. This value is about 2-3/4 times as great as the value of defense production in 1948 and more than one-third greater than in 1944, the peak war year for defense production.

If economic planning in the USSR is reoriented toward war mobilization, it is estimated that, by cutting investment and consumption, it would be possible to increase the value of Soviet defense

* This report contains information available as of 1 February 1953.

production in 1957 to about 725 billion rubles, or almost 60 percent of gross national product. This value is probably the equivalent of between $50 billion and $100 billion. It is about 4-1/4 times as great as Soviet military production in 1944, the wartime peak. It is estimated that agricultural output, which did not recover from war damage to equal the levels of the late 1930's until 1950, will further expand by about 15 to 25 percent between 1951 and 1957.

The pattern of total Soviet Bloc economic activity has conformed closely to postwar activity of the USSR, even though growth of the Satellite energy, agriculture, and consumer goods sectors has lagged behind Soviet growth in these sectors and the Satellite nonferrous metals sector has exceeded the Soviet.

The Soviet Bloc economy probably will experience a slightly slower economic expansion between 1951 and 1957 than will the economy of the USSR, reflecting both the greater limitations to Satellite development of agriculture and several industries and the Kremlin policy which concentrates Bloc military production in the USSR.

If economic planning in the Soviet Bloc is reoriented toward war mobilization, it is estimated that it would be possible to increase the value of Bloc defense production in 1957 to about 925 billion rubles, probably the equivalent of between $65 billion and $130 billion.

I. Postwar and Future Growth of the Soviet Economy.

Intensified industrialization of the USSR was begun with the introduction in 1928 of the first of the Five Year Plans. During the period of the first two Five Year Plans (1928-37), the average annual rate of growth for gross national product was nearly 7 percent,* a rate much higher than for all other major powers during the same period. Even the rapid growth in Japan prior to World War I did not exceed this rate, and neither the US nor Germany has ever maintained such a high rate for a comparable period. The last prewar year devoted primarily to industrial expansion was 1938. From then until World War II, defense considerations demanded an increasingly larger share of the country's resources. As defense outlays mushroomed,

* Growth rates are calculated on a compound basis.

investment activities were curtailed, and industrial expansion nearly ceased (see Appendix A, Chart 3). Following the German invasion, losses of territory and destruction from war drastically reduced industrial and agricultural output. By 1944, gross national product was only 70 percent of the 1940 level.

A. Postwar Era.

The postwar recovery of the Soviet economy was rapid. By 1948, prewar levels had been regained, and, by 1951, gross national product was about one-third* greater than in 1948. During this 3-year period, while Soviet gross national product was growing at an average annual rate of 10 to 11 percent, US gross national product was growing at a rate of about 5 percent.

The high postwar rate of growth in the USSR has been the result of a number of factors, including the following:

1. The intensity and direction of investment have been planned to promote rapid industrial expansion. In 1948 the USSR was devoting about 24 percent of its gross national product to gross investment.** By 1951 the investment share had risen to about 27 percent. In contrast, gross investment in the US accounted for only about 20 percent of gross national product in both 1948 and 1951. Moreover, because of the differences in the stock and age structure of capital in the two countries, a much larger portion represents net investment in the USSR than in the US. The Soviet pattern of investment emphasizes producer goods industries, particularly the metals and metal products industries, whereas in the US a larger proportion of investment is made in consumer goods industries, housing, and public works.

2. During the war years, priority was given to expansion of metals production in the Urals and West Siberia. When the

* Statistics relating to the postwar era are ORR estimates (in some cases taken from Rand Corporation studies) and are subject to errors discussed in Appendixes B and C. For comparison of ORR estimates with official results of Soviet Plan fulfillment in 1952, see Appendix F.

** Gross investment includes capital replacement as well as net increases in capital.

metallurgical plants in areas occupied by the Germans were recovered and reconstructed, the Russians possessed a ferrous and nonferrous production capacity far larger than prewar capacity.

3. The USSR received substantial amounts of industrial plant and equipment in the form of war booty and reparations.

4. Aid received from the US and the UK provided the USSR with prototypes embodying the most advanced Western technical developments.

5. Vocational and professional training has been heavily stressed with resulting benefit to productivity. The skilled labor force* increased by about 30 percent from 1948 through 1951, although the total population rose by only about 5 percent.

B. Prospects for Future Expansion: 1957.

It is estimated that in the 6 years from 1951 to 1957 gross national product of the USSR will rise by 35 to 50 percent, or nearly to double the prewar (and 1948) level. On the basis of this projection, the average annual rate of growth would be about 5 to 7 percent as contrasted with 10 to 11 percent for the period 1948-51. In comparison with the expected annual rate of growth of about 3 percent** for the US, however, the Soviet rate will remain remarkably high. The projected annual rate of growth for the USSR is slightly less than that for the entire period from 1928 through 1940.

Among the explanations for the anticipated decline in the growth rate are the following:

1. The windfall factors inherited from World War II are no longer present, the flow of reparations has been moderated, the

* Defined as labor given special vocational training and possessing higher qualifications. For a breakdown of the labor force, see Appendix E, Table 4.

** See US Department of Commerce, Markets after the Defense Expansion, 1952; also the President's Materials Policy Commission, Resources for Freedom, 1952. All estimates of future US economic activity presented in this report are ORR estimates based upon trends predicted in these two documents.

effect of the wartime-enlarged metals base has been realized, the skilled labor force is increasing at a more moderate rate, and the benefits from borrowed technology are diminishing.

2. In agriculture and in many branches of industry, annual growth probably will, on the average, be constant in absolute terms; hence, as the base becomes larger, the percentage rate will fall.

3. As an economy matures, the marginal productivity of investment outlays can be expected to decline. In addition, a larger proportion of investment outlays must be used for capital replacement.

4. Since annual increments to the unskilled labor force have been large in the past and the reserve of unemployed individuals has declined to relatively small proportions, annual increments in the unskilled labor force probably will fall off during the period 1951-57.

Even though factors contributing to high rates of growth are no longer present, the willingness of the Soviet leadership to devote a large, and annually increasing, proportion of Soviet resources to investment purposes should sustain growth rates higher than those of Western economies.

C. Trends in Composition of Gross National Product.

Gross national product is generally expressed in terms of either origin or use. In the first case, gross national product is broken down by sector of origin, such as industry, agriculture, transportation, construction, or services; and in the second case, it is broken down into its final uses, such as consumption, investment, defense, and government administration. These breakdowns represent opposite sides of the same coin and analyze the same aggregate figure.

Changes over time in the relative shares of gross national product originating in different sectors provide a rough guide to changes in the structure of the Soviet economy. Percentage breakdowns of gross national product by origin are shown in Chart 1.* The changes in structure reflect the generally increasing Soviet industrialization.

* Following p. 6.

The breakdown of Soviet gross national product by final use, shown in Chart 2,* provides indications of broad economic intentions and shifts of emphasis over time. Although gross national product in 1948 was approximately at the same level as in 1940, drastic changes had taken place in the use pattern. Particularly striking was the relative diversion of resources from consumption into investment channels. Consumption had fallen from about 65 percent to about 58 percent of gross national product, and gross investment had increased from about 16 percent to about 24 percent.

Even with a large increase in the US defense sector by 1951, the consumer share of gross national product was much larger in the US than in the USSR. Both defense and investment accounted for considerably smaller shares in the US than in the USSR. The small share of Soviet gross national product allotted to consumption indicates the willingness and ability of an authoritarian government simultaneously to improve its military position and to expand its productive potential at the cost of depressed living levels for its citizenry. The contrast between US and Soviet practice is even more sharply illustrated in absolute terms, since the US gross national product in 1951 was probably three to four times Soviet gross national product.

During the period 1951-57 the Soviet policy of diverting an ever larger share of resources to investment and defense will continue, though at a decelerated pace. Consumption probably will increase by about one-quarter over 1951, investment by one-half to two-thirds, and resources allocated to military uses by at least three-quarters.

II. Soviet Industry.

A. Postwar and Future Growth.

1. Postwar.

During the 3-1/2 years following the end of World War II, industrial activity in the USSR was devoted primarily to restoration of facilities and to recovery from the low production levels of the war years. As might be expected in such circumstances, industrial expansion was rapid. By 1948, aggregate industrial output had regained its 1940 level (see Appendix A, Chart 3). The degree of

* Following p. 6.

CHART 1

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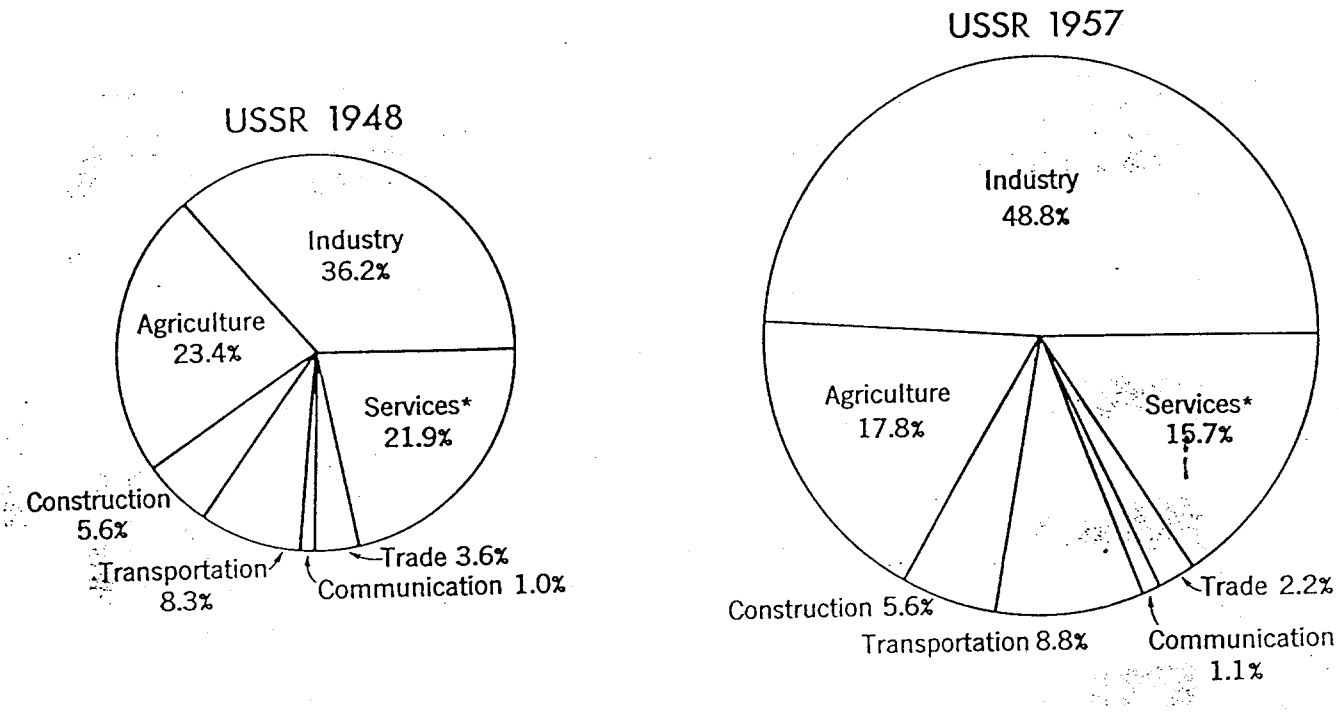
GROSS NATIONAL PRODUCT BY SECTOR OF ORIGIN, US AND USSR



*Services comprise social services, personal services, military services and government administration.

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CHART 2

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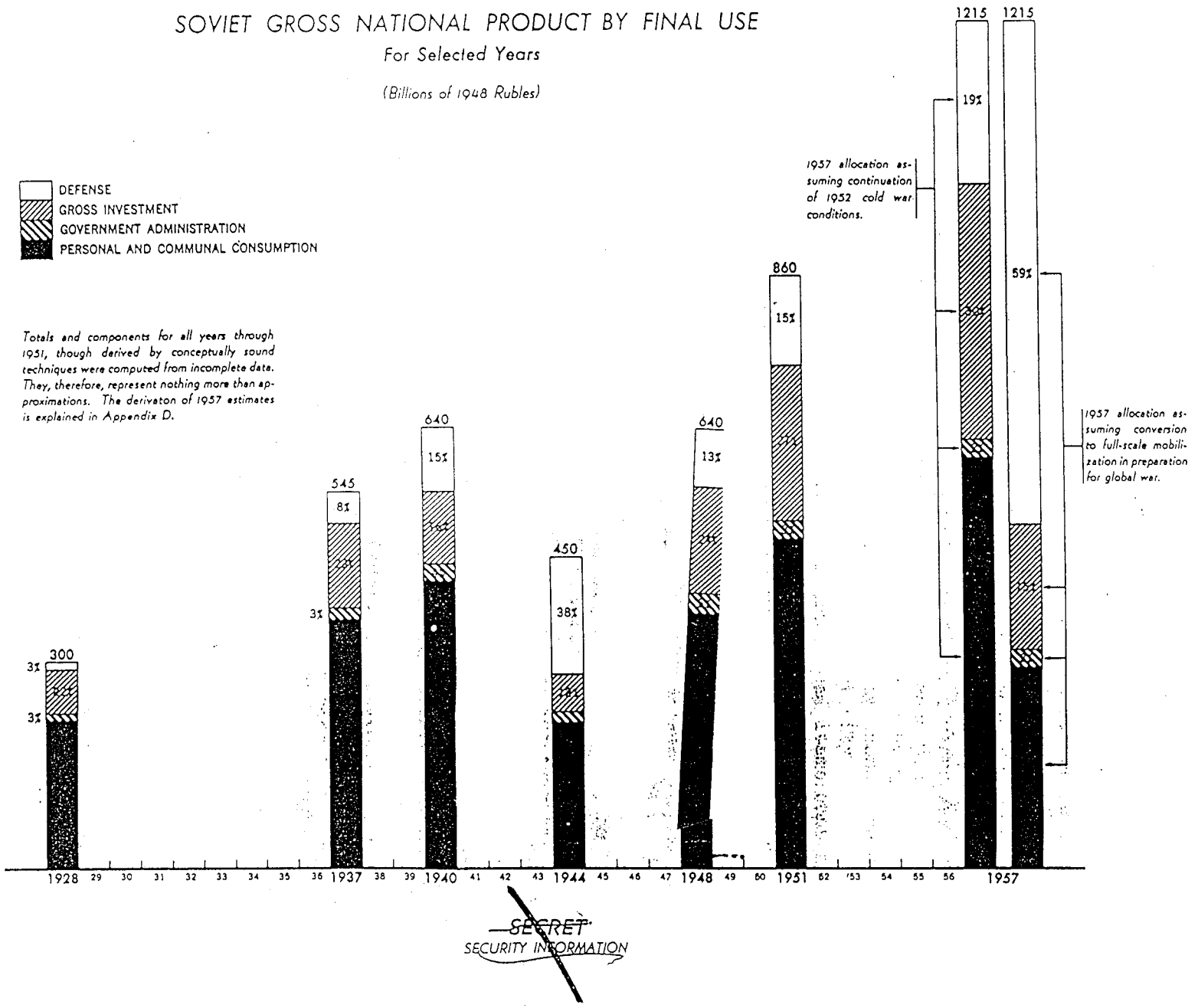
SOVIET GROSS NATIONAL PRODUCT BY FINAL USE

For Selected Years

(Billions of 1948 Rubles)



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recovery was by no means uniform for all sectors. Whereas production of producer goods in 1948 was about 4 percent above its prewar level, production of consumer goods was about 13 percent below prewar.

Industrial output rose by almost 60 percent from 1948 to 1951. The average annual rate of growth for these 3 years was about 17 percent. Although the growth rate declined each year after 1948, it was still high in 1951 (about 14 percent) by most standards of comparison. During this period the average annual rate of US industrial growth was 4.5 percent. The high priority assigned in the USSR to producer goods and military end items continued. Production of producer goods increased by about 56 percent, to a level about three-quarters higher than prewar; military end items by about 93 percent, to a level two-thirds higher than prewar; and consumer goods by about 36 percent, to a level about one-fifth higher than prewar.

2. Prospects for Future Expansion.

It is estimated that industrial output in 1957 will be nearly two-thirds greater than in 1951. This would be more than 2-1/2 times industrial output in 1948. The decline in the rate of industrial growth which appeared following 1948 probably will continue in the 6 years after 1951. For the latter period the average annual rate of growth of industrial production is estimated at 8 to 9 percent, falling from about 10 percent in 1952 to about 7 percent in 1957. This estimated rate would be slightly higher than the average for the entire span of 1928-51, although much lower than the 17 percent average for the 1948-51 period. The effects of many of the same factors and forces which reduced the annual rate of growth from 19 percent in 1949 to about 14 percent in 1951 will continue, though with reduced impact, to lower the growth throughout the period of this estimate.*

The differential pattern of growth rates projected for the period 1951-57 does not differ markedly in structure or in degree from the pattern of the postwar period. Industry will grow more rapidly than agriculture. Within industry the previous priority

* These estimates are believed to be accurate within 1 percentile. For example, the 8.5-percent average is probably no greater than 9.5 percent and no less than 7.5 percent.

given to producer goods and military end items probably will be retained. Although production in these categories probably will increase by about two-thirds and nine-tenths, respectively, production of consumer goods probably will rise by only one-third.

B. Producer Goods and Services.

1. Pattern of Growth.

The pattern of growth rates within the producer goods sector is changing. In the periods before and after World War II, production of machinery and equipment grew at a faster rate than the output of energy and basic metals. This relationship probably will be reversed in the years following 1951. The prewar pattern was normal for a maturing industrial economy, and, in the early postwar period, machinery and equipment were required for restoration of industry. The future emphasis, however, probably will be on expanding metals production, particularly production of aluminum for aircraft and of steel for military use.

2. Energy Industries.

Energy output expanded steadily in the prewar period (see Appendix A, Chart 4). After the war the expansion was resumed. By 1948, energy output was about 12 percent above prewar, and in 1951 it was about 42 percent above the 1948 level. During these postwar years the annual rate of growth was about 12 to 13 percent. This rate is more than double the US rate for the same period, although absolute levels of energy output are still several times higher in the US than in the USSR.

Between 1951 and 1957, energy output is likely to increase by 65 to 70 percent, a growth more than twice that predicted for the US. In the USSR as in the US, the largest gains will be in petroleum and electric power. These estimates assume that Plan goals will be fulfilled, that new oil fields will be developed, that new refinery capacity will be completed, and that the large hydroelectric stations under construction will be opened on schedule.

3. Minerals and Metals Industries

Production of minerals and metals, in addition to output of the energy industries, is generally recognized to be an indicator of an economy's basic industrial progress. If this criterion is used, the growth of Soviet industry has been impressive (see Appendix A, Chart 5). Production of ferrous metals in 1951 was seven times production in 1928 (see Appendix A, Chart 6); and the nonferrous industry, which started from a smaller base, has developed even more rapidly (see Appendix A, Chart 7).

By 1948, production of the metals industries exceeded prewar peaks. From 1948 to 1951, production of ferrous metals increased by about 61 percent and production of nonferrous metals by about 33 percent. These rates of growth are both approximately 2-1/2 times the rates for the same industries in the US during the period.

Rapid growth of the metals industries will continue through 1957. Production of ferrous metals is likely to increase an additional 55 to 65 percent above 1951 levels, and production of nonferrous metals, an additional 80 to 90 percent, with 1957 output in both industries being approximately 150 percent higher than in 1948.

If these estimates are correct, in 1957 the US superiority over the USSR in output of metals, although still large, will have been at least relatively reduced. For example, US steel production in 1951 was 3.1 times Soviet production, whereas US production in 1957 will probably be only 2 to 2-1/2 times Soviet production.

4. Machinery and Equipment Industries

Prewar growth of the Soviet machinery and equipment industries (see Appendix A, Chart 8) was much more rapid than general industrial growth. Nevertheless, throughout this period, there was a heavy reliance on imports to supplement Soviet output. Postwar growth was also rapid. By 1948, output was 28 percent above the prewar peak, and in the three subsequent years it increased another 89 percent.

Growth of the industries between 1951 and 1957 is estimated at a significantly slower rate than for the postwar period before 1951. Production of automotive equipment, railway equipment, and ships (see Appendix A, Charts 9, 10, and 11) will nearly level off during this period as inventories of these items become sufficient for the economy's requirements. Only the metalworking machinery, machine tools, electrical machinery, and electronic equipment industries (see Appendix A, Charts 12 and 13) are expected to grow at rates significantly higher than the general advance as a consequence of increasing defense requirements and perhaps also of Satellite industrial requirements.

5. Chemicals Industry.

The chemicals industry (see Appendix A, Chart 14) is another Soviet industry whose production grew rapidly as the economy matured. In 1948, the benchmark year for industrial recovery from the war, production of chemicals exceeded its prewar peak output by about 25 percent and, in the three subsequent years, increased an additional 74 percent.

The chemicals boom will continue, with growth from 1951 to 1957 estimated at 90 to 100 percent. That this rate is one-half again as high as the rate of general industrial growth is probably explained in part by increasing military uses for chemicals.

6. Forest Products and Construction Material Industries.

Both the forest products and the construction materials industries were among the most important industries existing when the First Five Year Plan (1928-32) was begun. From 1928 to 1951, a year in which production was still below the prewar peak, the forest products industry was the most backward among all Soviet industries (see Appendix A, Chart 15). The slowness in growth reflects the consistent failure, the causes of which are not known, to meet Plan goals and the conversion of the economy to other types of building materials. Its estimated growth from 1951 to 1957 is one of the lowest in the economy.

Advance in output of construction materials was large during the 1930's until in 1938 the armaments program reversed the trend (see Appendix A, Chart 16). Postwar growth was rapid, with output about 41 percent higher in 1951 than in 1948. Estimated

1957 output is 75 to 85 percent above 1951, reflecting the belief that a vast construction program will be continued.

C. Transportation and Communications.

In the period of prewar industrial expansion the value of Soviet rail and water freight traffic (see Appendix A, Chart 17) increased severalfold, at a rate faster than the general industrial rate of increase. It was an era of extensive railway construction. After the war, restoration of service was rapid, even though damage to transportation facilities had been extensive. The value of freight carried in 1948 exceeded the value of the prewar peak year by about 9 percent.

The increase of approximately 50 percent in the following 3 years was slightly lower than the general industrial increase. During the period 1951-57 a further increase of about 33 to 40 percent is estimated. That this rate of increase is about one-half the estimated rate for general industrial expansion during the period probably indicates (1) that rail and water facilities are now adequate for industrial requirements; (2) that internal transportation will not constitute a restriction to industrial growth (otherwise, planned expansion of freight haulage would be higher); and (3) that there will be an increase in freighting by truck.

The communications industry (see Appendix A, Chart 18), which accounts for about 1 percent of gross national product, has expanded since 1927 at rates parallel to the rates of general industrial expansion. Expansion from 1951 to 1957 is estimated at 50 to 60 percent, a rate again parallel to the rate of general expansion.

D. Consumer Goods.

Output of Soviet consumer goods* was not much larger in 1948 than it had been in 1928 (see Appendix A, Chart 3). This slowness in

* Changes in the level of output of consumer goods should not be equated with changes in the standard of living, even though the former is a large component of the latter. Other components, such as housing, medical service, education, working conditions and hours, and household services, also greatly influence living standard measurements. Since research by ORR on these elements is inadequate, no estimates on living standards can be formulated.

growth resulted not only from economic planning that emphasized investment and military output regardless of poor living standards but also from the close relationship of agricultural to consumer goods output. Although low as compared with other industrial goals, Plan goals for consumer goods were consistently underfulfilled. As shortages of input items arose, the consumer goods industries were the first to be denied their requirements. Chaos in agriculture during the First and Second Five Year Plans also had a depressing effect on output of consumer goods. At the low point in 1933, output of processed foods was about one-half what it had been in 1928, though by 1938 it had virtually recovered to 1928 levels (see Appendix A, Chart 19). Because output of industrial crops improved in the prewar period (contrary to trends in food crops), output of the light and textile industry (producers of such goods as textiles, textile products, and boots and shoes) increased steadily until 1940, when it was about 88 percent above the 1928 level (see Appendix A, Chart 20).

Restoration of the output of consumer goods immediately after the war was retarded by the poor recovery of agriculture. Thereafter, in the years from 1948 through 1951 -- all good crop years -- significant gains were displayed. Food processing in 1951 had nearly recovered its 1927-28 level, and output of textiles and footwear was about 27 percent higher than in the prewar peak year of 1940.

It is estimated that output of processed foods will rise between 1951 and 1957 by about one-third and apparel and footwear also by about one-third.* Judged by past performance in this sector of the economy, these are rapid rises. If these rises are achieved, this period will be the first in which per capita consumption of consumer goods will have risen substantially above 1928 levels.

III. Soviet Defense Industries.

A. Past Trends in Production.

The production of Soviet defense industries** does not exhibit the secular growth trends evident in other Soviet industries.

* For a discussion of the difficulties in estimating growth of output of goods, see Appendix D, Section 5.

** By the expression "production of defense industries" is meant the products of the economy flowing from industrial facilities to the

Instead, its fluctuations have reflected changes in external political relations of the USSR and assessment by the Kremlin of the likelihood of Soviet involvement in hostilities. In 1927 the defense industries were almost nonexistent. Even with a sevenfold increase in 10 years, defense production in 1937 was only about one-eighth of total industrial production. In the next 3 years the Kremlin prepared for the forthcoming war, and defense production more than doubled. This achievement was made possible by reallocating resources away from investment and consumption (see Chart 2*). In 1940, defense production accounted for almost one-quarter of total industrial output.

Despite territorial losses and the destruction of war, defense production in 1944 was about 78 percent higher than in 1940, when more than one-half of total Soviet industrial activity was being channeled into output of military end items. As total industrial output had fallen to about 79 percent of the prewar level, the diversion of resources to defense production was even more remarkable.

Demobilization of industry after the war was never so complete in the USSR as in the other major powers. Contrary to trends elsewhere, Soviet defense production is believed to have expanded from 1946 to 1948.** In the three subsequent years, defense production is estimated to have increased at an accelerating rate as follows: 21 percent in 1949, 22 percent in 1950, and 30 percent in 1951. The larger increase in 1951, when one-quarter of total industrial output consisted of defense production, reflects the Soviet reaction to the outbreak of hostilities in Korea.

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armed forces. If, for instance, a particular plant produces both tanks and tractors, that portion of the plant designed for tank production is (by this definition) part of defense industry, and the rest of it is a part of the automotive equipment industry.

* Following p. 6, above.

** An independent index of military production has not been computed for most years prior to 1947. However, the ORR index of industrial output, which excludes military production, moves at the same percentage rate as the official Soviet index of industrial output, which includes military production over the years 1946 through 1948. This identical movement implies that military production increased at the same percentage rate as other industrial output.

B. Prospects for Future Expansion: 1957.

It is estimated that Soviet defense production will be about 81 percent larger in 1957 than it was in 1951.* If this rate of output is achieved, the value of 1957 defense outlay (including services such as troop pay and manitenance, as well as production of military equipment) should be about 230 billion rubles (1948 prices), probably the equivalent of between $16 billion and $32 billion.** This value is about 2-3/4 times as great as the value of defense outlay in 1948 (measured in constant prices) and more than one-third greater than the value in 1944, the peak war year for defense outlay.

C. 1957 Potential.

Estimates of defense production and defense outlay presented in the preceding section and estimates of the future trends in economic activity presented in I and II, above, are based on an assumption that economic planning will continue to emphasize investment and improvement in living standards simultaneously with greater military production. Implicit in this assumption are the following additional assumptions: (1) that the Soviet Bloc countries will not engage in further peripheral wars during the period of this estimate and (2) that global war will neither break out nor be considered imminent by the Kremlin during the period of this estimate.

It is possible, however, that developments in the cold war might result in a reorientation of Soviet economic planning toward the maximum possible preparation for global war. If the Soviet economy should be mobilized for war, far greater defense production could be achieved than has been estimated. Drastic reductions in consumption and investment could make available additional resources for defense production.***

* The ORR estimate of 1957 defense production was derived by extrapolating the trends of Soviet defense expenditures from 1948 through 1951.

** To obtain dollar figures, it was assumed that the ruble-dollar ratio for valuing defense outlay is no smaller than 14 to 1 and no larger than 7 to 1 (figures rounded).

*** Gross national product would be affected by the difficulties of such a conversion. Curtailment of investment and dislocation during conversion would tend to reduce total output below levels which otherwise would be attained. On the other hand, new resources

It is estimated that both investment and consumption could be cut by one-half prior to the outbreak of a war.* Such cutbacks would release enough resources to increase the value of Soviet defense outlay to 725 billion rubles, or almost 60 percent of gross national product (see Chart 2**). This value is probably the equivalent of between $50 billion and $100 billion.*** It is about 4-1/4 times Soviet military outlay in 1944, the wartime peak.

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probably would be introduced into economic processes. These would include the following: retired workers, women, and school-age youths; idle war plants and equipment; and stockpiled materials and capital equipment. It is impossible to evaluate accurately the net results of such changes. However, in calculating the maximum resources available for military purposes, analysis is greatly simplified, and the likelihood of error is not substantially increased if it is assumed that these two effects would offset each other: that is, that gross national product in 1957 would be about the same as predicted in I, above.

* Although consumption in time of war might be reduced to near-starvation levels, there is little chance it would be reduced more than 50 percent prior to the onset of hostilities. With a 50-percent reduction, output of consumer goods and services in the USSR would fall to about the 1948 level, although, because of population increases, per capita consumption would be lower than in 1948. Whether reduction in investment would be extensive would depend on war strategy. In general, the shorter the length of the anticipated war and the smaller the anticipated destruction of Soviet industrial facilities, the larger the reduction in total investment would be during the period of preparation. If a war of less than 2 or 3 years' duration were estimated, production of most producer goods could be reduced to a small fraction of normal, construction could be curtailed, and strategic stockpiles and working inventories reduced. Deferred replacement could be substantial. By such changes, total investment could be halved.

** Following p. 6, above. These figures represent at best an order of magnitude of maximum total availability of resources for military production at the end of the period of this estimate. It is highly improbable that the Kremlin would plan economic activity to realize this potential, for it would cause a subsequent deterioration in industry that would weaken the long-run power position of the USSR.

*** Compiled by the same conversion ratios used in the preceding section.

IV. Soviet Agriculture.

The agricultural sector has not shared in the rapid growth of the Soviet economy following 1927, and the value of agricultural output in recent years has fallen to less than one-quarter of gross national product (see Chart 1*).

A. Past Trends in Output.

Over the entire span of years from 1927 to 1951 there was almost no increase in agricultural output (see Appendix A, Chart 21). Until the mid-1930's, output was depressed by resistance to collectivization. Although there was improvement from the mid-1930's until the war, Plan goals were consistently underfulfilled. The only significant gains were made in industrial crops (a small part of total agriculture in the USSR), output of which in 1940 was 40 percent greater than in 1928.

Prior to 1948, postwar recovery was hampered by adverse weather and shortages of farm equipment. Not until 1950 did output equal the levels of the late 1930's. As in the prewar period, postwar Plan goals were not met, and the greatest achievements were in industrial crops.

B. Prospects for Future Expansion: 1957.

Within the period of this estimate, several major factors and forces will affect Soviet agricultural outputs in unpredictable ways, making it impossible to estimate agricultural output with confidence. The success of efforts to increase productivity through increased mechanization and greater use of fertilizers and irrigation is difficult to forecast. In addition, there is a possibility that institutional arrangements will be altered drastically, and the effects of such changes on output cannot be foreseen. For example, collective farms and the open markets for peasants' surplus produce may be eliminated.

The primary reason for believing that gains in agricultural output will be modest as compared with industrial output gains is that soil and climate impose severe limitations on development. The best areas were already intensively cultivated before the First

* Following p. 6, above.

Five Year Plan was inaugurated. The only lands not cultivated are of marginal utility. Yields per acre can be improved, but only gradually, with extensive use of fertilizers and expansion of irrigation facilities. Availability of feed will place a ceiling on the increase in livestock numbers.

The best possible estimate is that, aside from fluctuations resulting from weather, agricultural output will increase by about 15 to 25 percent between 1951 and 1957,* with larger gains in industrial crops than in food crops and livestock numbers.

V. Growth of the Economy of the Soviet Bloc.

A. Postwar and Future Trends.

Although existing estimates of gross national product for the Soviet Bloc economy** are of dubious reliability, it is possible, nevertheless, to estimate output trends in major sectors and to deduce that, in general, the behavior of Bloc economic activity has conformed to the postwar economic expansion in the USSR.*** From 1946 to 1951, Bloc output increased at a rate slightly lower than that of the USSR. Comparisons of sectors, moreover, reveal that growth of producer goods industries was more rapid in the Satellites than in the USSR, whereas the growth of agriculture and the consumer goods industries was slower.

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* See Appendix D, Section 5, for a discussion of the problems of extrapolating trends in agricultural output.

** The Soviet Bloc economy, as defined in this report, includes the present Eastern European members and Communist China beginning in 1946.

*** For two reasons, Soviet Bloc indexes tend to conform closely to Soviet indexes. First, for most commodities and branches, Soviet output is several times greater than Satellite output, and most Bloc indexes are therefore weighted heavily with Soviet output. Second, where Satellite data were insufficient to construct Bloc indexes -- the construction equipment, metalworking machinery, agricultural machinery, textile machinery, and defense industries -- it was assumed in constructing major sector indexes that Satellite growth was equal to Soviet growth.

The Soviet Bloc economy probably will experience a slower rate of economic expansion between 1951 and 1957 than will the economy of the USSR. This estimated difference reflects the limitations to further expansion of Satellite agriculture and consumer goods industries, an increasing emphasis on exploiting natural resources in the USSR, and the rapid expansion of defense production in the USSR.

B. Sector Trends.

Soviet Bloc industry has expanded at about the same rate as Soviet industry during the postwar period. In 1951, Bloc industrial output was about 61 percent higher than in 1948, whereas Bloc agriculture expanded at a rate significantly slower than the Soviet rate. Within industry the Bloc pattern of growth differed in several significant respects from the pattern of Soviet growth. From 1951 to 1957, further changes in patterns of development are estimated. The most significant elements among these Bloc-Soviet differences are reviewed in the following paragraphs.

1. Satellite output of producer goods grew more rapidly than postwar output in the USSR. This may be explained as an aspect of reorganization along lines of Soviet-type planning. Soviet Bloc output of producer goods increased by about 65 percent from 1948 to 1951, whereas the Soviet increase was about 56 percent. The higher Satellite rate of growth reflects a rapid expansion of the smaller Satellite industrial base as it existed in 1948. Output of the Bloc capital goods industry will increase by an estimated 55 to 70 percent from 1951 to 1957, with the expansion of Soviet output of producer goods estimated at 50 to 65 percent.

2. Output of energy increased more slowly up to 1951 in the Satellites than in the USSR, a trend which will continue through 1957. Soviet Bloc output of energy increased by about 39 percent from 1948 to 1951 as compared with about 42 percent in the USSR. It is estimated that Bloc output of energy will increase by 40 to 45 percent between 1951 and 1952 as compared with an increase of 65 to 70 percent in the USSR.

3. The postwar trend of increasing Soviet dependence on the Satellites for tin, lead, zinc, and several of the other nonferrous minerals and metals probably will be reversed by 1957, if the Soviet industry meets its ambitious Plan goals. Soviet Bloc production of nonferrous metals increased by about 44 percent from 1948 to 1951

as compared with about 33 percent in the USSR and, by 1957, will have increased by an estimated additional 75 to 85 percent as compared with an increase of 80 to 90 percent predicted for the USSR.

4. During the postwar reorganization of the Satellite economies, growth of the machinery and equipment industries was significantly larger in the Satellites than in the USSR. From 1948 to 1951, Soviet Bloc output increased by about 98 percent as compared with about 89 percent in the USSR, and, by 1957, Bloc output will have increased by an estimated additional 50 to 60 percent as compared with an estimated 45 to 55 percent in the USSR.

5. Output of consumer goods has increased at a slower rate in the Satellites than in the USSR. Under Soviet control the relatively high proportion of production devoted to consumer goods in the Satellites has been cut back. The slow growth of Satellite agriculture, moreover, has precluded rapid expansion in the consumer goods industries. These trends probably will continue. Soviet Bloc output of consumer goods increased by about 23 percent from 1948 to 1951 as compared with a Soviet increase of about 36 percent, and it will increase by an estimated additional 25 to 30 percent by 1957 as compared with an estimated one-third increase in the USSR.

6. In the intensely cultivated European Satellites, there are only limited possibilities for increasing crop yields. Moreover, the postwar reorganization of agricultural life along lines of the Soviet model of the early 1930's has tended to disrupt Satellite agricultural output. In the postwar years, output of food crops failed to increase, and livestock numbers actually declined. In Communist China the backward state of agricultural technology and organization and the heavy pressure of population on land have limited increases in output. For all these reasons, agricultural gains in the Satellites were small in the postwar years, a period in which Soviet agriculture exhibited large gains. Soviet Bloc agricultural output increased by about 5 percent from 1948 to 1951 as compared with about 16 percent in the USSR, and it is estimated that Satellite output will increase by an additional 10 to 15 percent by 1957 as compared with 15 to 25 percent in the USSR.

C. Soviet Bloc Defense Industries.

Trends in Satellite defense production cannot be satisfactorily estimated. In this report it is assumed that defense production has

increased at the same rate in the Satellites as in the USSR and that it is a smaller component of total industrial production in the Satellites than in the USSR.

If, in 1957, Satellite consumption and investment were reduced by one-half during industrial mobilization for war -- reductions similar to those estimated for the USSR in III, above* -- it is estimated that resources valued at 250 million rubles would be released to Satellite defense production. Total Soviet Bloc defense production, under these assumptions, would be valued at 925 billion rubles, probably the equivalent of between $65 billion and $130 billion.**

* These figures represent at best an order of magnitude of maximum total availability of Soviet Bloc resources for defense production at the end of the period of this estimate. It is highly improbable that the Kremlin would plan economic activity to realize this potential, for it would cause a subsequent deterioration in industry that would weaken the long-run power position of the USSR.

** See III C, above, for a discussion of the conditions and problems of industrial mobilization for war.

APPENDIX A

PRODUCTION DATA: INDEX NUMBERS AND TREND GRAPHS

All the index time series presented in this report are incorporated into Table 1,* which gives index numbers for the USSR and the Soviet Bloc. Charts 3 through 21* portray graphically the same time series. Along with the many time series, production curves of a few key commodities have been graphed.

For comparative purposes, US data also have been plotted. In several industries it was necessary to forego comparisons, because US data in comparable units could not be obtained. No attempt has been made in this report to interpret the comparative economic positions of the US and the USSR or of the US and the Soviet Bloc. Projections of US trends from 1951 through 1957 are ORR estimates, though they conform to trends established in the President's Materials Policy Commission report, July 1952.

* Following p. 22.

TABLE 1

INDEXES OF PRODUCTION

(1948 = 100)

USSR

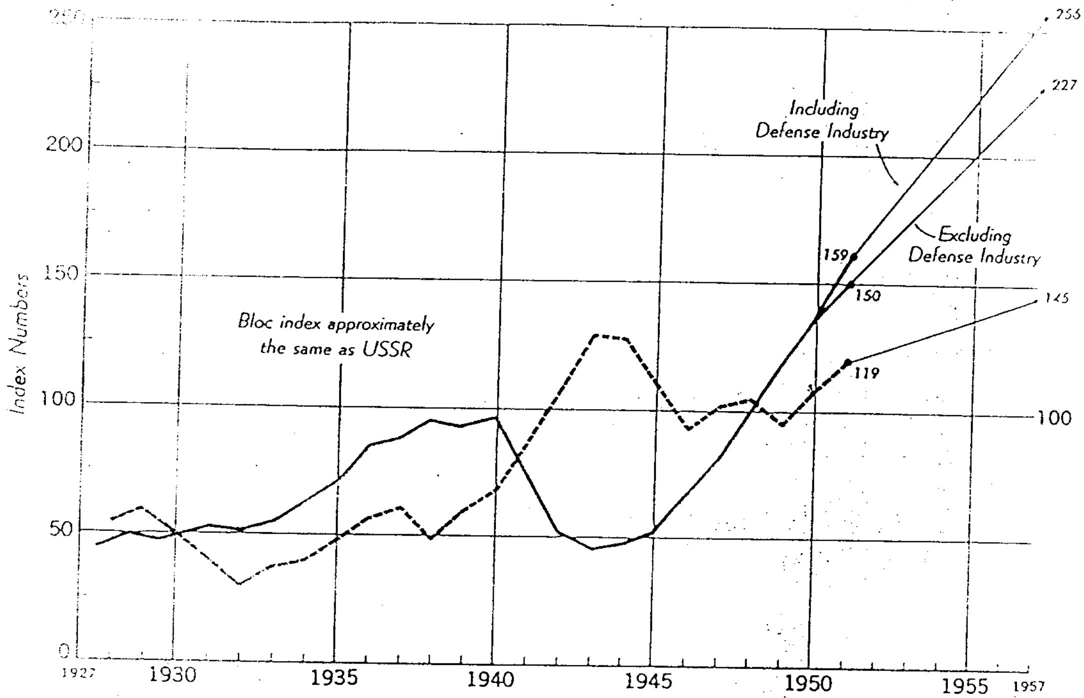
SOVIET BLOC

* Insufficient Data
† Insignificant Production

	1927-1928	1928-1929	1929-1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1957	1945	1947	1948	1949	1950	1951	1957
I MAJOR SECTORS																																
1 INDUSTRY**	44 37	49	49	52	51	55	63	72	86	89 82	95	93	97 101	76	52	46	47 80	53	68	81 81	100 100	119 119	137 139	160 159	227 256	70	80 80	100 100	120 120	140 141	156 141	231 252
A Producer Goods**	34 19	37	31	37	39	47	58	68	80	83 74	85	85	89 96	64	38	37	42 88	51	65	80 80	100 100	120 121	142 144	164 167	347 281	67	77 77	100 100	134 123	147 147	165 170	253 275
B Consumer Goods	86	95	85	88	84	72	75	80	98	103	116	112	115	101	80	65	56	58	73	84	100	115	126	136	185	80	90	100	107	116	123	159
2 AGRICULTURE	106	103	99	89	87	85	87	101	103	122	106	108	114	111	91	85	85	85	91	96	100	105	110	116	144	92	95	100	100	103	105	121
3 TRANSPORTATION	21	25	30	34	38	38	46	57	72	79	82	87	92	102	80	56	68	70	75	79	100	117	134	149	202	73	79	100	118	132	148	208
4 COMMUNICATIONS	18	22	28	35	42	41	39	43	60	66	63	67	70	74	58	58	58	68	82	91	100	110	120	132	203	89	96	100	106	115	123	168
** Figures in Bold Type Include Defense Industry; Other Figures Exclude Defense Industry.																																
II INDUSTRY																																
1 ENERGY	22	25	31	40	41	45	55	61	71	74	77	82	89	81	47	50	60	70	77	88	100	114	129	142	239	99	88	100	112	125	139	197
A Electric Power	8	10	13	17	21	26	33	41	51	57	62	68	75	78	82	87	92	68	74	86	100	118	141	162	321	75	87	100	116	136	156	295
B Solid Fuels	20	23	27	35	37	42	52	60	70	71	73	80	88	72	35	45	59	72	80	88	100	113	125	136	195	107	88	100	111	123	135	168
C P.O.L.	40	47	59	76	73	73	83	86	95	101	103	102	106	109	75	87	61	67	74	88	100	114	128	140	273	79	89	100	114	126	141	265
2 METALS	16	21	24	23	27	35	51	64	81	90	87	88	92	71	43	46	54	67	74	84	100	117	137	153	256	66	83	100	118	137	155	251
A Nonferrous	*	*	*	*	*	11	17	27	35	39	45	56	81	65	99	54	64	69	78	90	100	113	134	133	245	69	86	100	111	125	144	261
B Ferrous	22	29	33	32	37	44	64	78	98	95	103	100	104	73	37	43	51	66	72	82	100	119	142	161	260	68	82	100	120	140	158	249
3 MACHINERY & EQUIPMENT	11	13	18	24	34	43	50	68	78	78	70	89	88	38	9	12	18	26	42	65	100	136	173	189	256	42	64	100	139	176	198	307
A Shipbuilding	81	91	99	107	116	123	128	127	121	113	105	96	86	79	42	44	77	88	94	91	100	103	104	107	124	90	94	100	109	117	128	176
B Bearings	†	†	†	2	6	15	30	40	49	53	55	60	77	43	34	77	85	87	56	77	100	128	166	202	330	62	72	100	130	176	216	374
C Construction Equipment	†	†	†	†	3	4	11	17	23	20	20	19	16	17	*	*	*	*	10	35	100	150	192	202	385	*	*	*	*	*	*	*
D Automotive Equipment	1	2	5	18	30	50	64	81	97	91	93	80	69	37	15	19	29	34	48	64	100	138	178	191	234	45	64	100	137	177	195	244
E Electrical Machinery	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	25	42	66	100	136	164	183	228	42	68	100	136	167	189	326
F Electronic Equipment	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	17	49	70	100	127	167	204	445	49	70	100	132	170	211	447
G Railway Equipment	26	31	39	50	49	54	70	103	78	79	72	64	65	55	8	0	0	1	26	64	100	140	168	183	226	36	62	100	149	177	205	253
H Metalworking Machinery	2	3	3	6	7	17	30	37	44	50	57	63	70	54	27	32	36	52	68	84	100	116	132	147	317	*	*	*	*	*	*	*
I Agricultural Machinery	1	2	14	60	65	58	59	112	226	237	130	70	79	39	8	0	0	4	16	34	100	180	292	336	527	*	*	*	*	*	*	*
J Mining Machinery	†	2	4	10	12	19	20	24	19	32	45	43	42	*	*	*	*	37	47	78	100	115	171	133	205	47	78	100	112	125	142	215
K Textile Machinery	†	†	†	†	3	13	20	29	34	36	48	54	64	32	0	0	0	0	14	83	100	155	180	190	289	*	*	*	*	*	*	*
L Machine Tools	3	7	12	29	32	32	37	43	87	64	96	97	83	62	18	25	37	40	53	81	100	119	133	137	256	48	73	100	121	146	168	292
4 CHEMICALS	4	4	7	10	13	18	31	42	49	58	70	75	80	*	*	*	*	*	61	75	100	129	155	174	338	56	72	100	126	152	172	325
5 CONSTRUCTION MATERIALS	*	*	*	*	*	63	81	89	115	120	99	94	92	82	78	40	36	30	56	77	100	114	127	141	253	58	79	100	113	124	139	231
6 FORESTRY PRODUCTS	67	68	72	78	75	79	84	88	98	105	117	124	132	92	69	57	56	62	81	91	100	105	117	122	160	81	91	100	105	116	121	154
7 FOOD PROCESSING INDUSTRY	143	159	125	112	93	75	79	89	110	109	134	117	121	124	101	86	74	74	90	89	100	113	122	135	176	95	97	100	103	110	114	129
8 LIGHT & TEXTILE INDUSTRY	58	65	68	72	73	71	70	72	88	99	104	108	109	88	68	54	44	46	59	78	100	118	130	138	188	62	81	100	112	120	128	179
9 DEFENSE INDUSTRY	*	7	*	*	*	*	*	*	*	52	*	*	115	*	*	*	205	*	*	79	100	121	148	193	368	*	*	*	*	*	*	*
III AGRICULTURE																																
1 FOOD CROPS & LIVESTOCK	106	103	99	88	86	84	86	100	101	122	107	106	113	110	91	86	86	85	91	97	100	105	109	114	141	92	95	100	99	103	104	119
2 INDUSTRIAL CROPS	97	101	102	109	96	98	99	110	130	132	135	146	136	124	82	66	74	79	88	92	100	118	128	137	197	87	91	100	106	122	132	181

CHART 3

INDEX OF INDUSTRIAL PRODUCTION



Base Period: US, 1947-49 = 100
USSR, 1948 = 100

-------- US
— — — Bloc
———— USSR

... Index, see Appendix C

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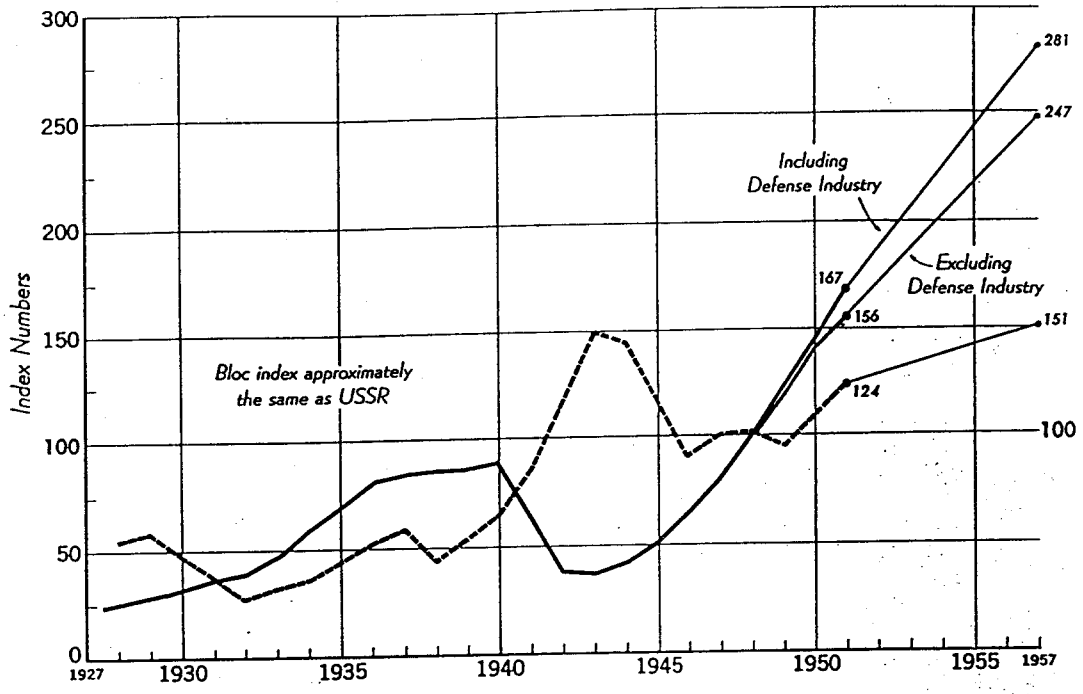
INDEX OF PRODUCER GOODS PRODUCTION



INDEX OF CONSUMER GOODS PRODUCTION

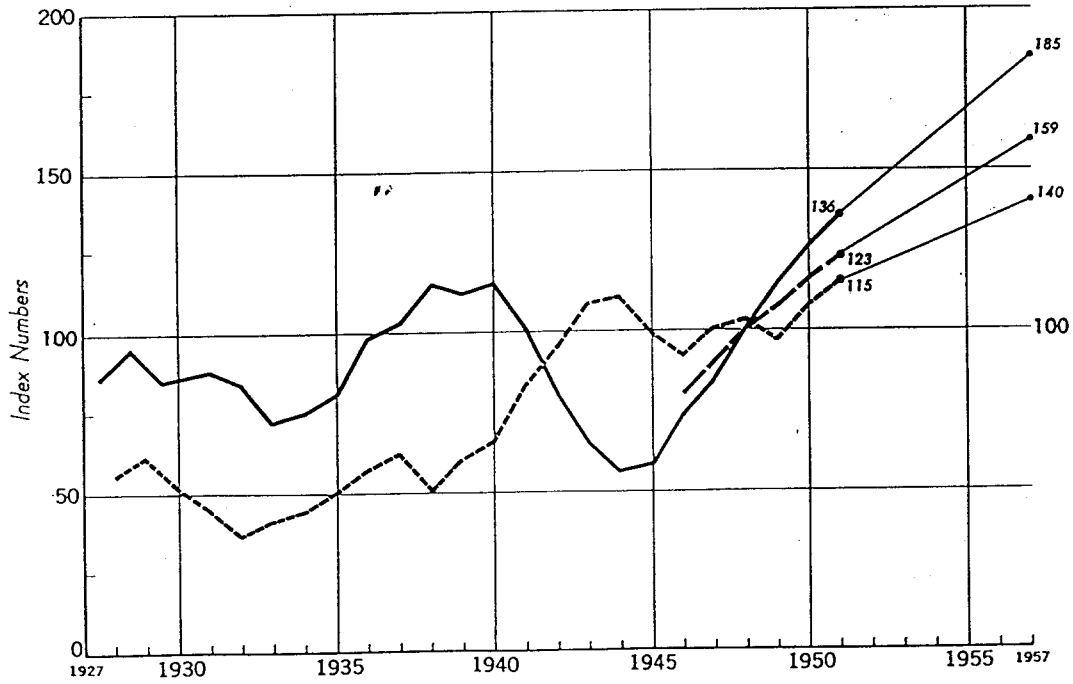
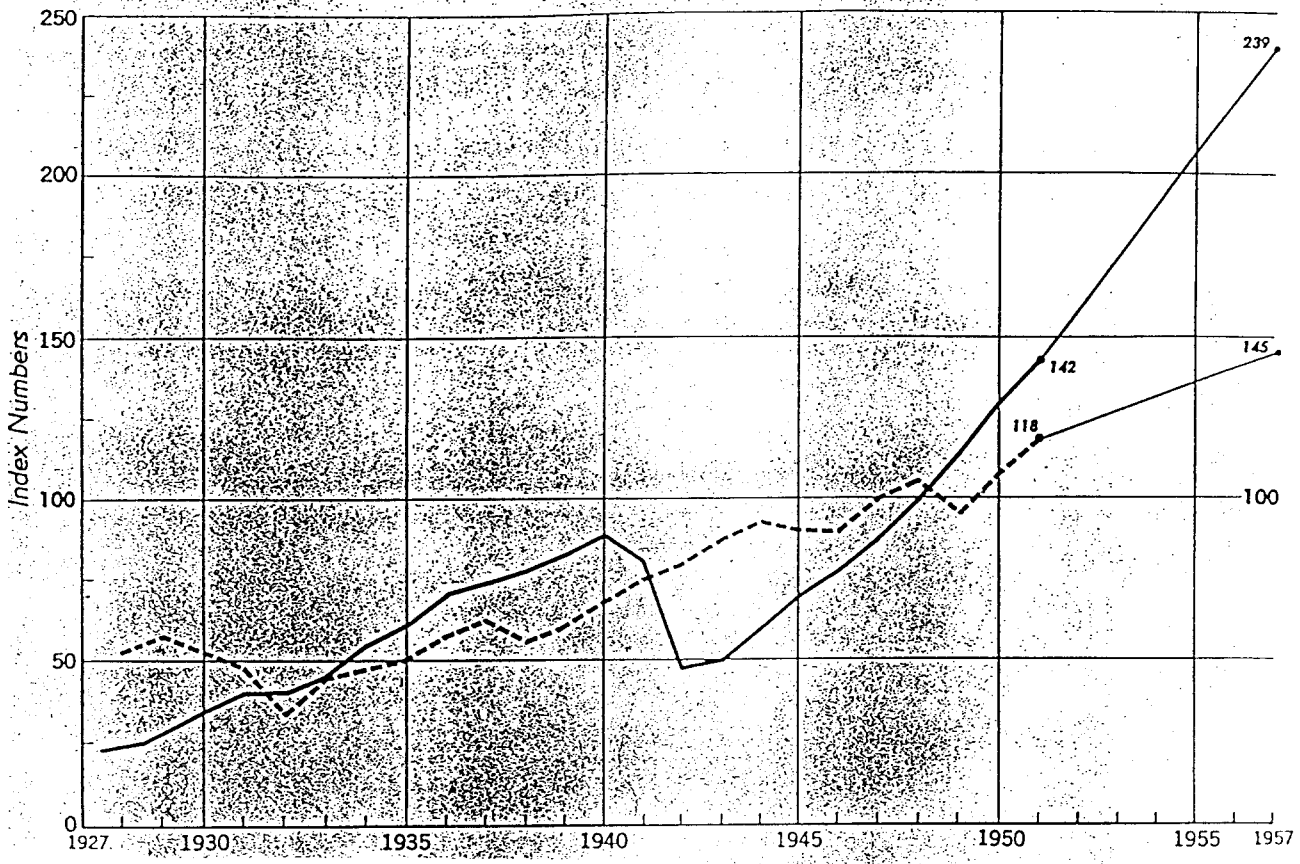


CHART 4

ENERGY

INDEX OF ENERGY PRODUCTION



Base Period: US, 1947-49 = 100
USSR, 1948 = 100

------- US

— — — Bloc

——— USSR

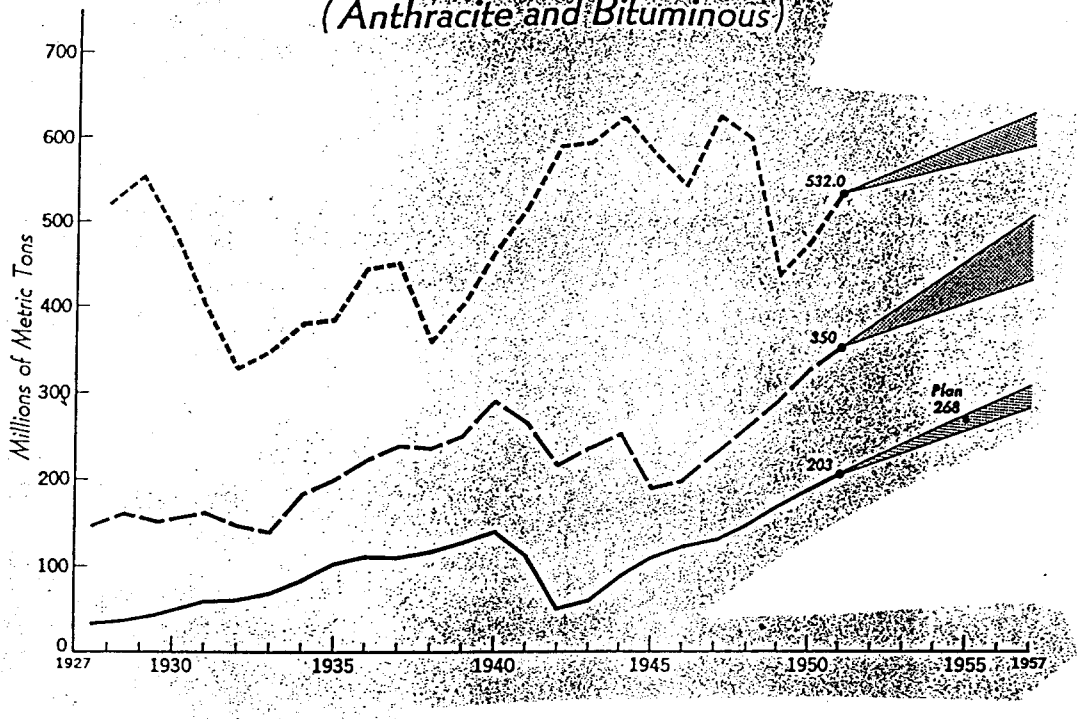
Range of probable production (ORR Estimates)

For components of Index, see Appendix C.

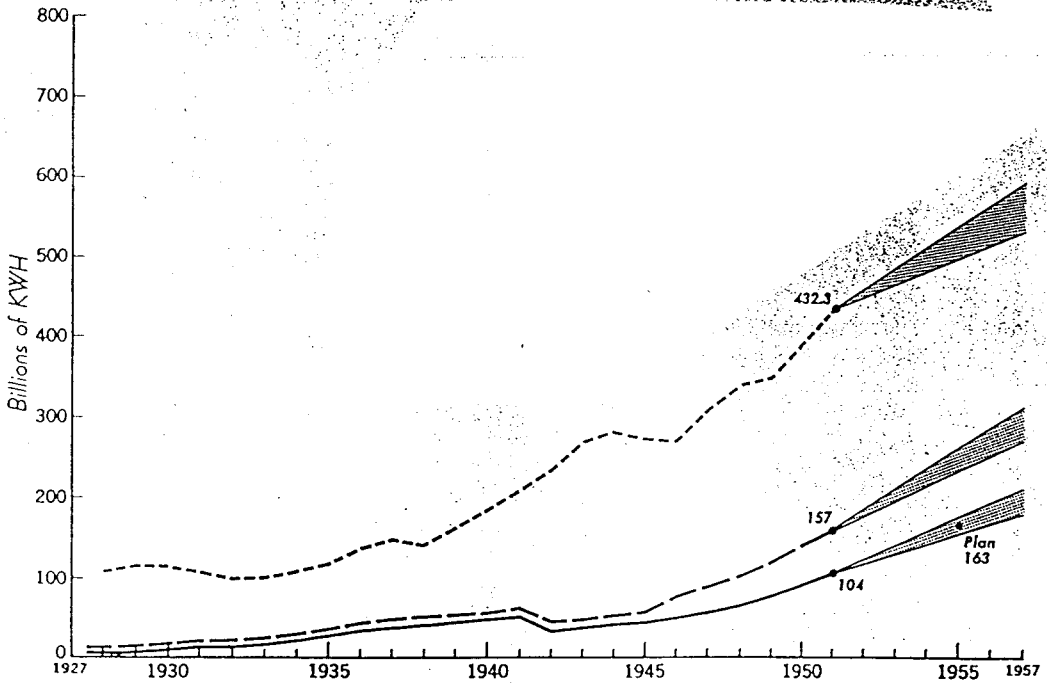
Index of Bloc production is not included because it is approximately the same as the index of USSR production.

SECRET
SECURITY INFORMATION

PRODUCTION OF COAL
(Anthracite and Bituminous)



PRODUCTION OF ELECTRIC POWER



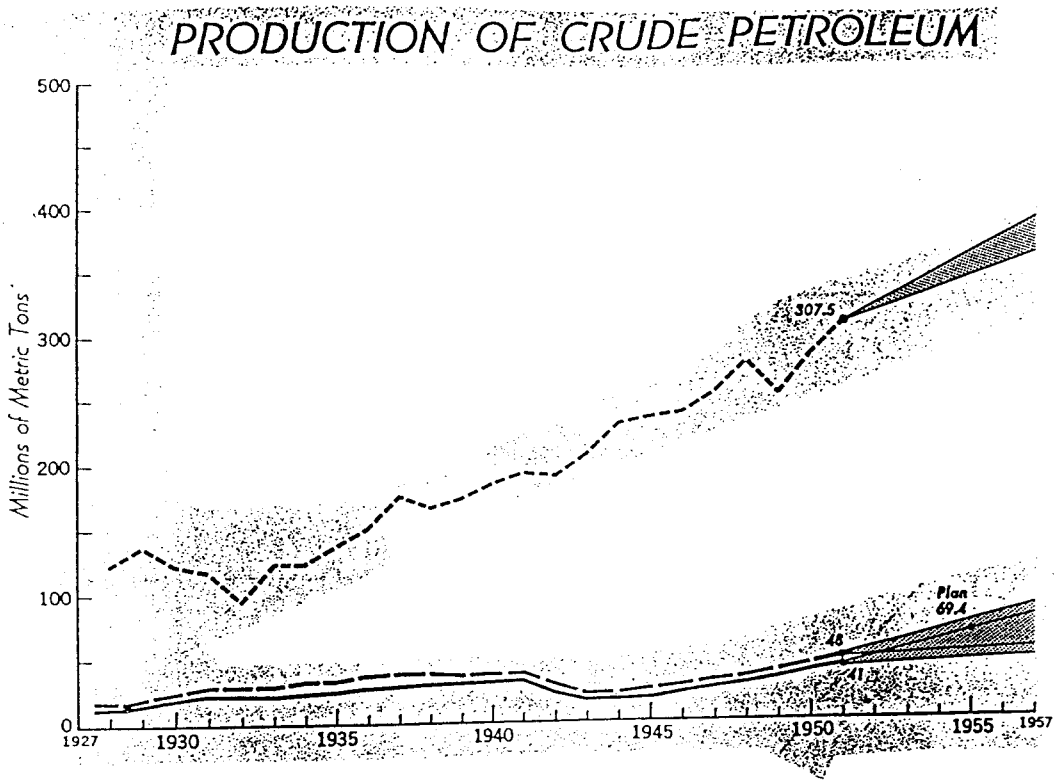

PRODUCTION OF CRUDE PETROLEUM
Millions of Metric Tons
500
400
300
200
100
0
1927
1930
1935
1940
1945
1950
1955
1957
307.5
Plan
69.4
48
41

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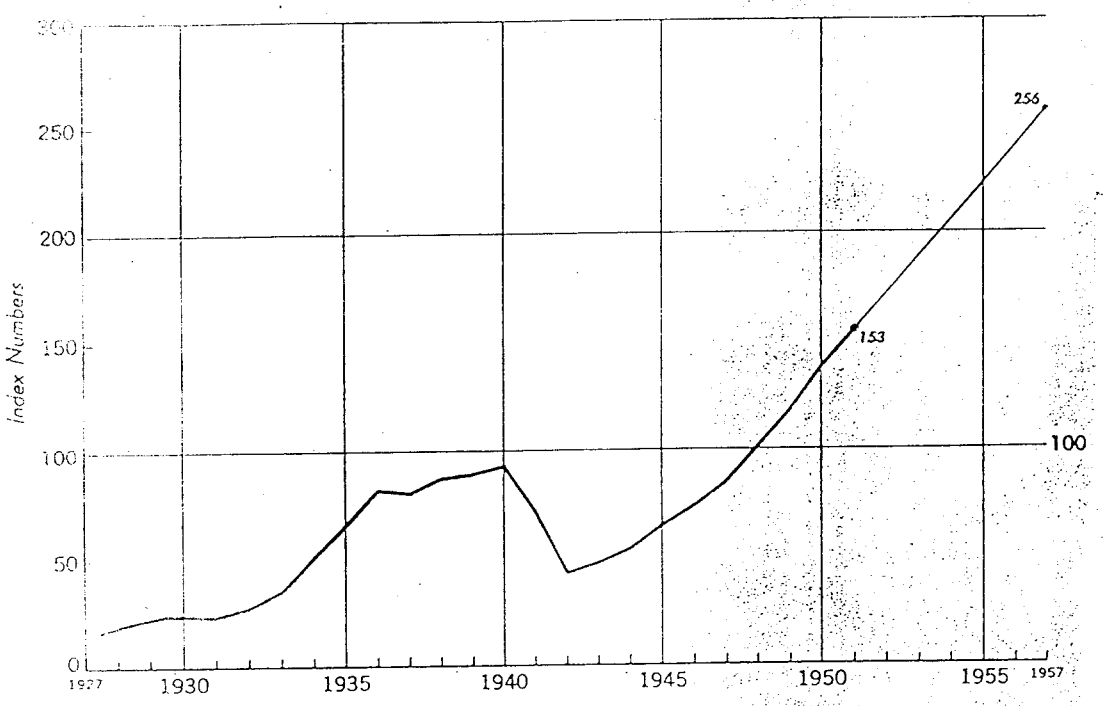
CHART 5

INDEX OF METALS PRODUCTION



Base Period: USSR, 1948=100

——— USSR

For components of Index, see Appendix C.

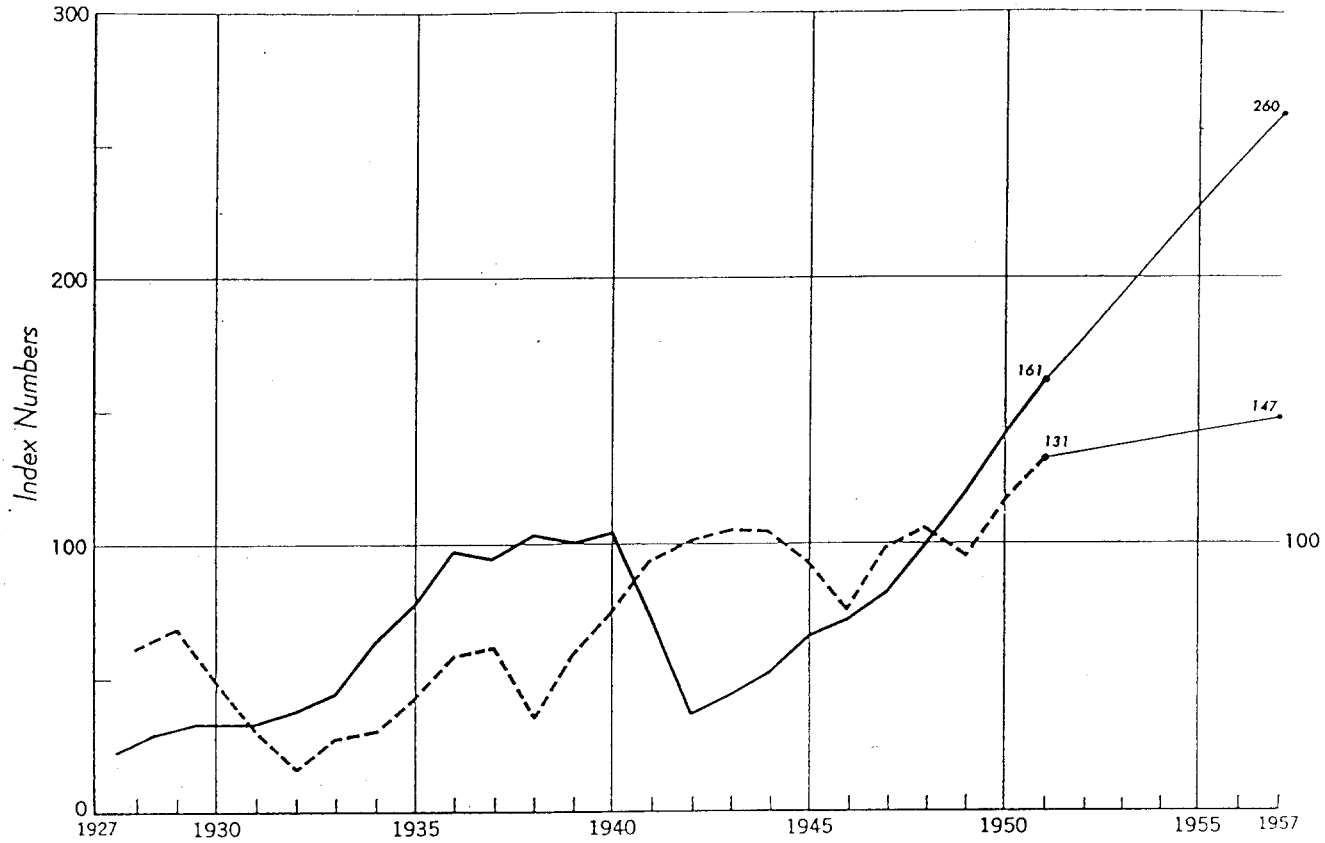
Index of Bloc production is not included because it is approximately the same as the index of USSR production.

Statistics not available for comparable US index.

CHART 6

FERROUS METALS INDUSTRY

INDEX OF FERROUS METALS PRODUCTION



Base Period: US, 1947-49 = 100
USSR, 1948 = 100

------- US

— — — Bloc

——— USSR

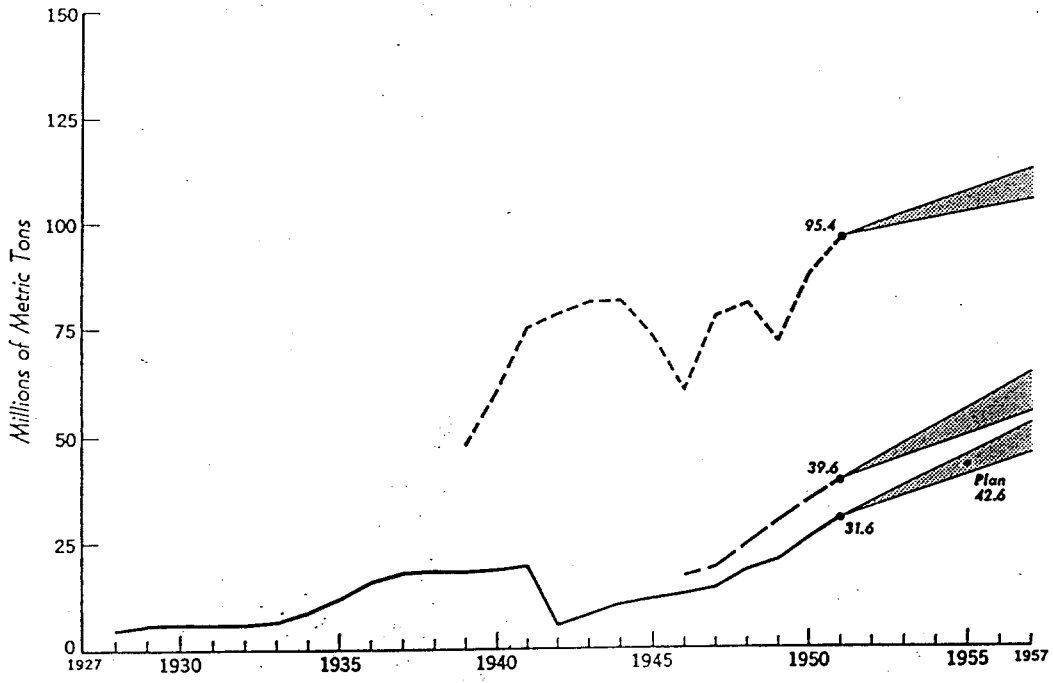
Range of probable production (ORR Estimates)

For components of Index, see Appendix C.

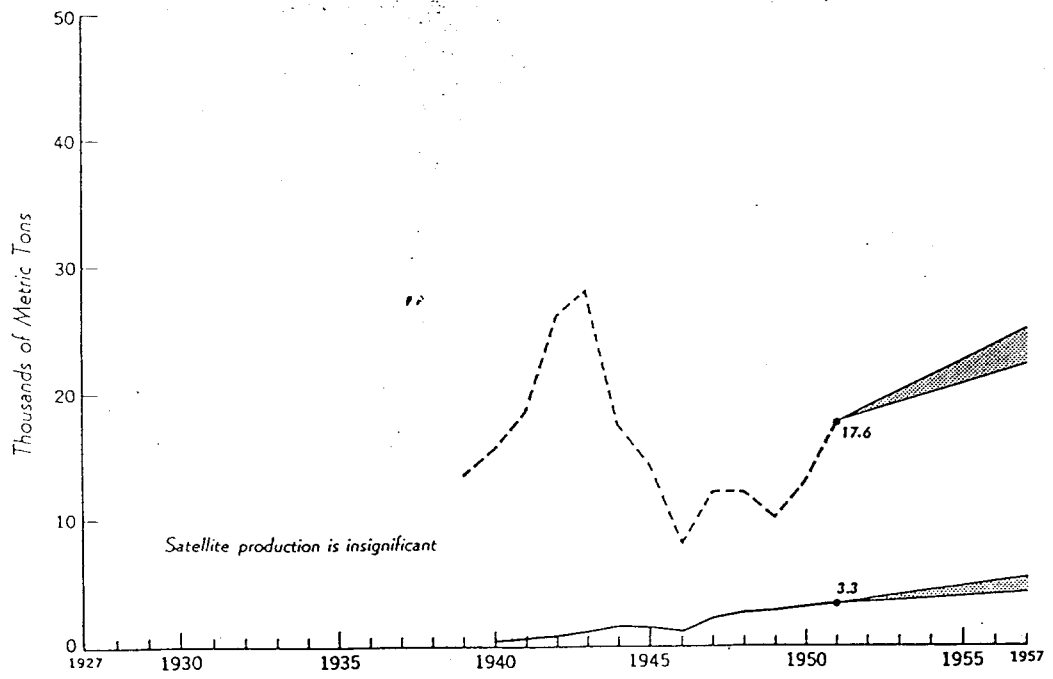
Index of Bloc production is not included because it is approximately the same as the index of USSR production.

~~SECRET~~
~~SECURITY INFORMATION~~

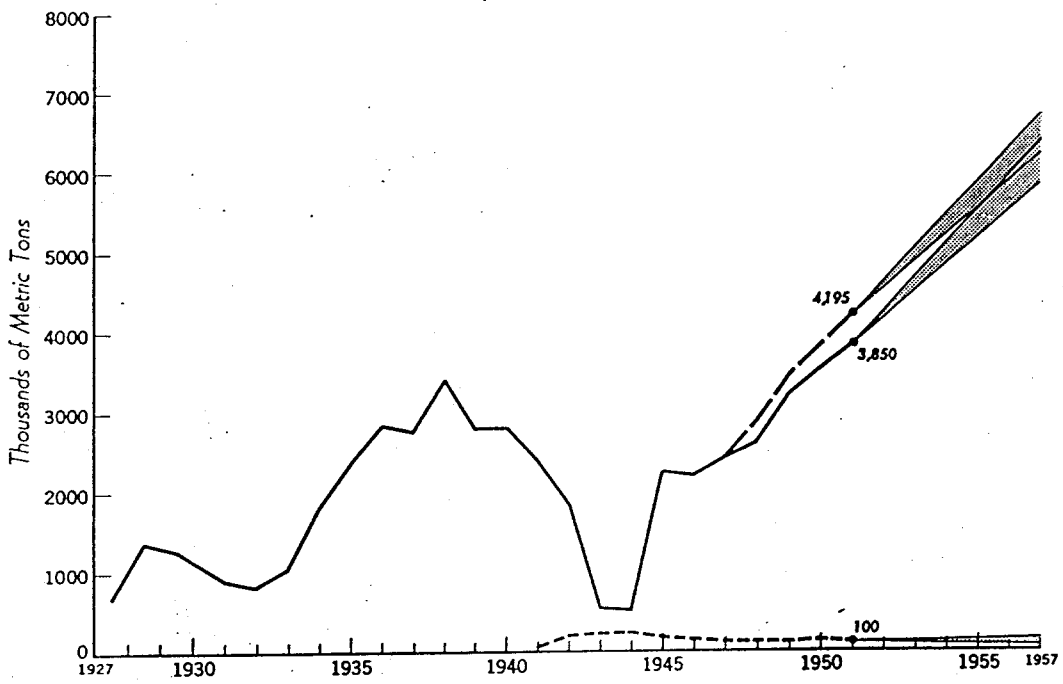
PRODUCTION OF RAW STEEL



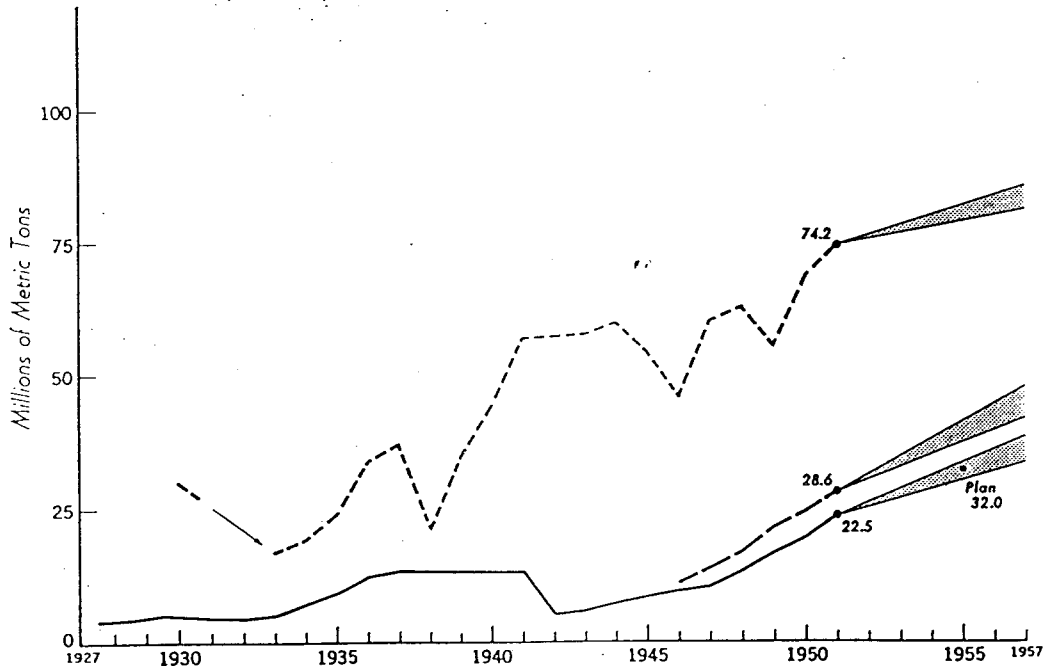
PRODUCTION OF MOLYBDENUM



PRODUCTION OF MANGANESE ORE



PRODUCTION OF ROLLED STEEL



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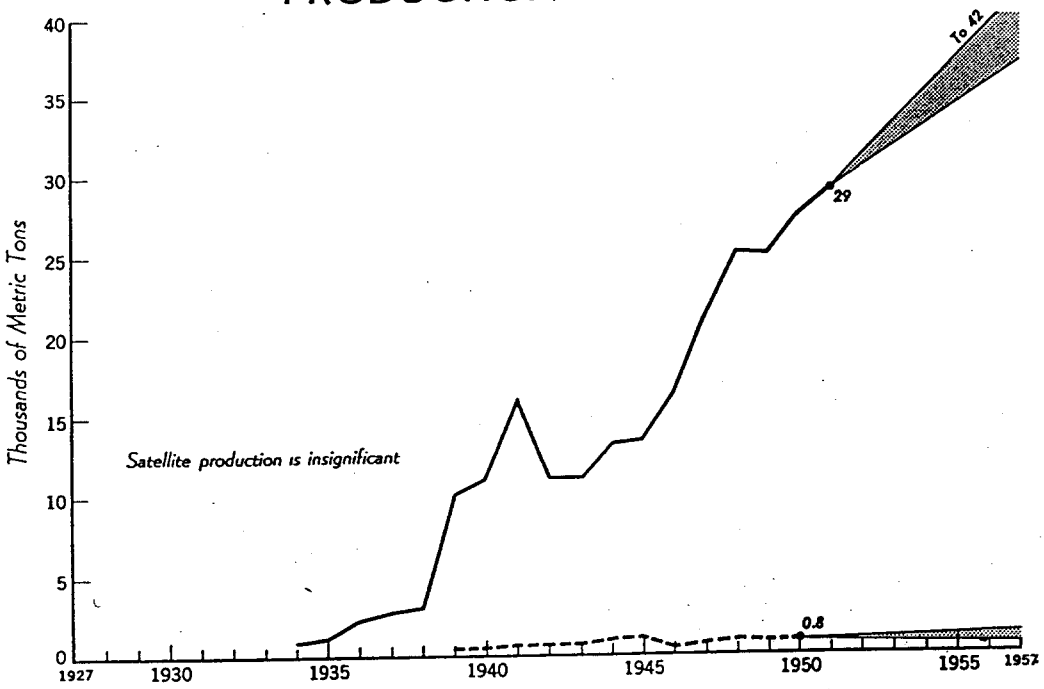
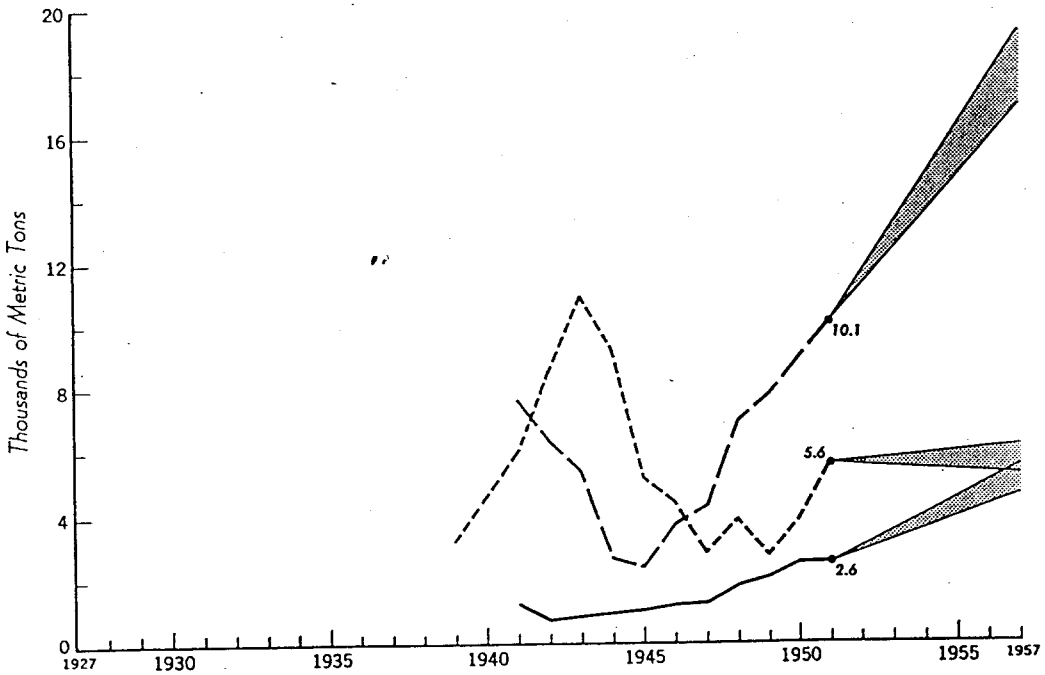
PRODUCTION OF NICKEL



PRODUCTION OF TUNGSTEN

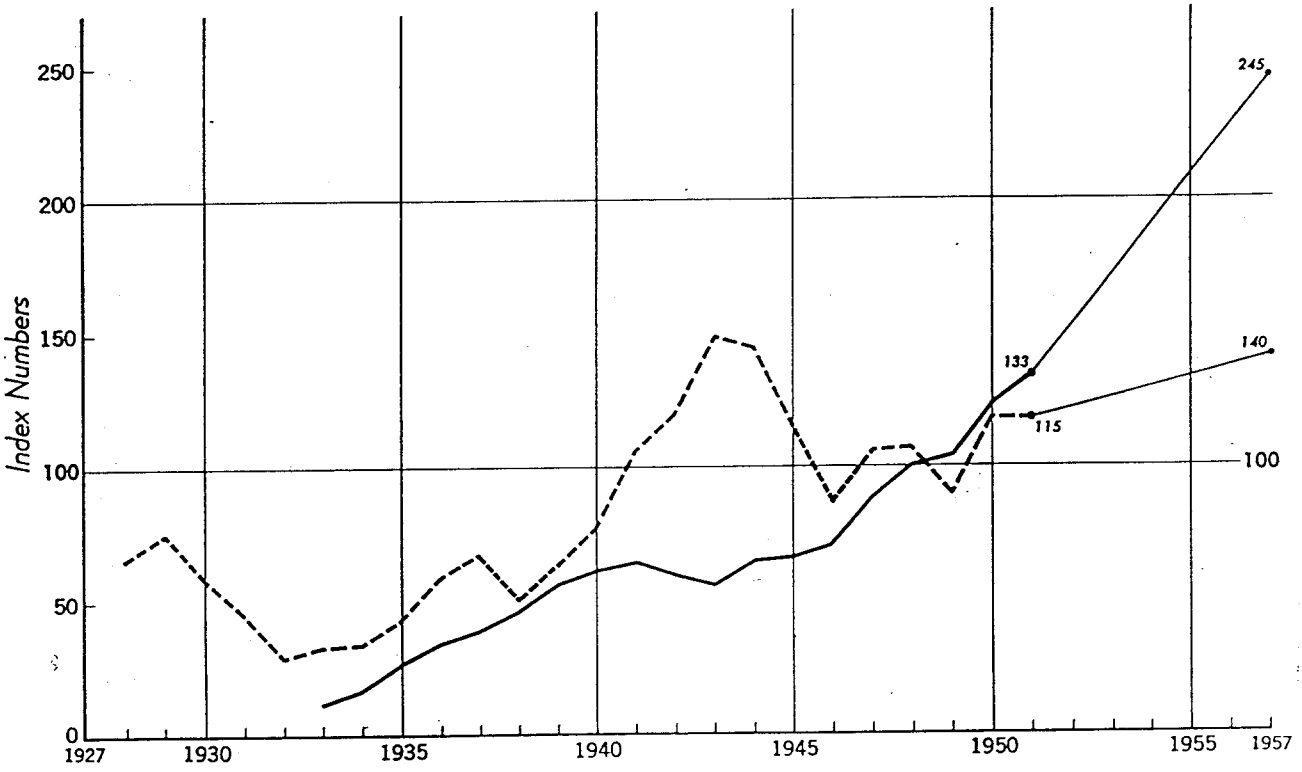


GPO—660

CHART 7

NONFERROUS METALS INDUSTRY

INDEX OF NONFERROUS METALS PRODUCTION



Base Period: US, 1947-49 = 100
USSR, 1948 = 100

-------- US

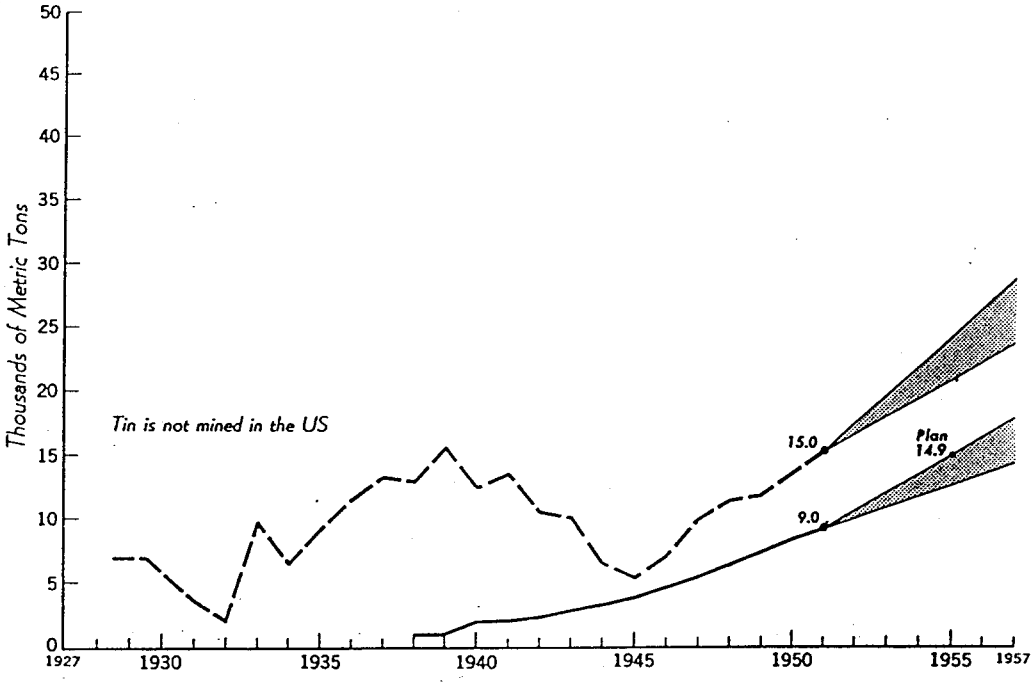
— — — Bloc

——— USSR

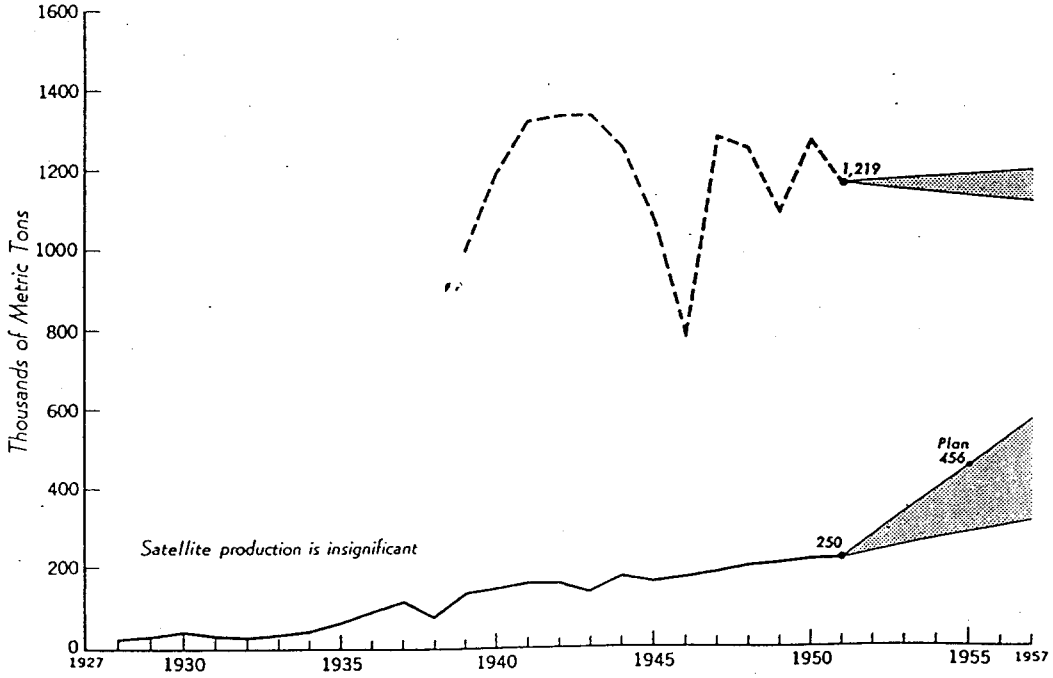
Range of probable production (ORR Estimates)

For components of Index, see Appendix C. Index of Bloc production is not included because it is approximately the same as the index of USSR production.

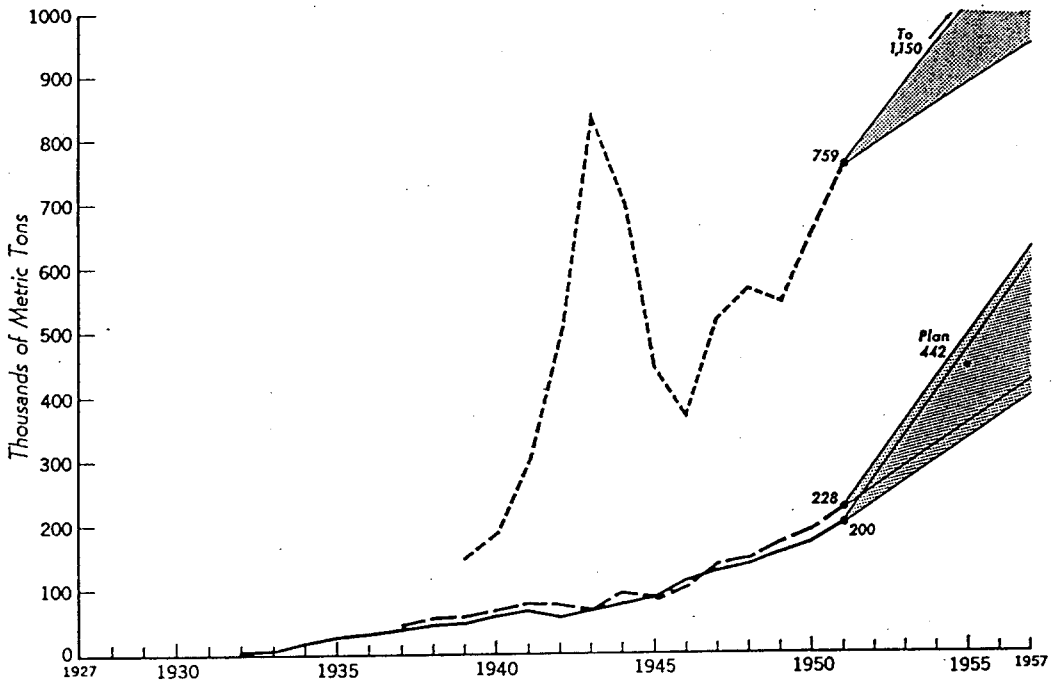
PRODUCTION OF TIN



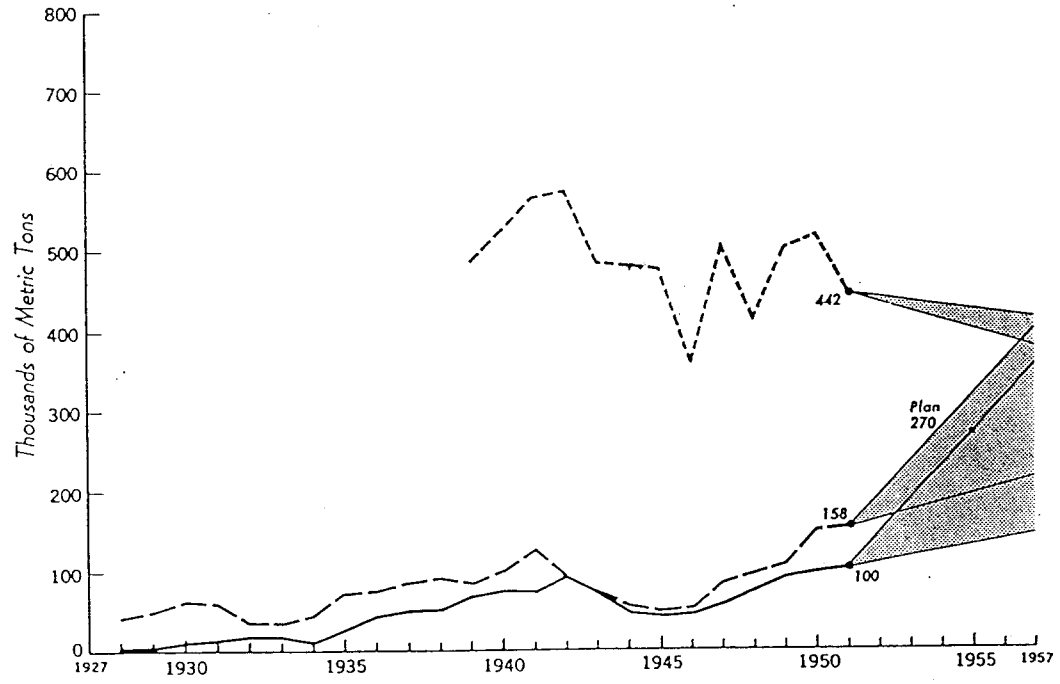
PRODUCTION OF PRIMARY COPPER



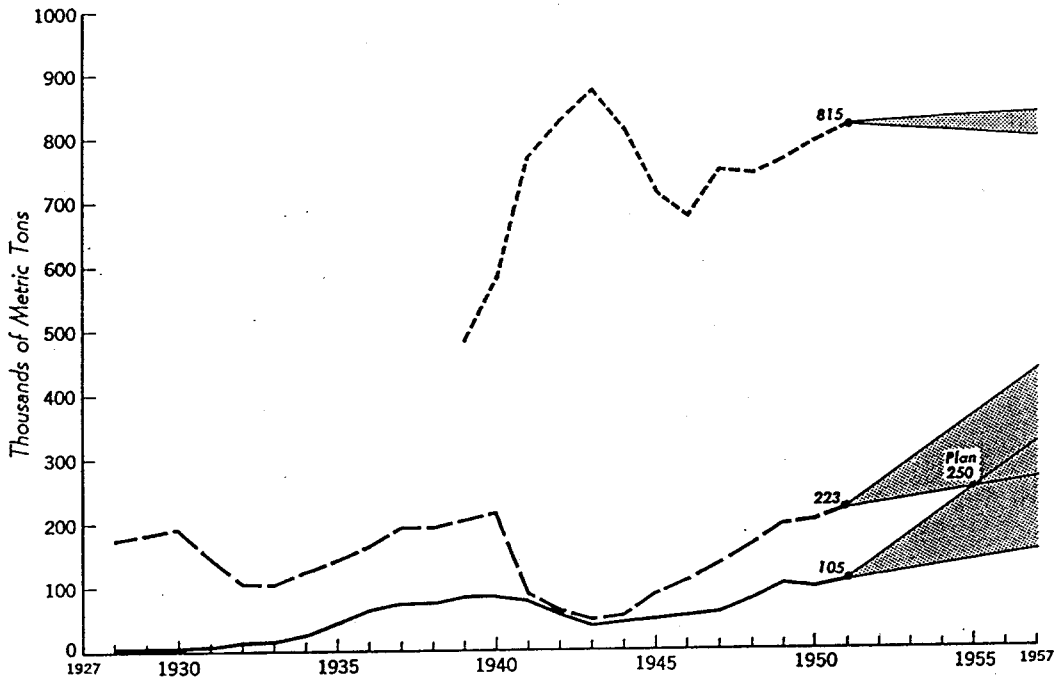
PRODUCTION OF PRIMARY ALUMINUM



PRODUCTION OF LEAD



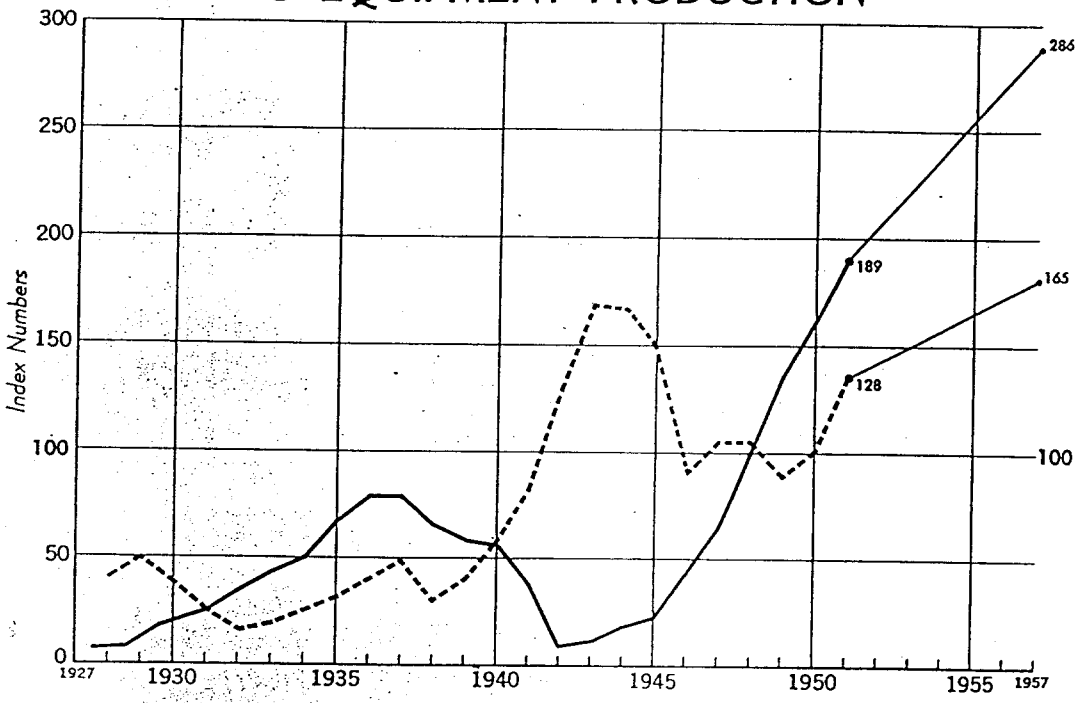
PRODUCTION OF ZINC



SECRET

CHART 8

INDEX OF MACHINERY & EQUIPMENT PRODUCTION



Base Period: US, 1947-49 = 100
USSR, 1948 = 100

-------- US

——— USSR

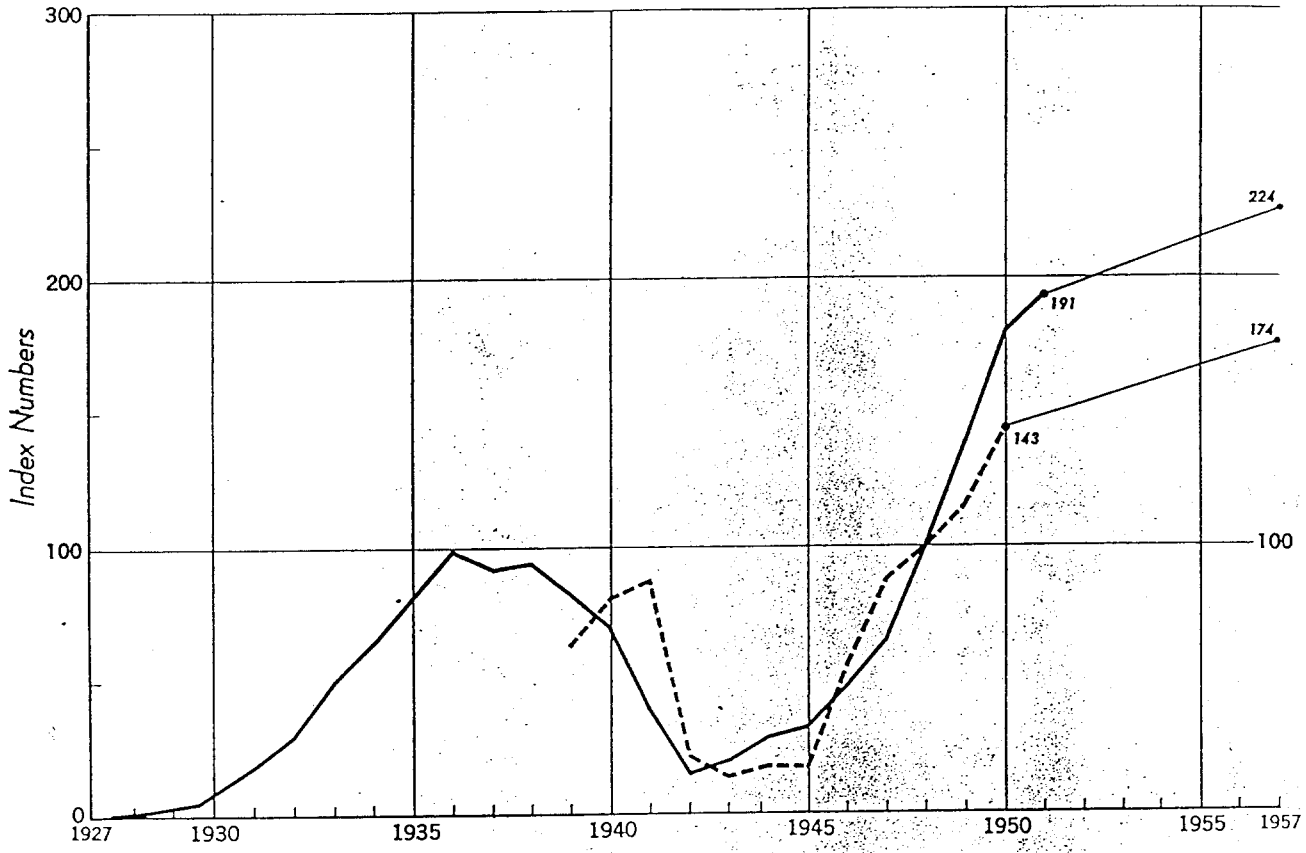
For components of Index, see Appendix C.

Index of Bloc production is not included because it is approximately the same as the index of USSR production.

CHART 9

AUTOMOTIVE EQUIPMENT INDUSTRY

INDEX OF AUTOMOTIVE EQUIPMENT PRODUCTION



Base Period: US, 1947-49 = 100
USSR, 1948 = 100

------- US

— — — Bloc

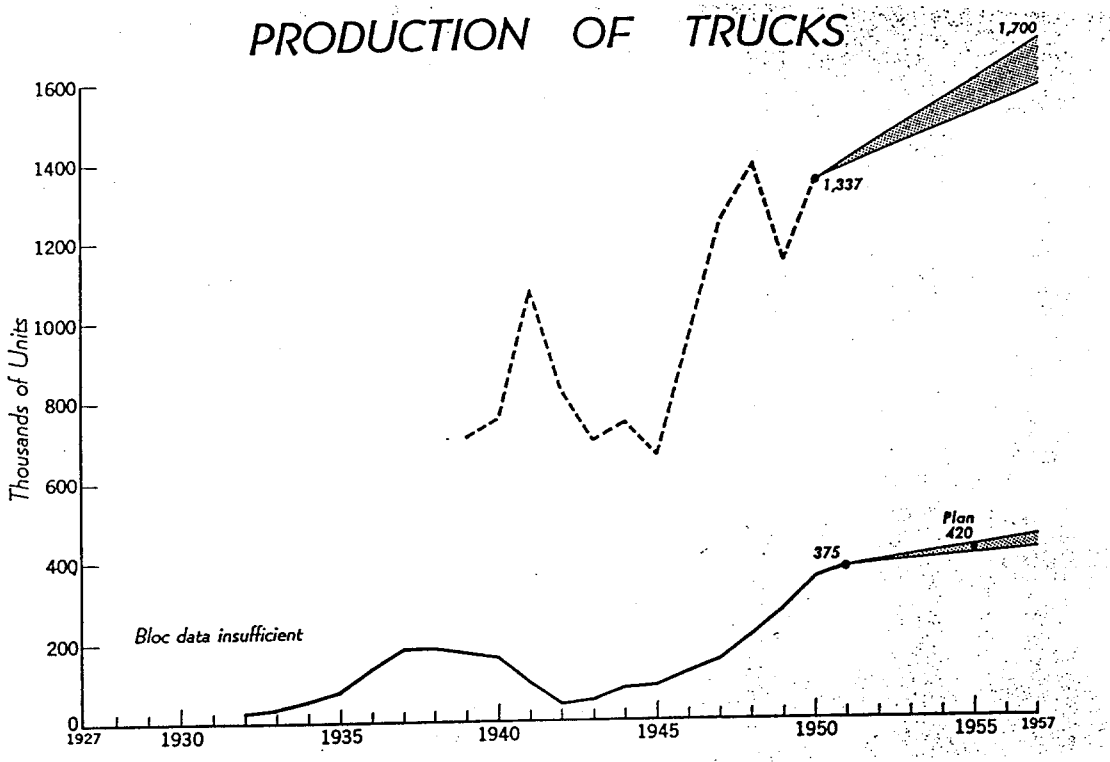
——— USSR

Range of probable production (ORR Estimates)

For components of Index, see Appendix C.

Index of Bloc production is not included because it is approximately the same as the index of USSR production.

PRODUCTION OF TRUCKS



PRODUCTION OF TRACTORS

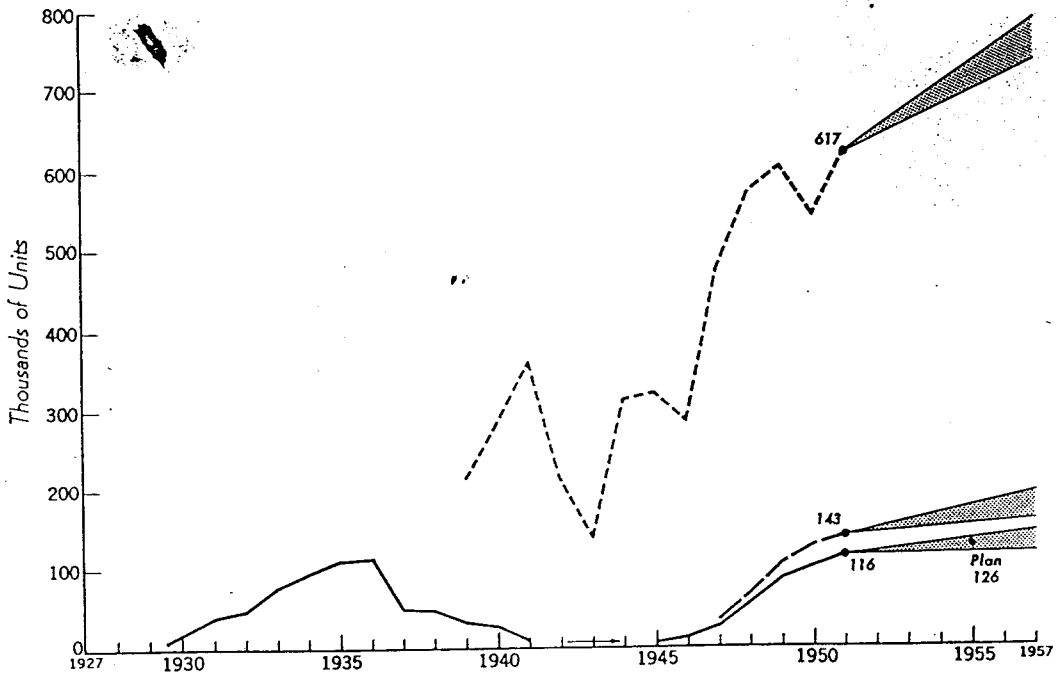
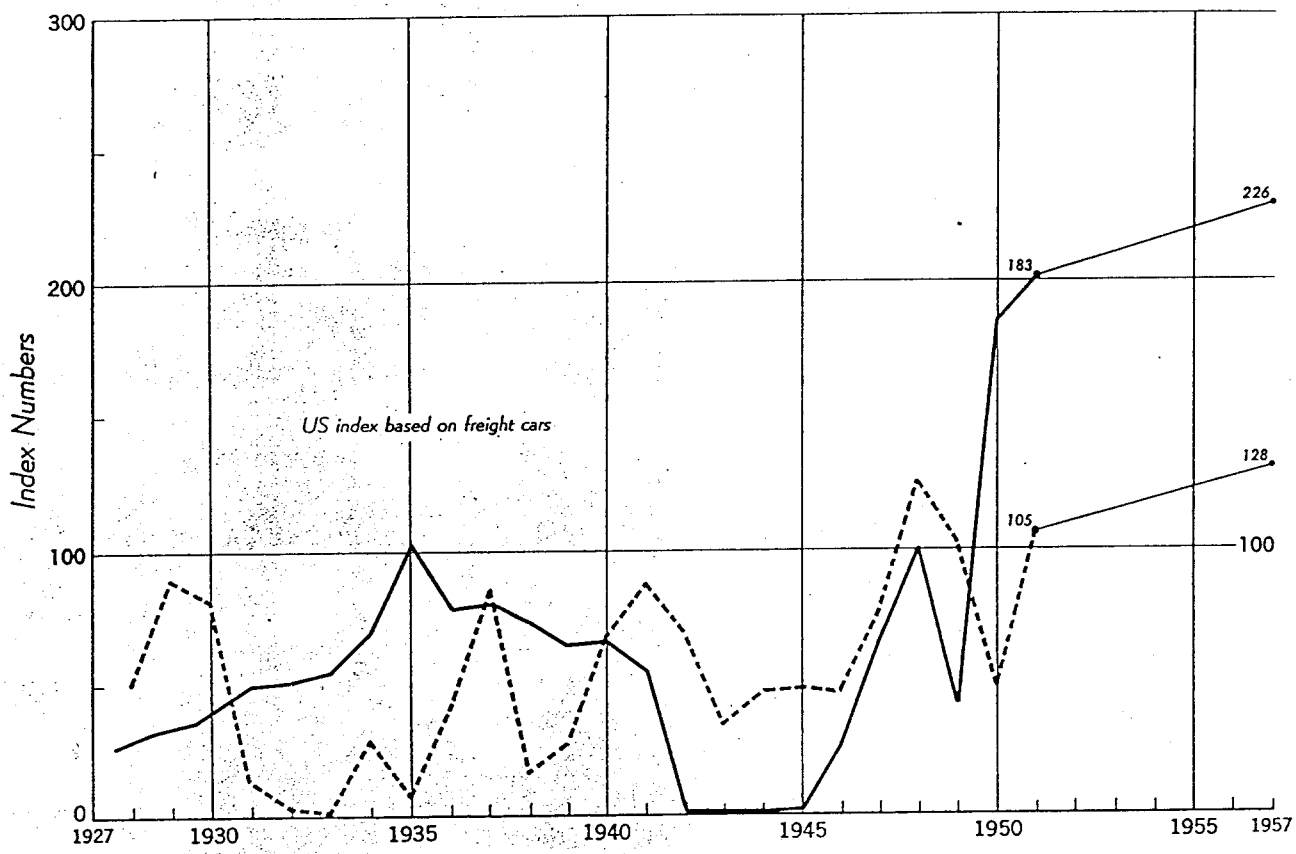


CHART 10

RAILWAY EQUIPMENT INDUSTRY

INDEX OF RAILWAY EQUIPMENT PRODUCTION



Base Period: US, 1947-49 = 100
USSR, 1948 = 100

US

Bloc

USSR

Range of probable production (ORR Estimates)

For components of Index, see Appendix C.

Index of Bloc production is not included because it is approximately the same as the index of USSR production.

PRODUCTION OF FREIGHT CARS

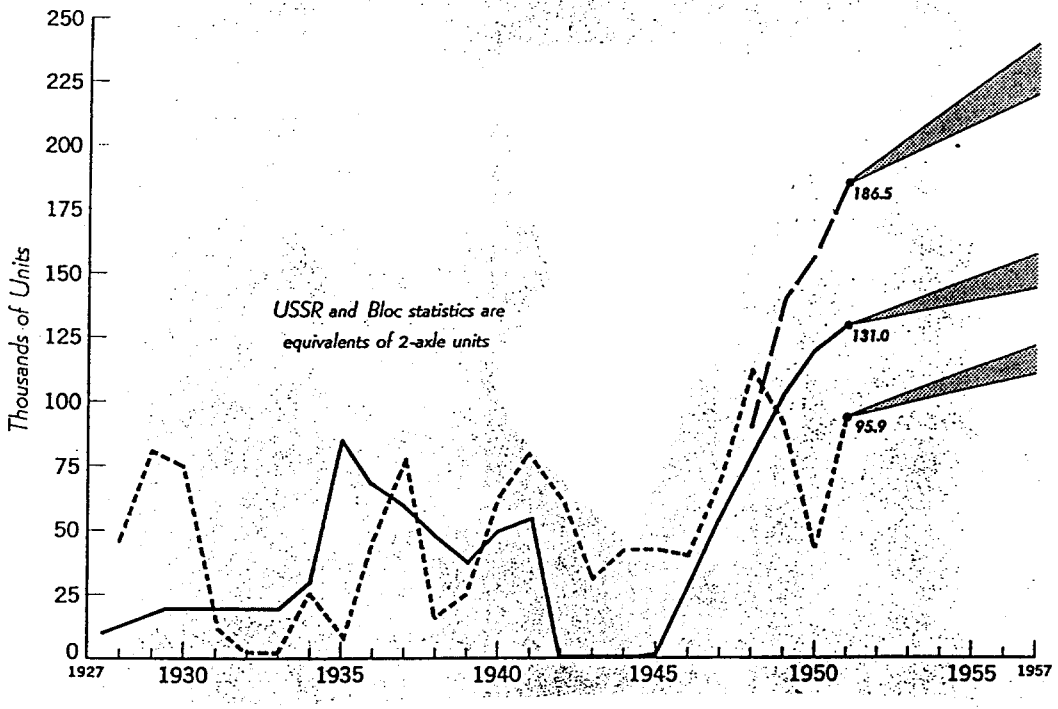
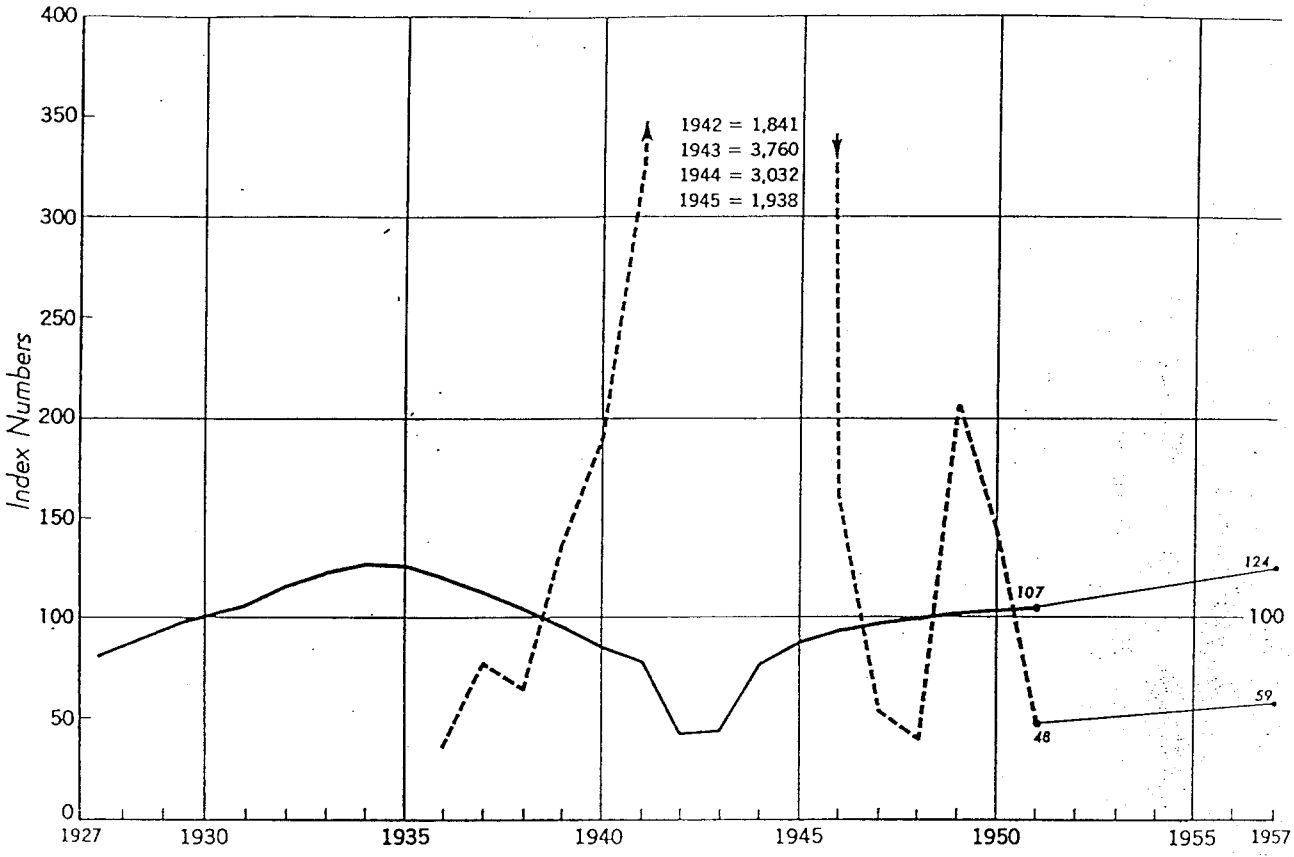


CHART 11

SHIPBUILDING INDUSTRY

INDEX OF SHIPBUILDING



Base Period: US, 1947-49 = 100
USSR, 1948 = 100

- - - - - - - US

— — — Bloc

——— USSR

Range of probable production (ORR Estimates)

For components of Index, see Appendix C.

Index of Bloc production is not included because it is approximately the same as the index of USSR production.

~~SECRET~~
SECURITY INFORMATION

~~SECRET~~

PRODUCTION OF MERCHANT VESSELS

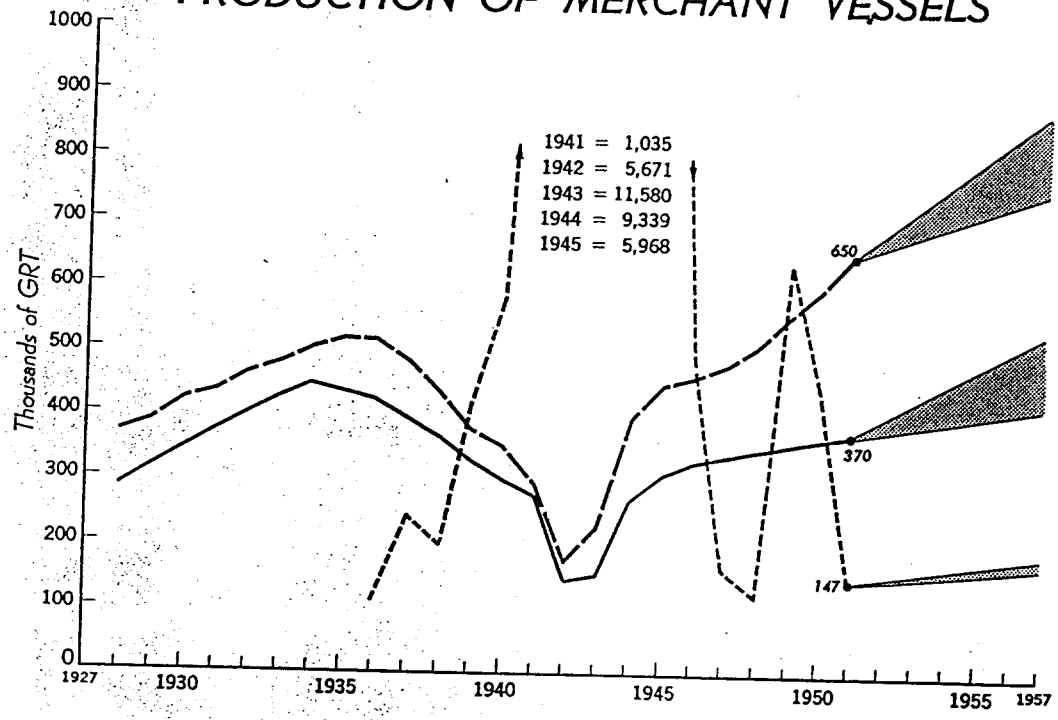
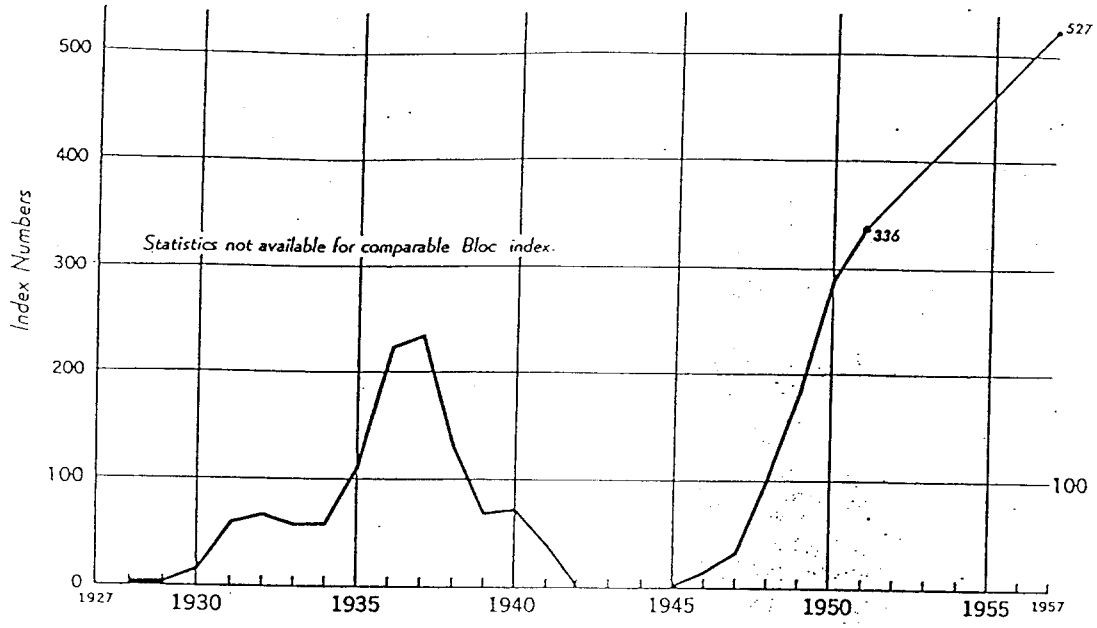
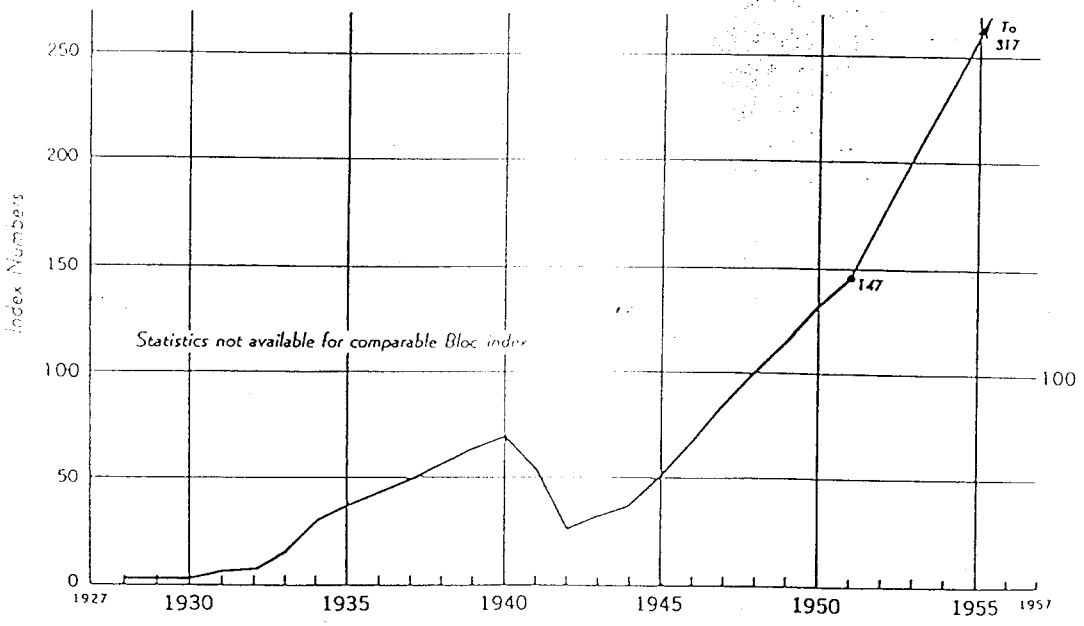


CHART 12

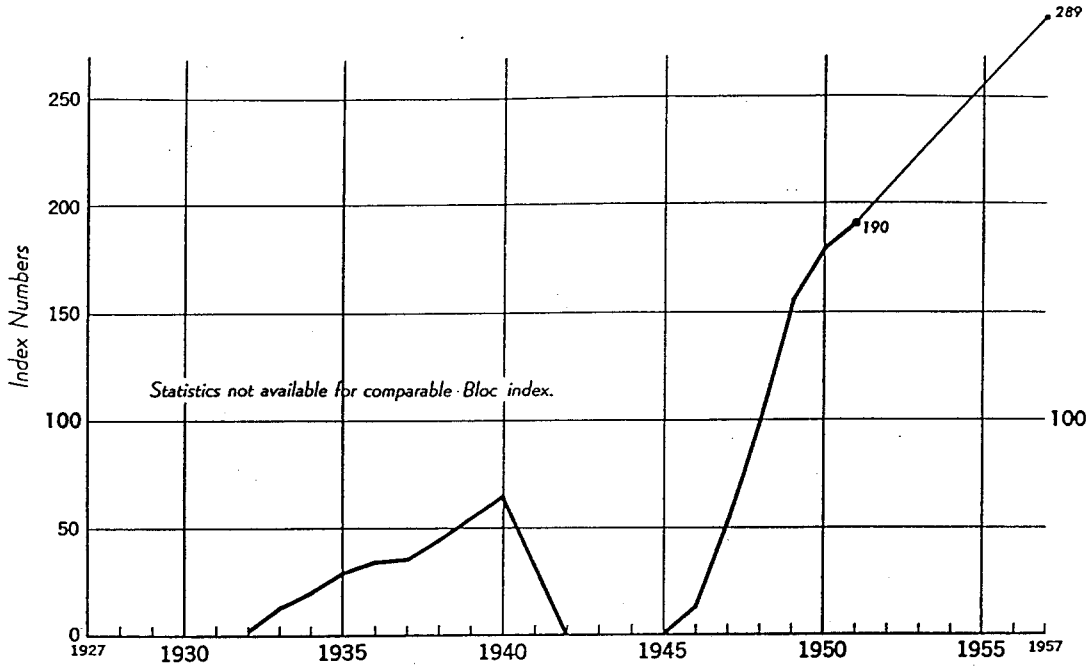
INDEX OF AGRICULTURAL MACHINERY PRODUCTION



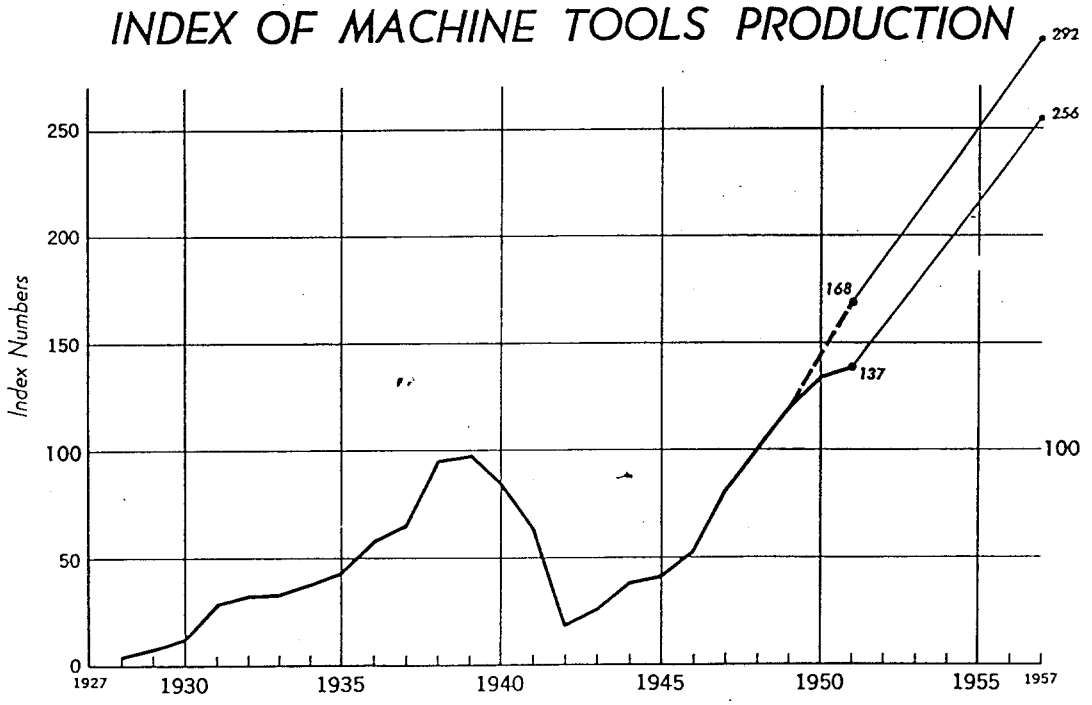
INDEX OF METALWORKING MACHINERY PRODUCTION



INDEX OF TEXTILE MACHINERY PRODUCTION



INDEX OF MACHINE TOOLS PRODUCTION



Base Period: USSR & Bloc 1948 = 100

——— USSR

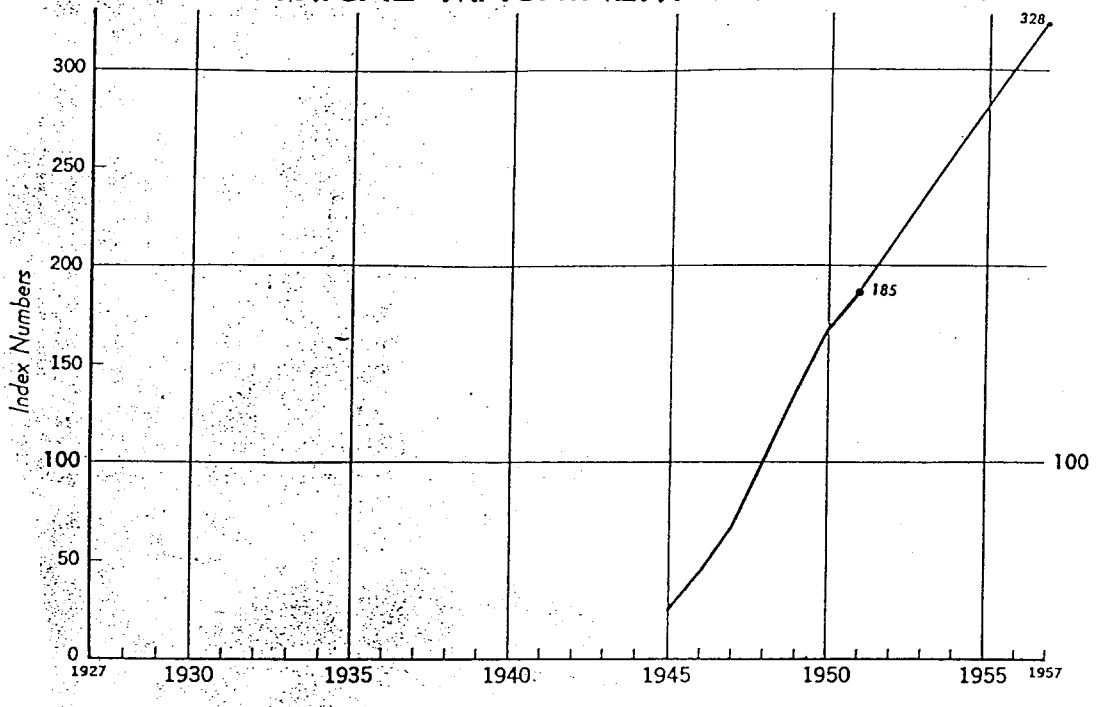
– – – – – Bloc

For components of Index, see Appendix C.

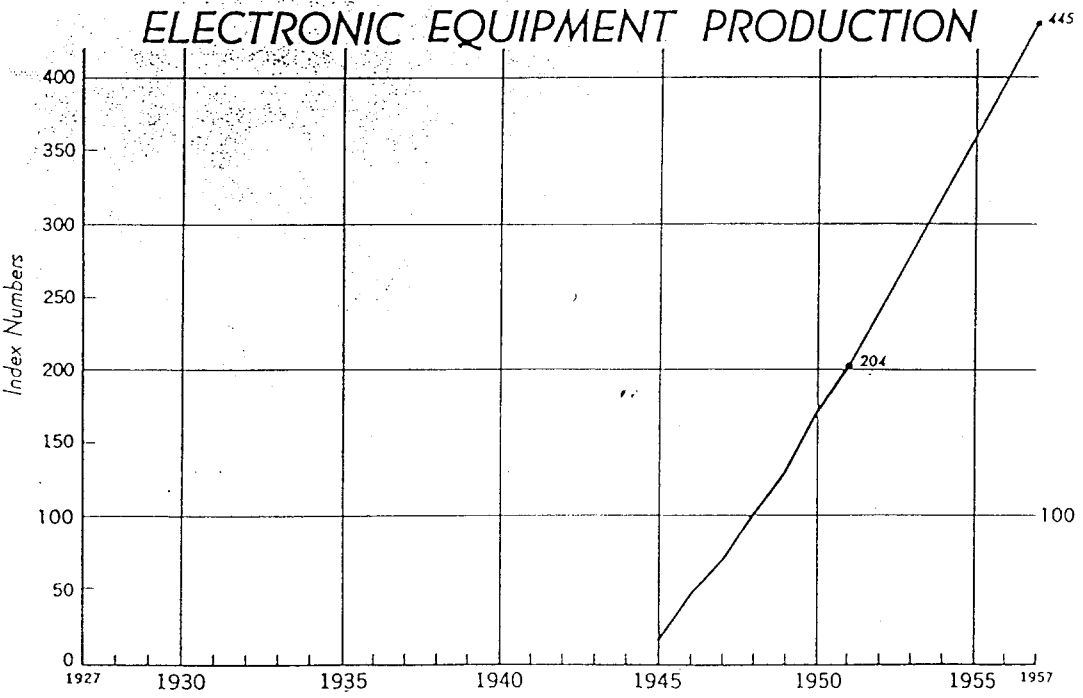
Statistics not available for comparable US indexes.

CHART 13

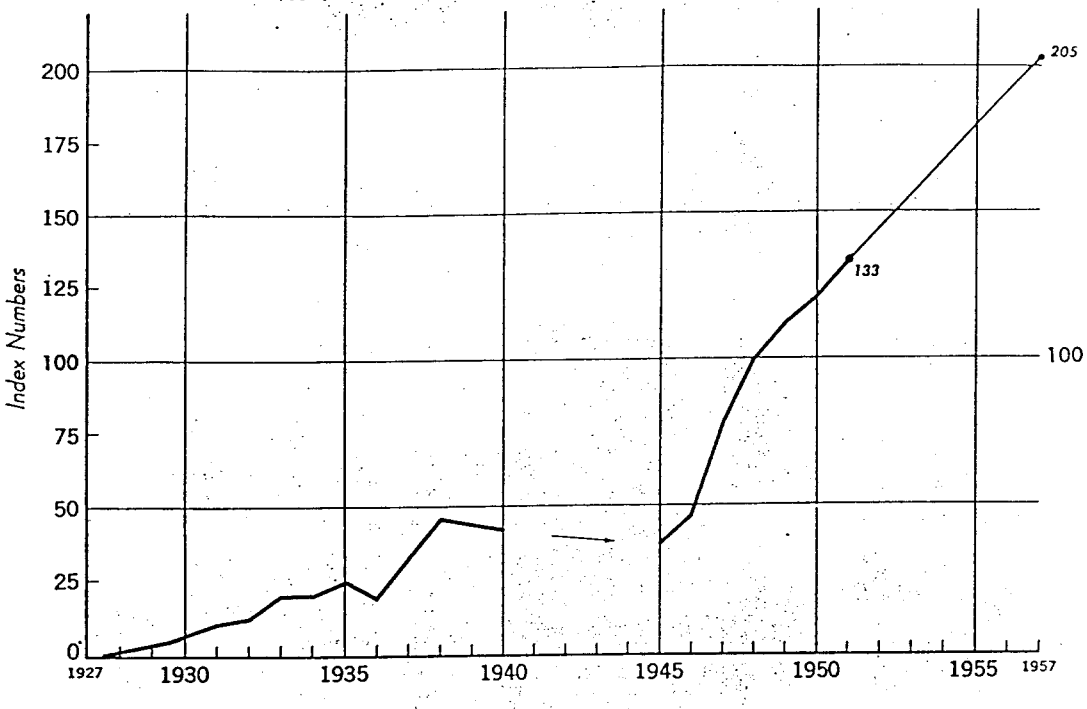
INDEX OF ELECTRICAL MACHINERY PRODUCTION



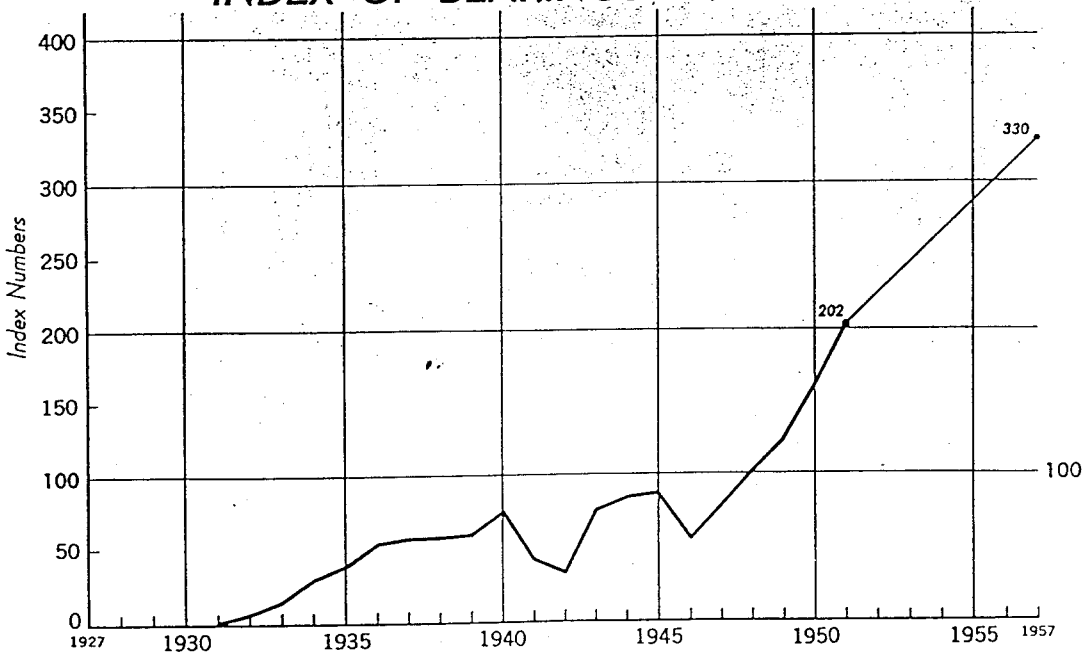
INDEX OF ELECTRONIC EQUIPMENT PRODUCTION



INDEX OF MINING MACHINERY PRODUCTION



INDEX OF BEARINGS PRODUCTION



Base Period: USSR 1948=100

——— USSR

For components of Index, see Appendix C.

Index of Bloc production is not included because it is approximately the same as the Index of USSR production.

Statistics not available for comparable US indexes.

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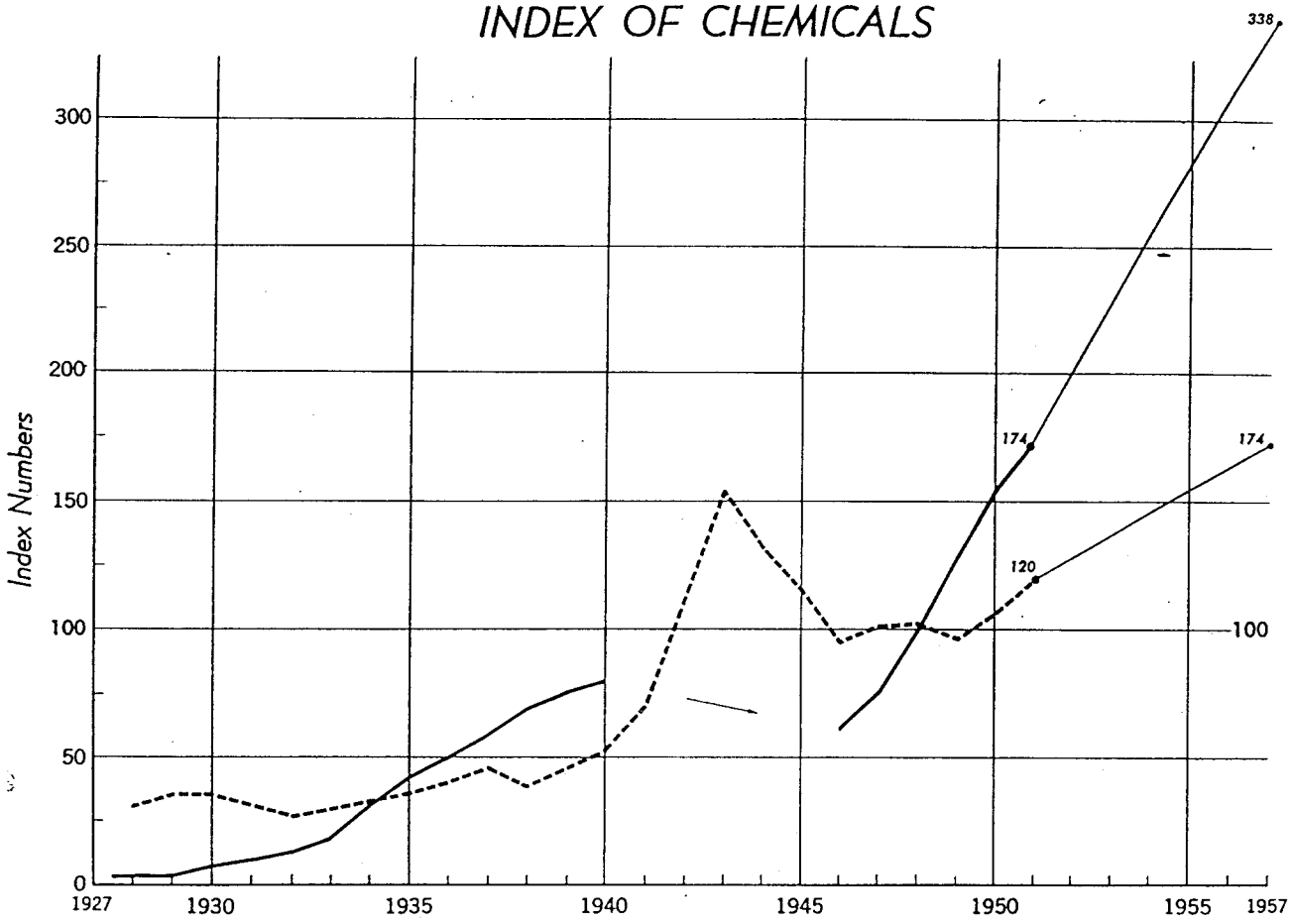
CHART 14

CHEMICALS INDUSTRY



Base Period: US, 1947-49 = 100
USSR, 1948 = 100

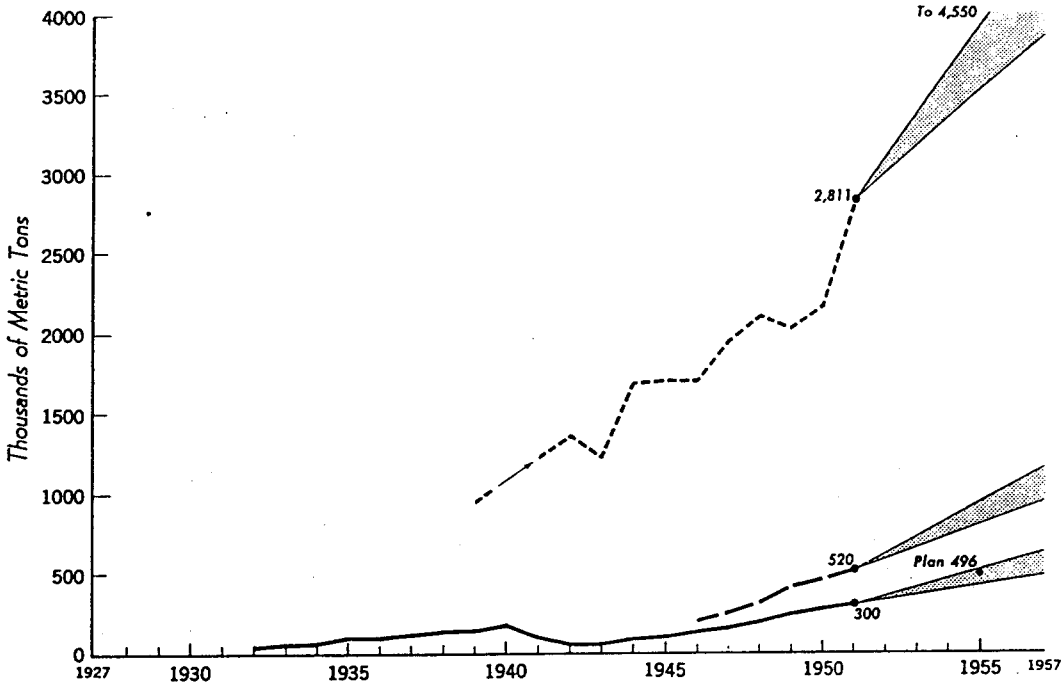
------- US
— — — Bloc
——— USSR
Range of probable production (ORR Estimates)

For components of Index, see Appendix C.

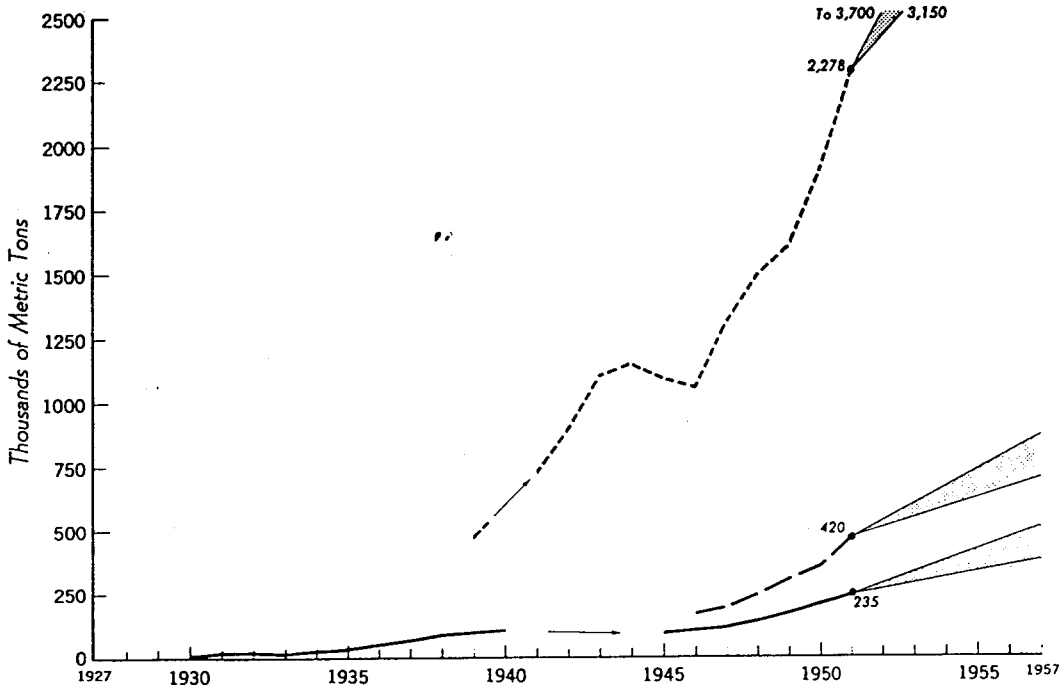
Index of Bloc production is not included because it is approximately the same as the index of USSR production.

~~SECRET~~
SECURITY INFORMATION

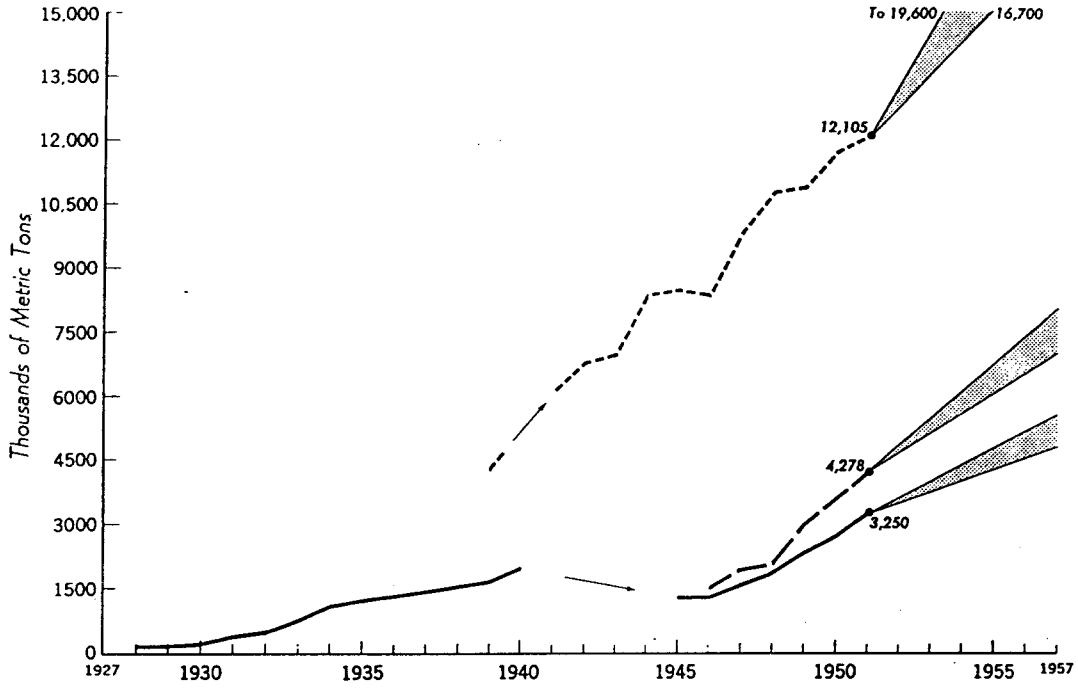
PRODUCTION OF CAUSTIC SODA



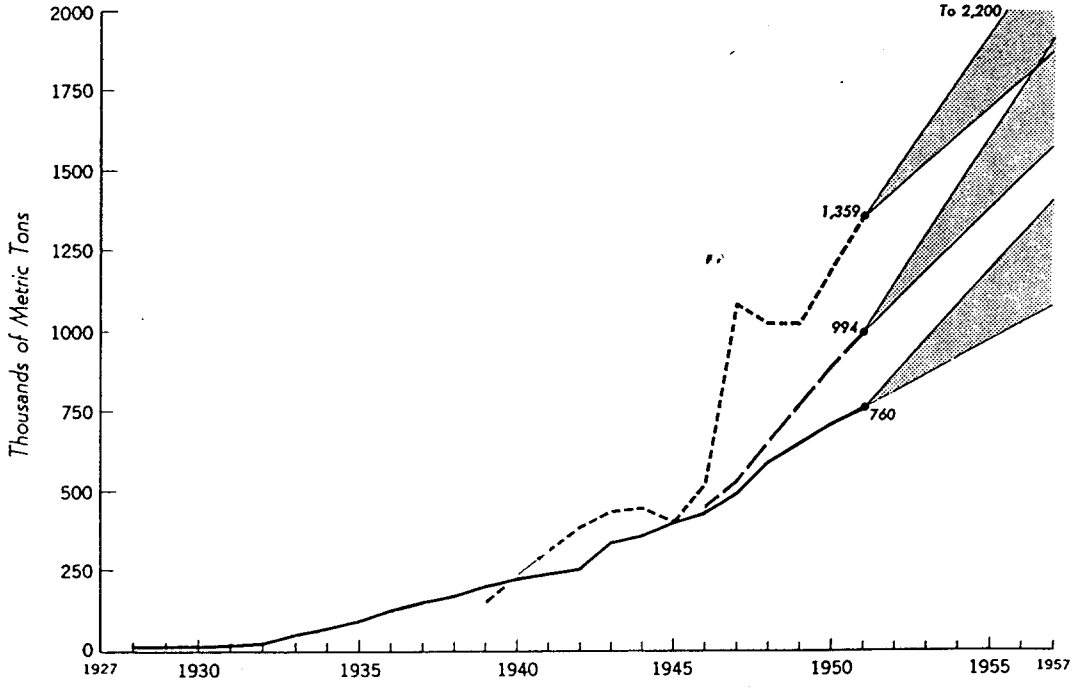
PRODUCTION OF CHLORINE



PRODUCTION OF SULFURIC ACID



PRODUCTION OF NITRIC ACID



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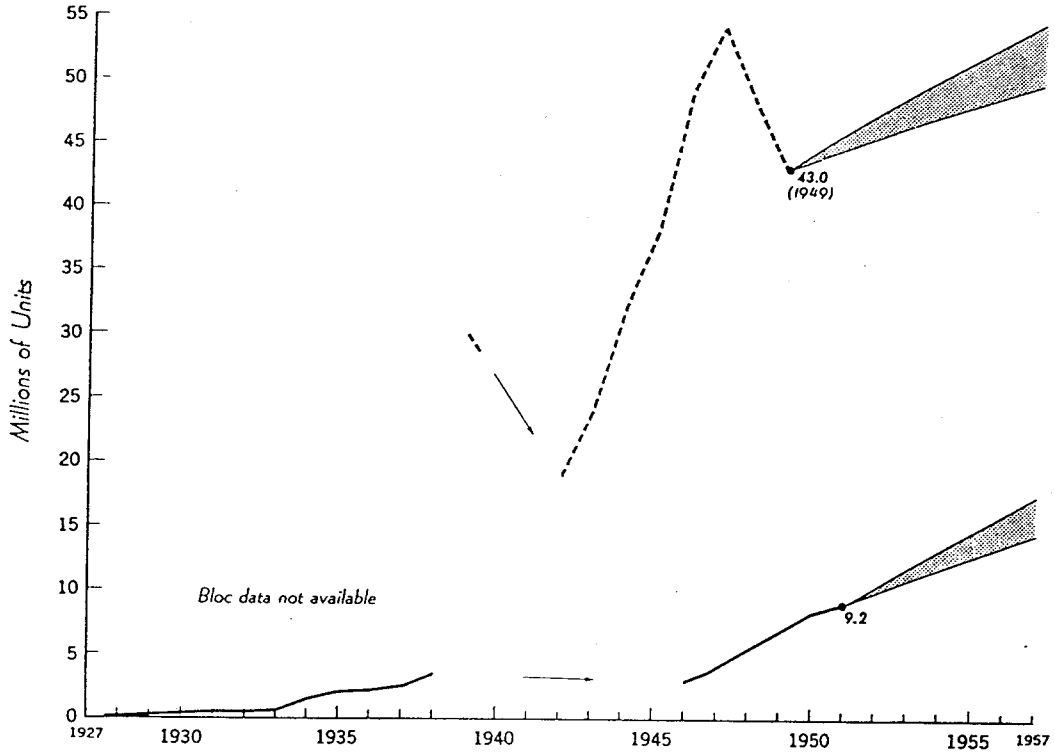
PRODUCTION OF RUBBER TIRES



PRODUCTION OF SYNTHETIC RUBBER

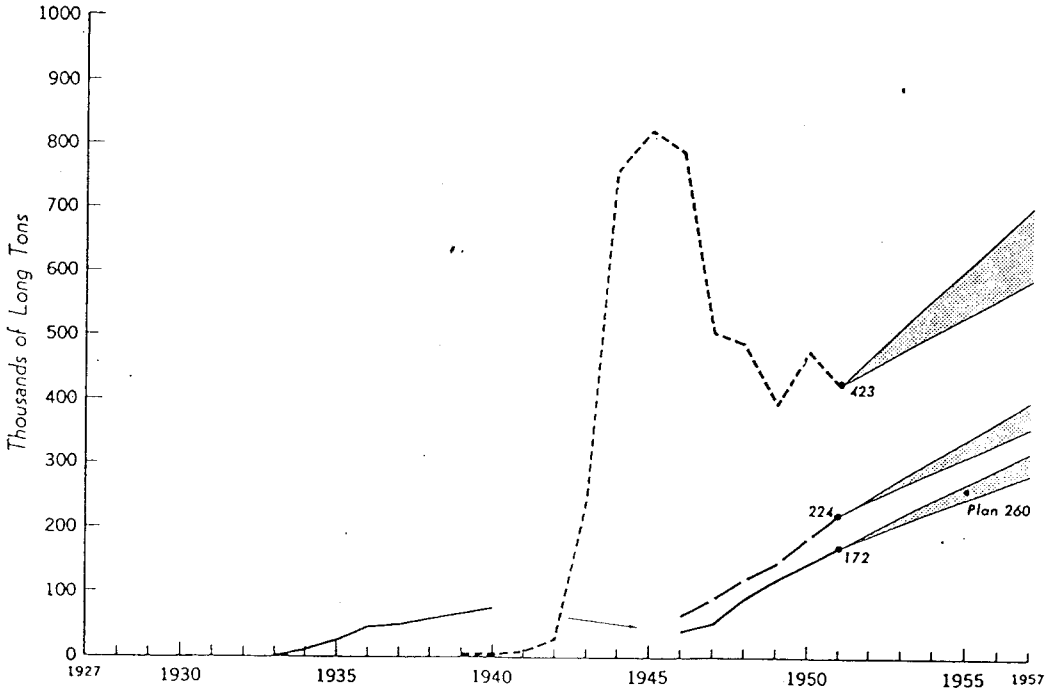


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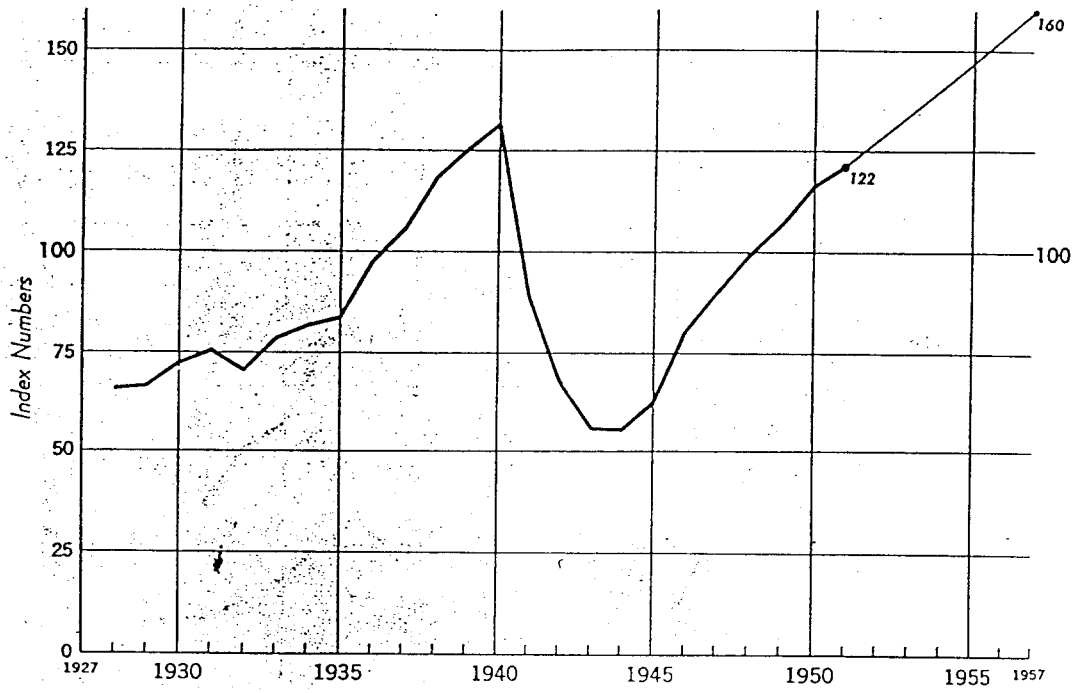
CHART 15

INDEX OF PRODUCTION OF FOREST PRODUCTS



Base Period: USSR, 1948 = 100

—— USSR

For components of Index, see Appendix C.

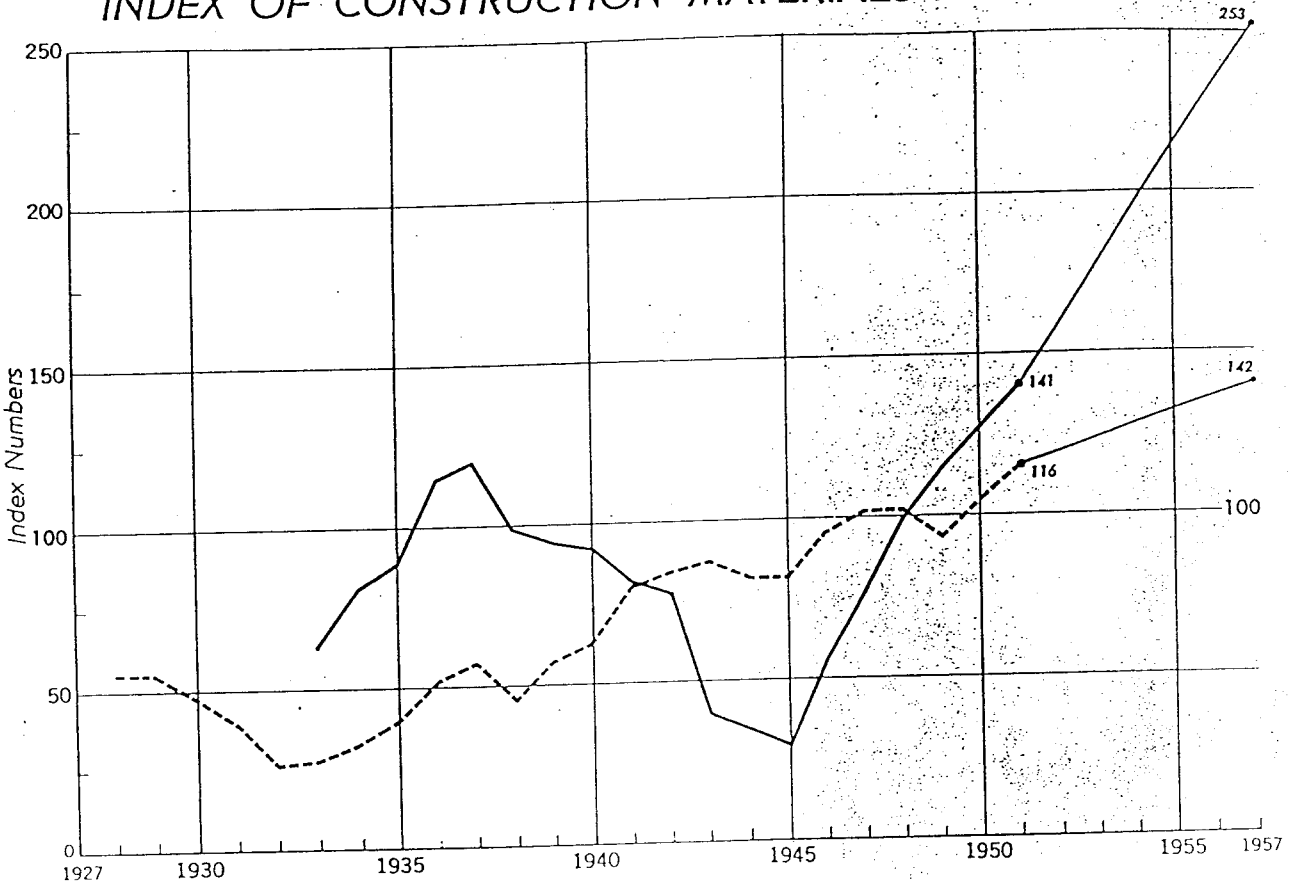
Index of Bloc production is not included because it is approximately the same as the index of USSR production.

Statistics not available for a comparable US index.

CHART 16

CONSTRUCTION MATERIALS INDUSTRY

INDEX OF CONSTRUCTION MATERIALS PRODUCTION



Base Period: US, 1947-49 = 100
USSR, 1948 = 100

- - - - - - - US

— — — Bloc

——— USSR

Range of probable production (ORR Estimates)

For components of Index, see Appendix C.

Index of Bloc production is not included because it is approximately the same as the index of USSR production.

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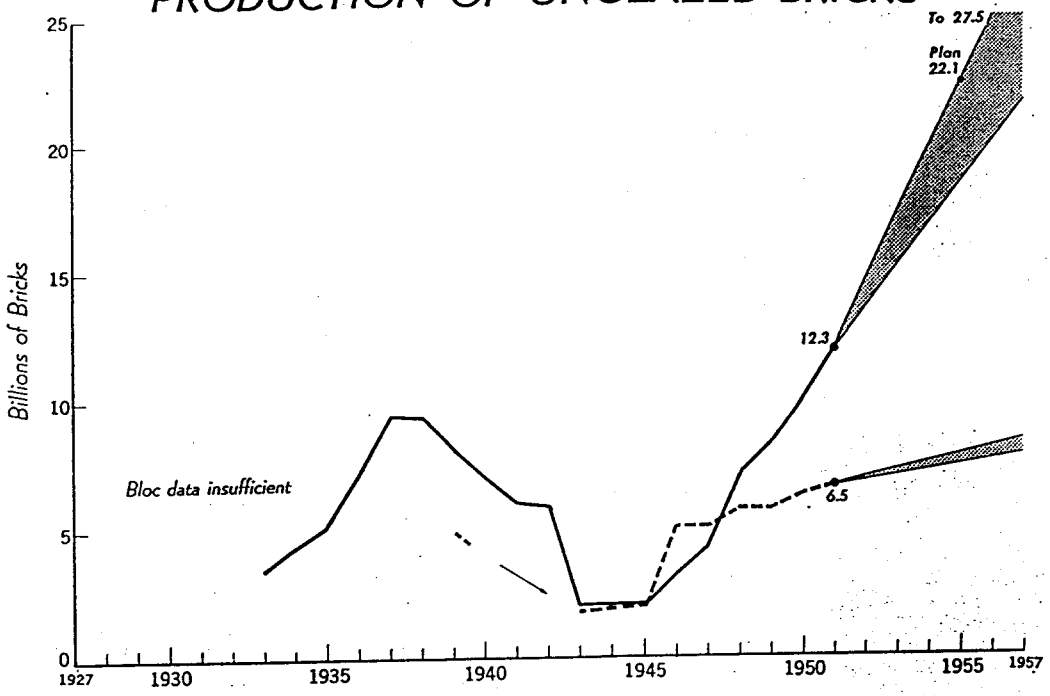
PRODUCTION OF UNGLAZED BRICKS



PRODUCTION OF CEMENT

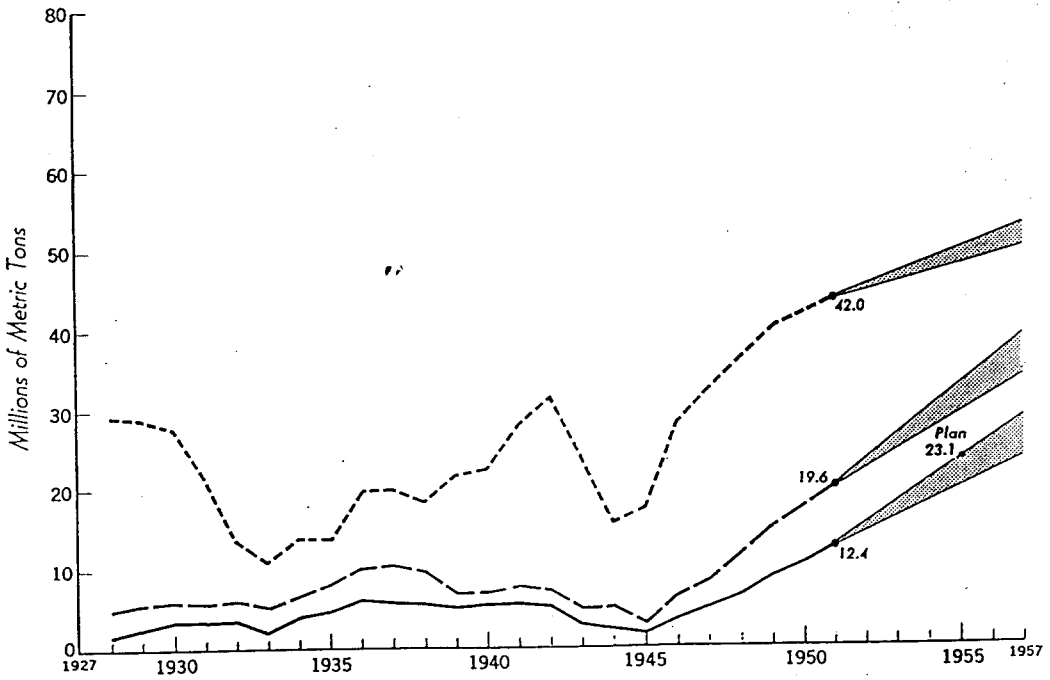
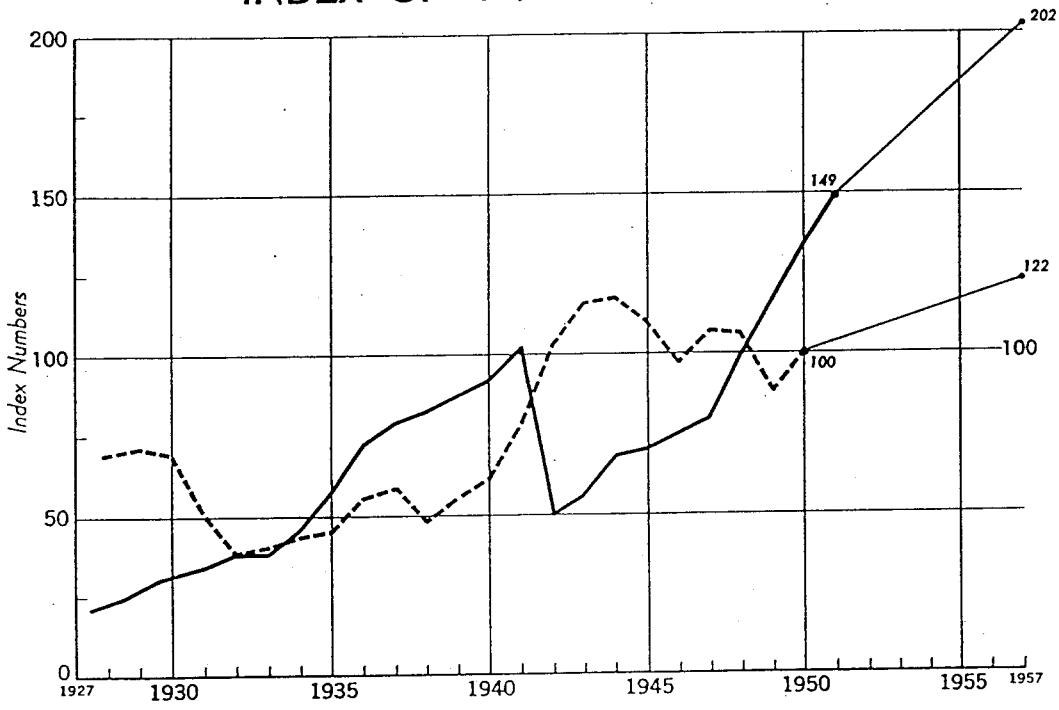


CHART 17

INDEX OF TRANSPORTATION



Base Period: US, 1947-49 = 100
USSR, 1948 = 100

-------- US

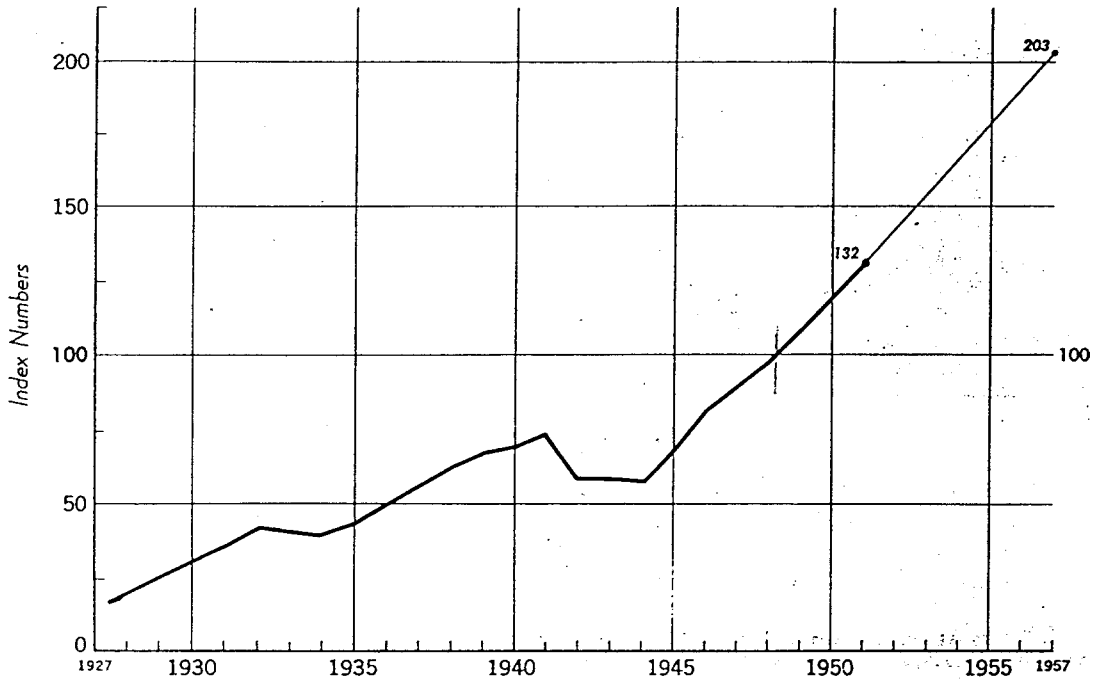
——— USSR

For components of Index, see Appendix C.

Index of Bloc transportation is not included because it is approximately the same as the index of USSR transportation.

CHART 18

INDEX OF COMMUNICATIONS



Base Period: USSR, 1948=100

——— USSR

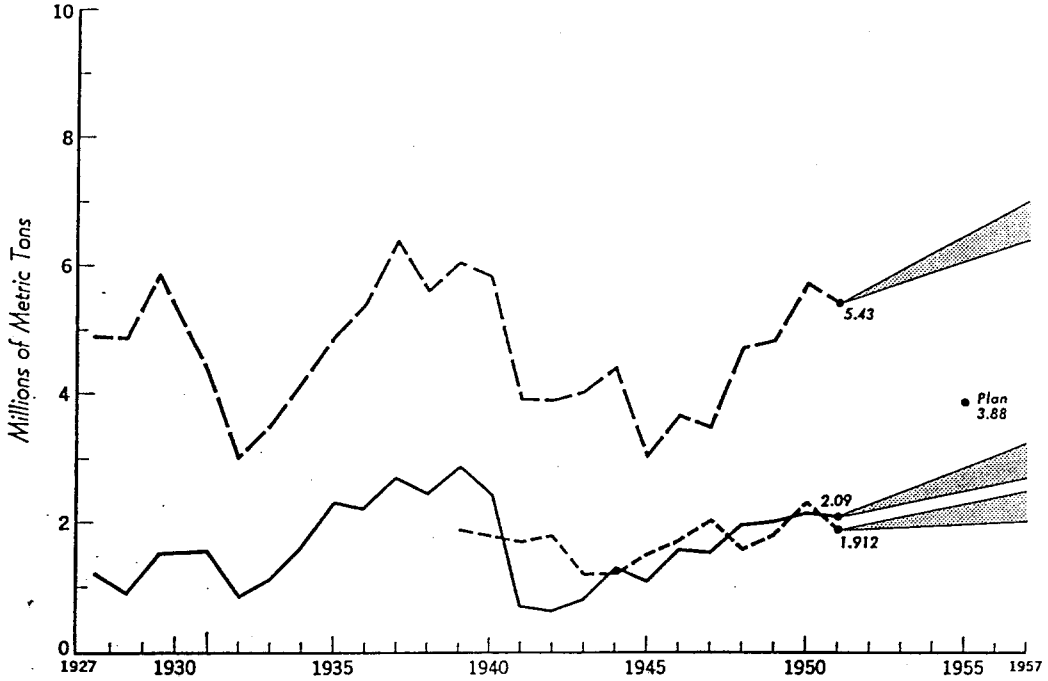
For components of Index, see Appendix C.

Index of Bloc production is not included because it is approximately the same as the index of USSR production.

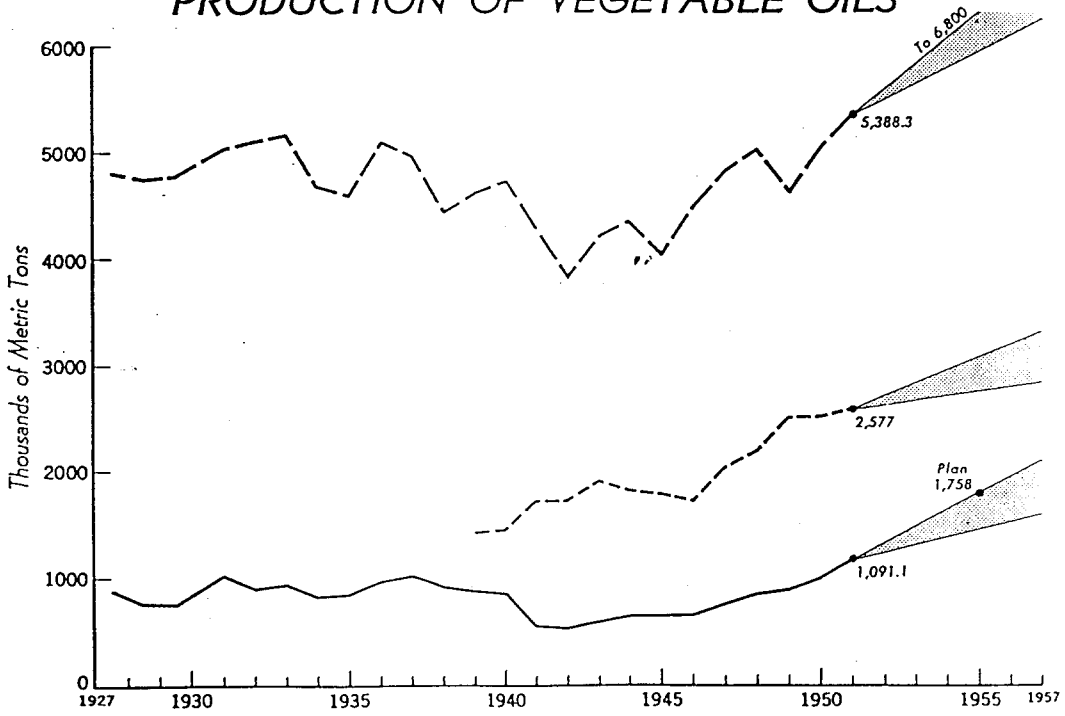
Statistics not available for a comparable US index.

~~SECRET~~

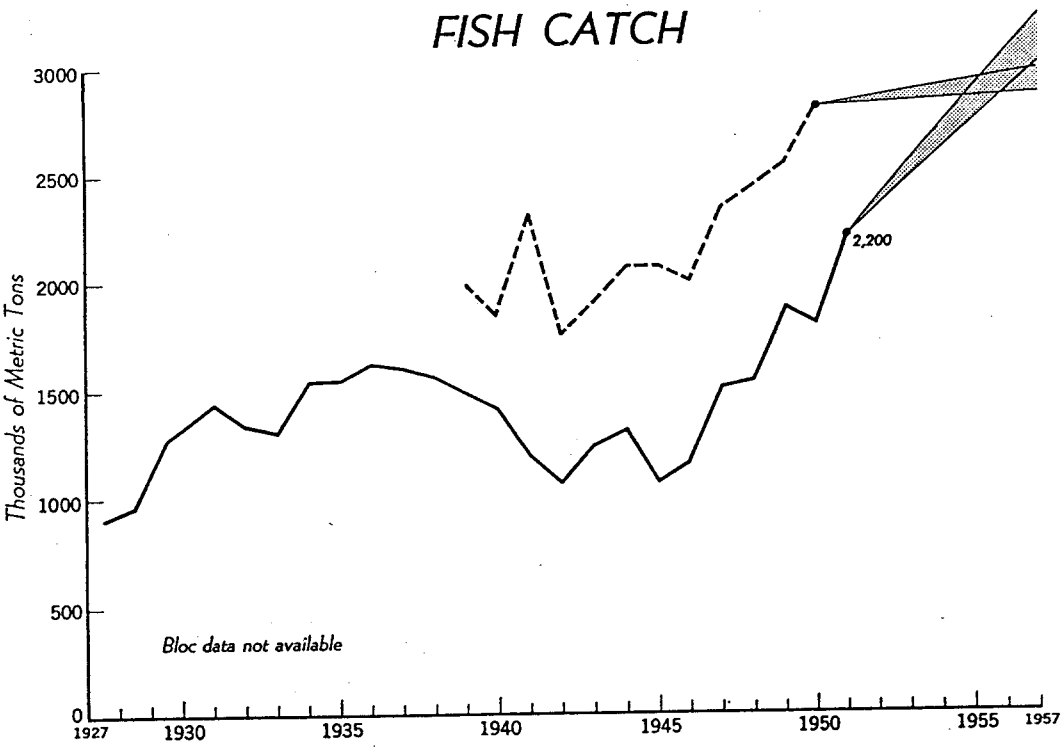
PRODUCTION OF SUGAR



PRODUCTION OF VEGETABLE OILS



FISH CATCH



PRODUCTION OF MEAT

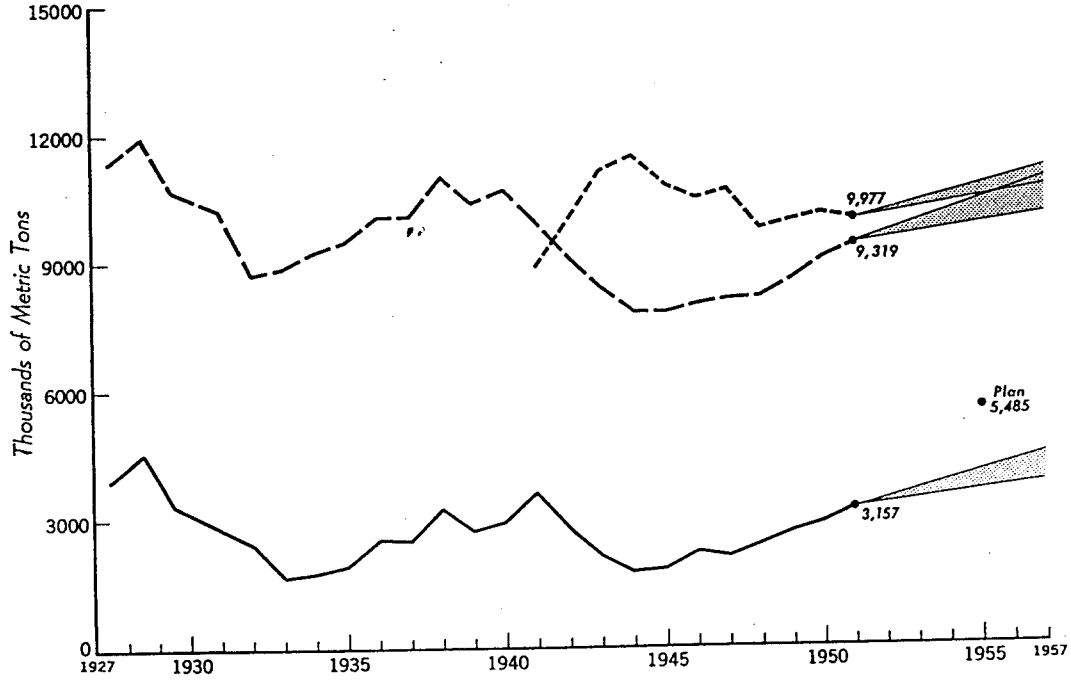
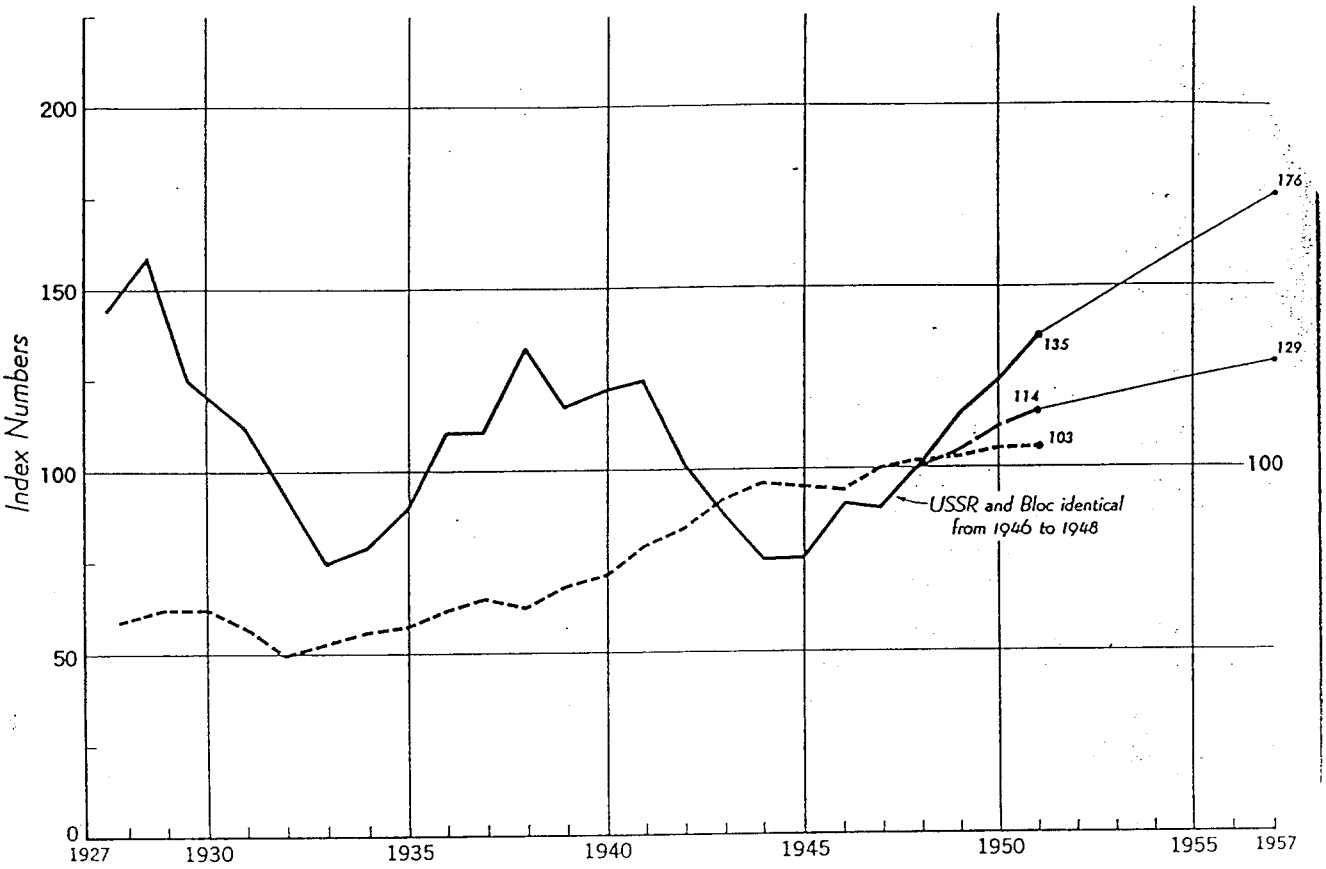


CHART 19

FOOD INDUSTRY

INDEX OF FOOD PROCESSING



Base Period: US, 1947-49 = 100
USSR & Bloc, 1948 = 100

------- US

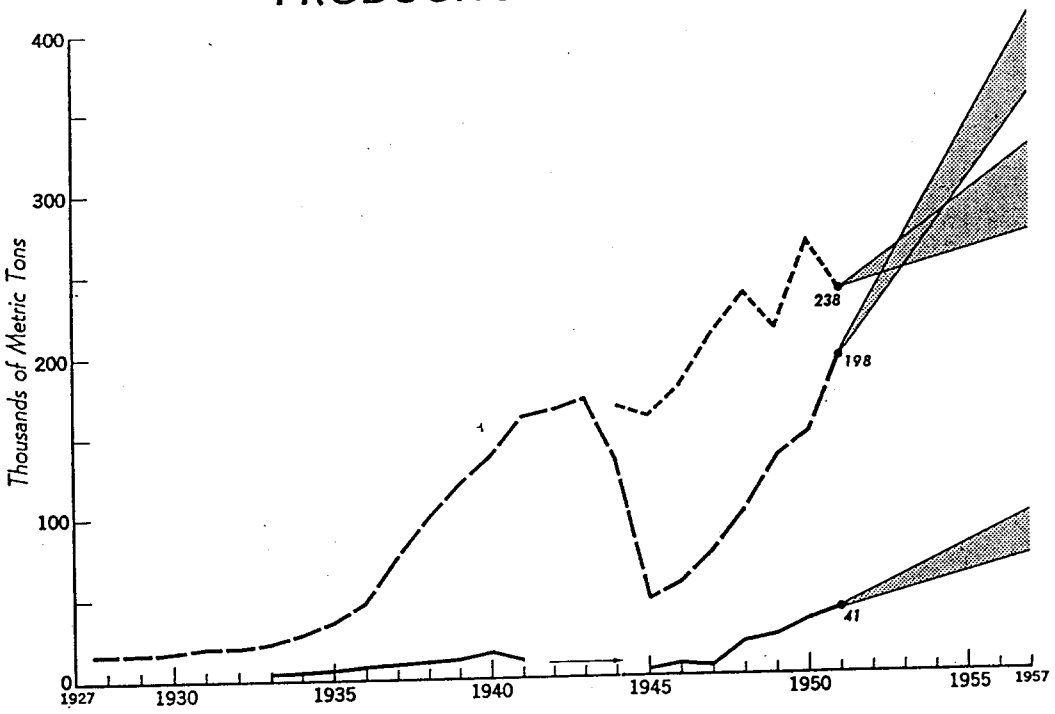
— — — Bloc

——— USSR

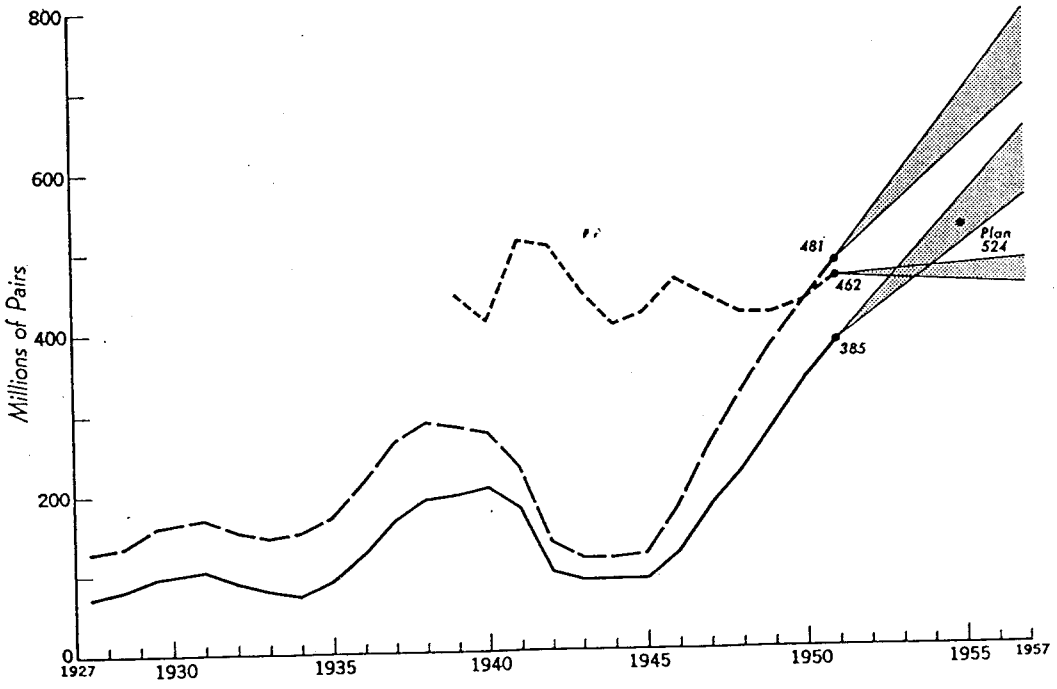
Range of probable production (ORR Estimates)

For components of Index, see Appendix C.

PRODUCTION OF RAYON



PRODUCTION OF BOOTS & SHOES



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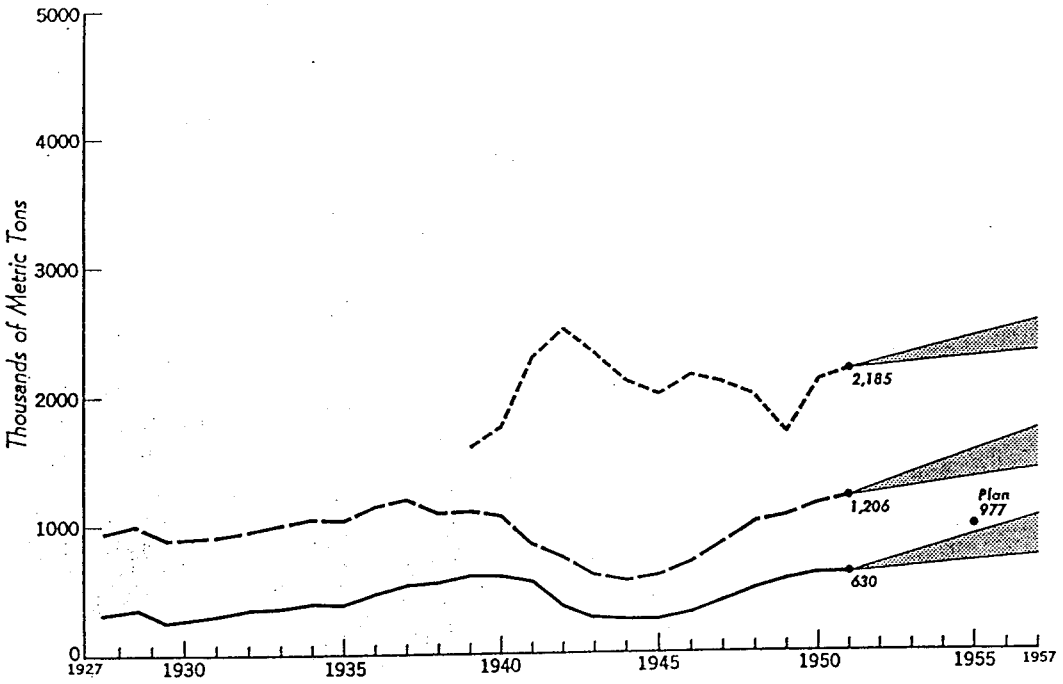
PRODUCTION OF COTTON YARN



PRODUCTION OF WOOL YARN

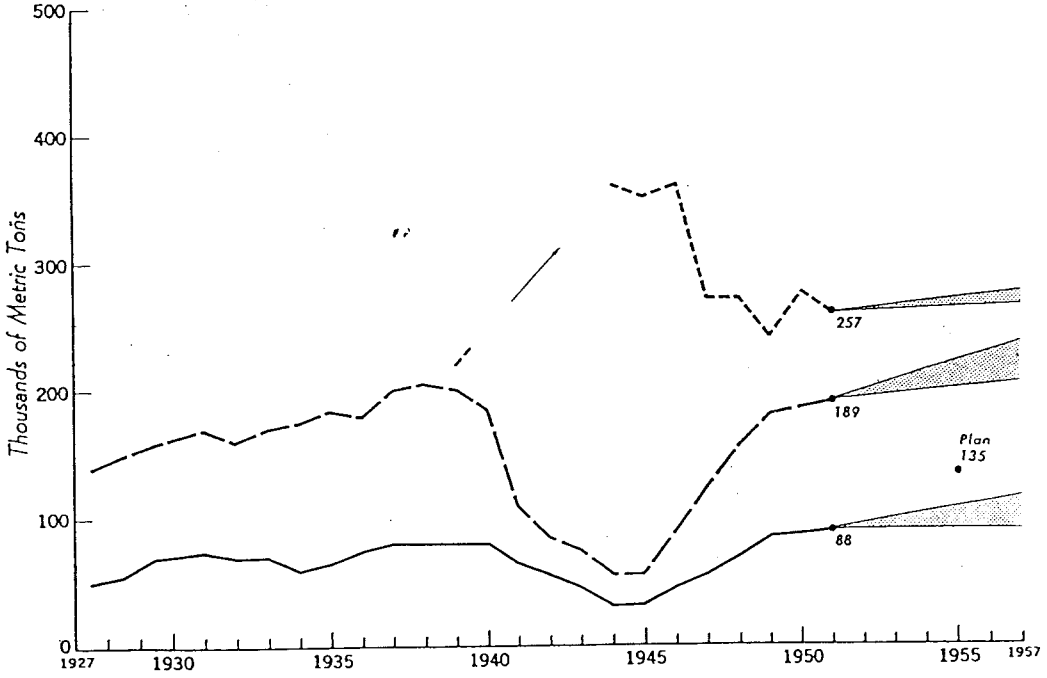
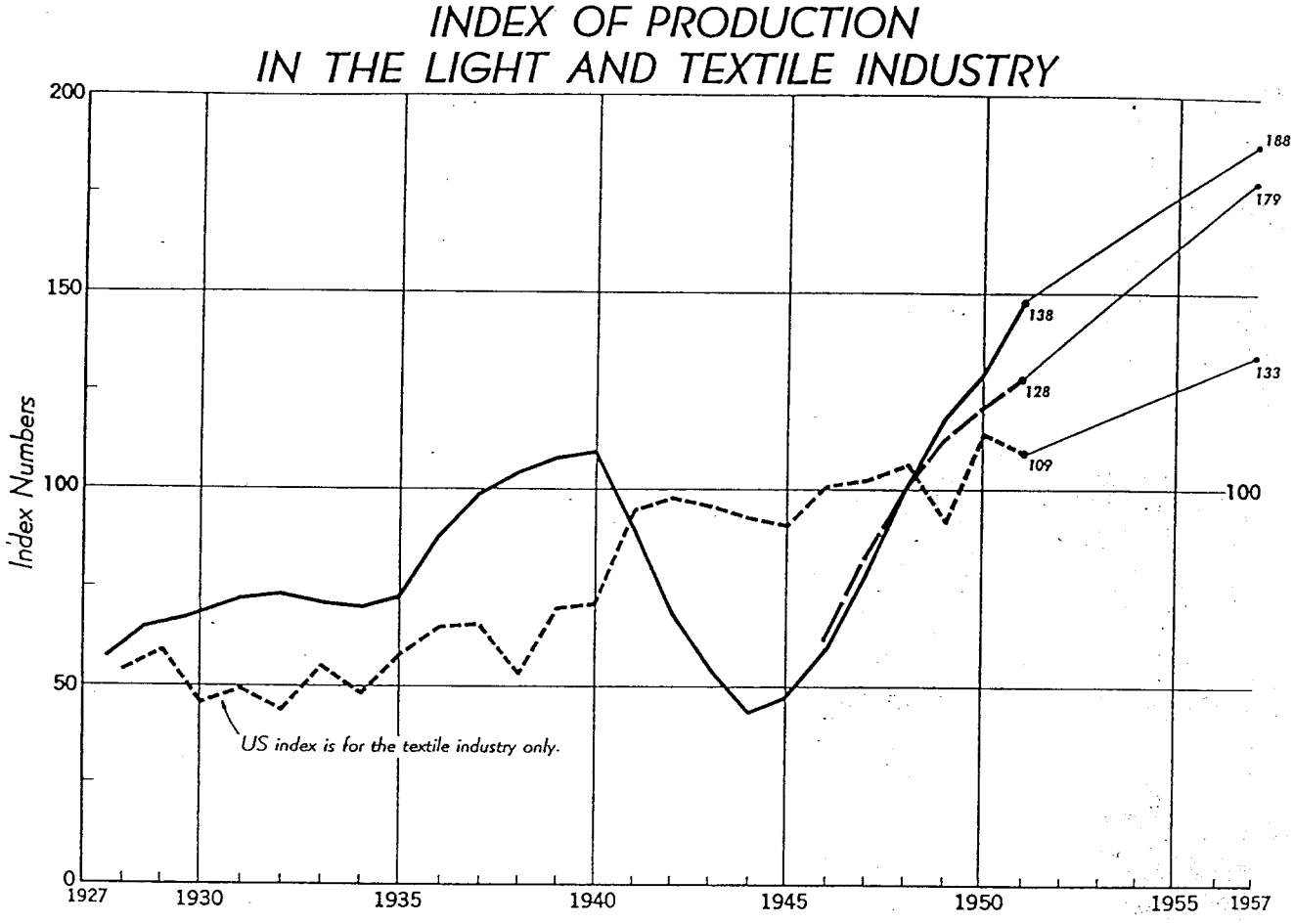


CHART 20

LIGHT AND TEXTILE INDUSTRY



Base Period: US, 1947-49=100
USSR & Bloc, 1948=100

------- US

— — — Bloc

——— USSR

Range of probable production (ORR Estimates)

For components of Index, see Appendix C.

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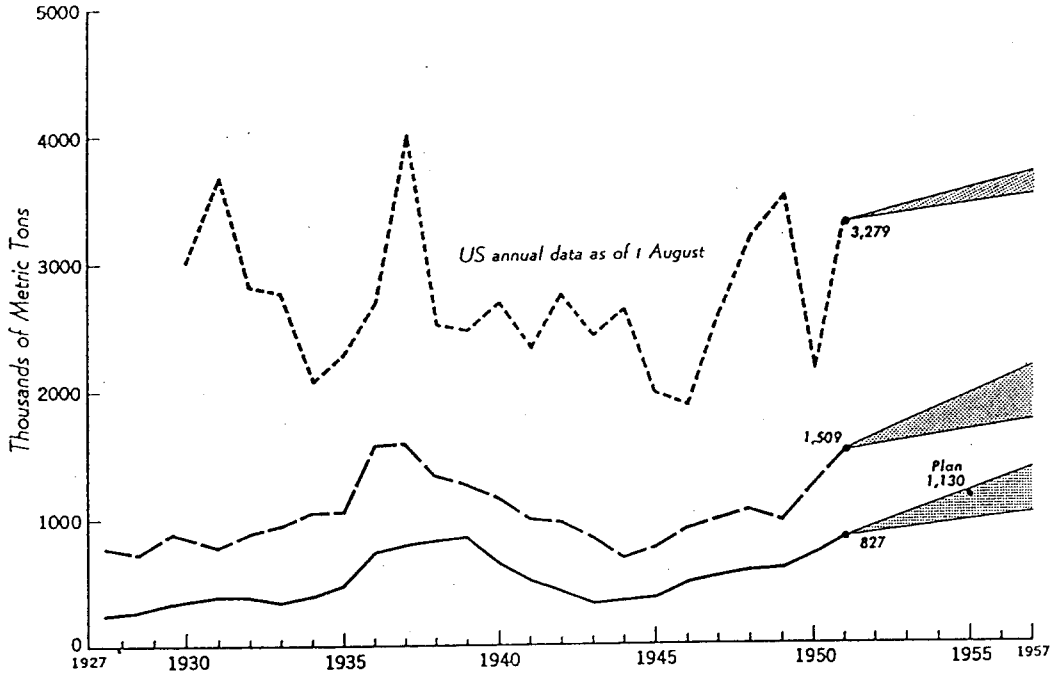
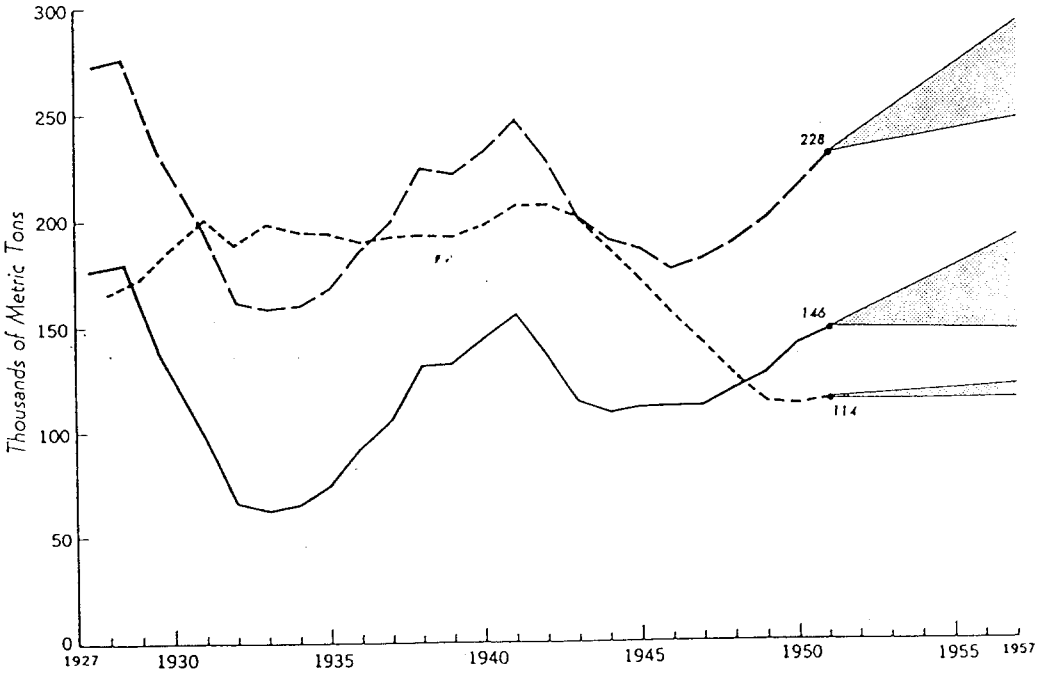
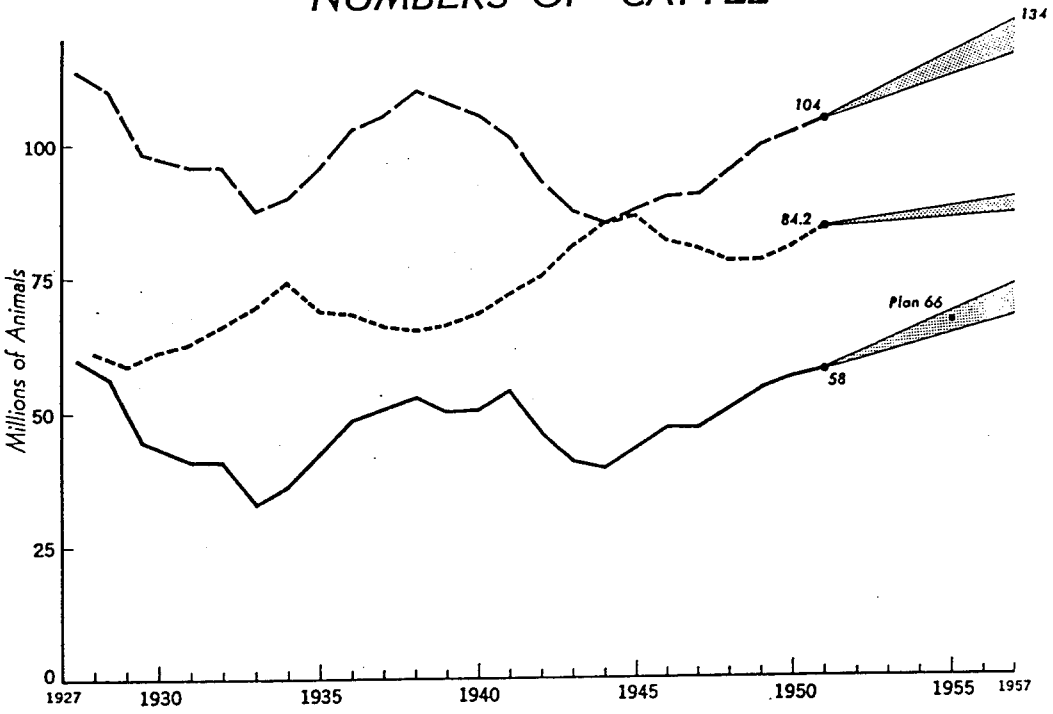
PRODUCTION OF COTTON



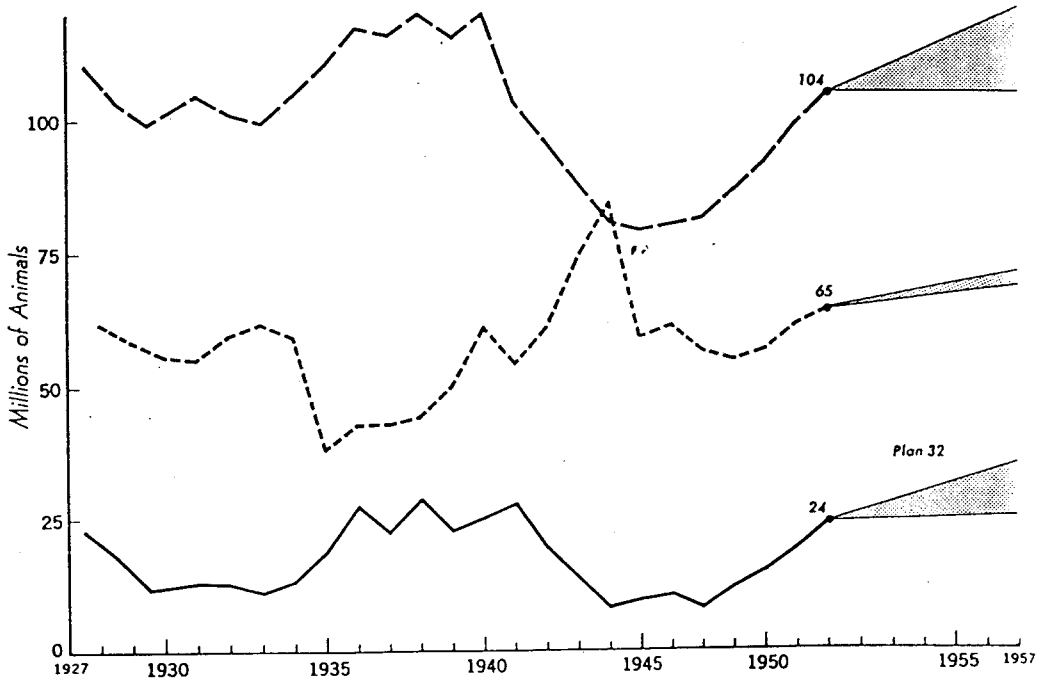
PRODUCTION OF WOOL



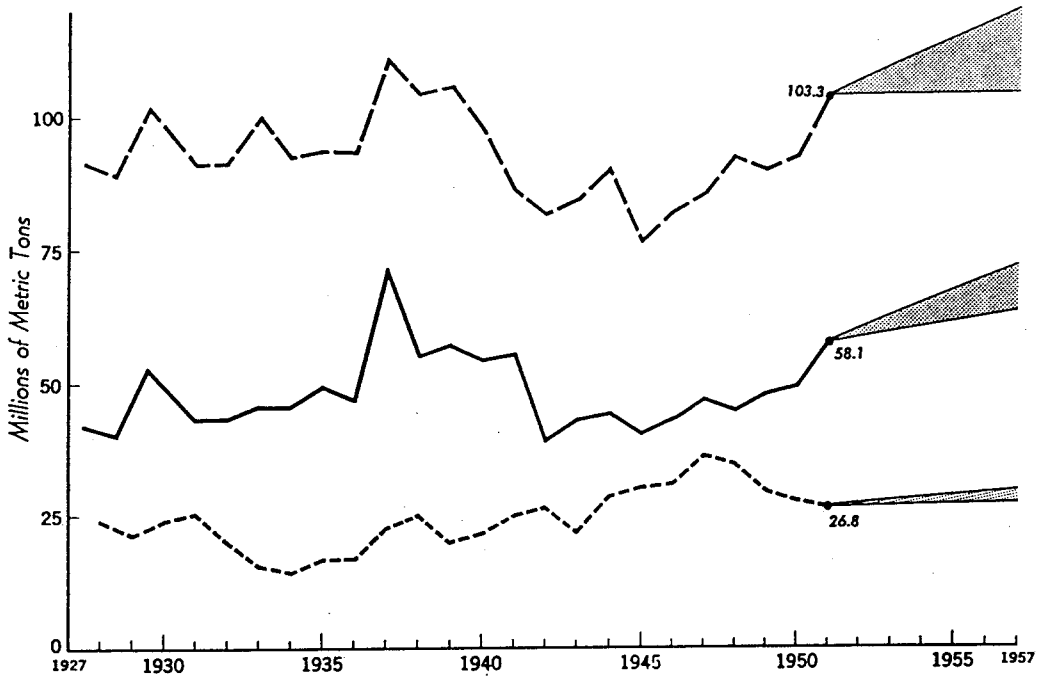
NUMBERS OF CATTLE



NUMBERS OF HOGS



PRODUCTION OF BREAD GRAINS

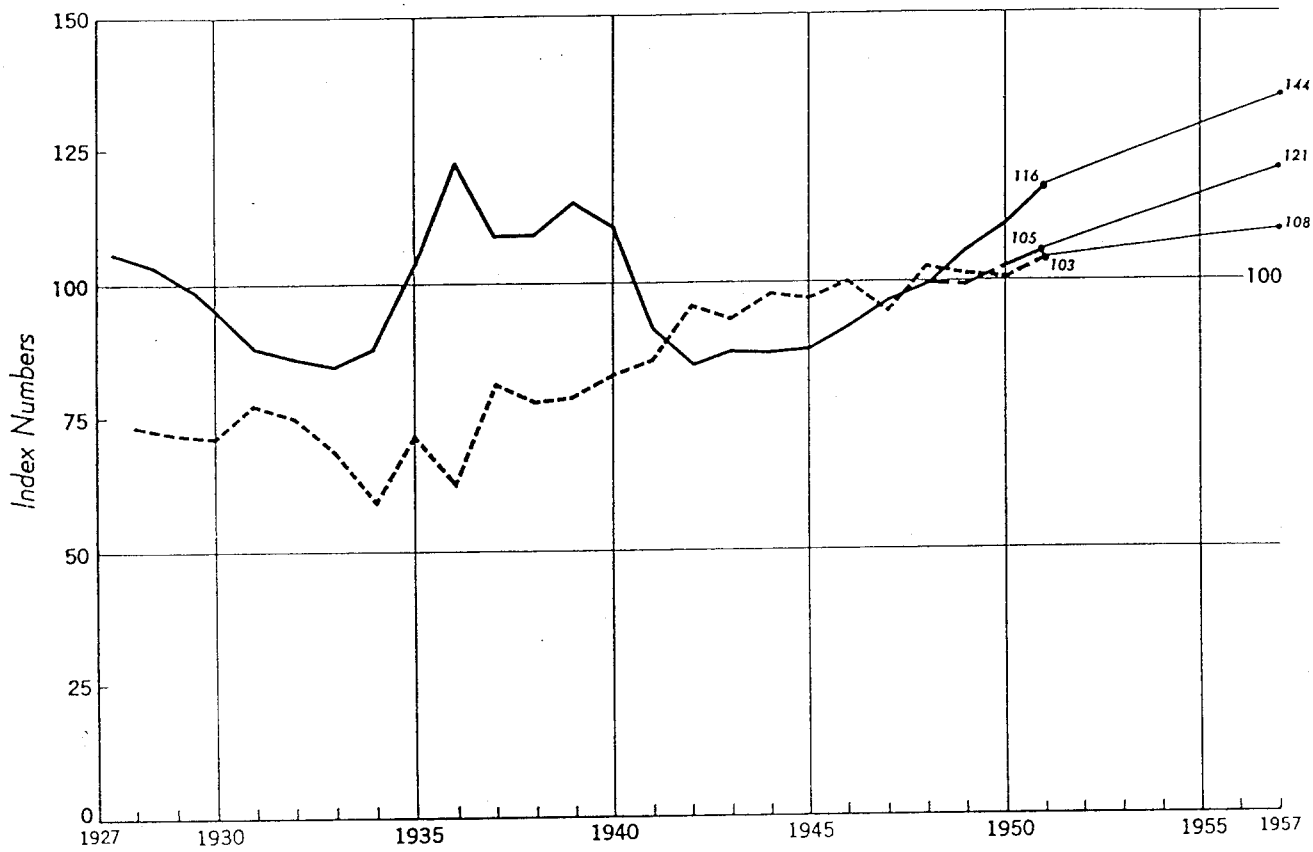


PRODUCTION OF POTATOES

CHART 21

AGRICULTURE

INDEX OF AGRICULTURAL PRODUCTION



Base Period: US, 1947-49 = 100
USSR & Bloc, 1948 = 100

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— — — Bloc

——— USSR

Range of probable production (ORR Estimates)

For components of Index, see Appendix C.

APPENDIX B

RELIABILITY OF PRODUCTION DATA USED IN CONSTRUCTING INDEXES

Each index in Appendix A is a time series indicating production trends in a branch of industry or in a major sector of the economy over a period of years. Each branch index was constructed by aggregating the value of output of major or typical commodities in the branch. Even with this selective coverage it was necessary to collect a vast array of output figures in order to make economy-wide estimates. Production series for more than 125 commodities and services were used in constructing Soviet and Soviet Bloc indexes.* To deal with the reliability of such a mass of figures, which is the purpose of this index, necessarily involves a choice between a comprehensive listing of diverse and voluminous source materials, on the one hand, and generalization from particulars, on the other. Because detailed documentation would be unmanageable in a report of this size, the latter method was selected, even though it involves loss of accuracy. Details of production data will be published separately in a forthcoming ORR economic intelligence handbook on the Soviet Bloc, and sources will be included in a documentary supplement to the handbook.

1. Prewar Production Data on the USSR.

Although there is reason to question the accuracy of many prewar Soviet statistics, those used in this report are believed to be

* The indexes on the USSR incorporate 109 industrial goods or groups of goods, 13 agricultural crops, and 5 services over a 24-year period, 1927-28 through 1951. Thus, taking account of occasional omissions, over 3,000 individual statistics were used. The coverage of the Soviet Bloc indexes is for nine countries -- the USSR, seven European Satellites, and Communist China -- aggregating the same commodities and services but only during a 6-year period, 1946-51. Thus, with omissions, the Bloc indexes were derived from over 6,000 individual production statistics. The economic activity of Viet Minh and North Korea cannot currently be measured; but even if measurable, their inclusion would have little influence upon the Bloc indexes, because of the relative smallness of both these countries.

reliable. Soviet statisticians are known to have followed questionable practices, particularly in constructing indexes which were weighted in such a manner as to impart considerable exaggeration to actual accomplishments. ORR has not, however, used Soviet indexes in establishing prewar output data. The statistics used for this period are, with few exceptions, official physical data: that is, metric tons, individual units, or ton-kilometers. Statistical collection techniques of the prewar period may have been relatively undeveloped, but no intentional bias or serious distortion in these figures is known.

For 1938 and 1939, official statistics are scarce, and for 1940 there are almost none. The 1941 Plan, however, furnishes an excellent means of estimating production in these years. The process of interpolating provides estimates which, on the average, probably have a low degree of error.

2. Wartime and Postwar Production Data on the USSR.

Wartime and postwar Soviet data are far more questionable. There is little independent evidence available for assessing their accuracy. Errors could be sizable and could have initiated a chain of erroneous estimates on Soviet Bloc capabilities.

With occasional exceptions, production figures since 1941 are based on official Soviet pronouncements, usually Plans, Plan fulfillments, announced percentage increases over 1940, or percentage increases over a preceding year. They are frequently derived by applying reported percentage increases in chain fashion to a relatively firm figure on physical production. Two questions regarding the use of technique must be answered. First, have the Soviet pronouncements been properly interpreted? Second, are official pronouncements distorted for propaganda purposes?

Data released by Soviet authorities are purposely vague. Many statements are subject to wide latitude in interpretation. In using these materials, ORR has scrutinized them closely in conjunction with corroborating and conflicting evidence. Covert materials and official data were amalgamated with scraps of published information, such as excerpts from newspapers and radio broadcasts. In many places, estimates were made by interpolation or extrapolation of trends. Other series were obtained by combining pieces of information on a limited number of plants and models. For many commodities and branches,

this research has produced estimates believed to be reliable; for others, the margin of error is large. Conclusive appraisal of the probable error in interpreting Soviet pronouncements must await further research based on evidence wholly independent of Soviet claims.

With respect to deliberate distortion, no conclusive answer is possible. ORR may have erected a "paper economy." On this score it would be fairly easy for the Soviet Bloc leaders to deceive the West and their own peoples. In announcing Plan goals and Plan fulfillments, for example, every figure might be increased by some fraction, such as 10 or 25 percent. Such a deception might be practiced to create an exaggerated impression of Soviet power and to justify to the Soviet Bloc population their depressed living levels. Furthermore, the possibility of detecting it, either in the West or below top administrative levels in the Bloc, would be slight.

In the opinion of ORR, however, there is no deliberate distortion in most official Soviet pronouncements.* Limited intelligence exists which tends to confirm wartime and postwar data based on official claims. One reason for believing that they are correct is their consistency. Close scrutiny of official data indicates, for instance, that reported steel production is not low when compared with reported production of steel products. Similarly, the reported production of crude oil appears consistent with reported consumption of petroleum products. Such consistency does not, of course, eliminate the possibility of wholesale Soviet deception.

A second reason for believing that these Soviet figures are approximately correct is their plausibility. Although the postwar rate of growth of Soviet economy has exceeded normal rates of growth in Western countries by large margins, unusual factors have been involved. These factors are discussed in II, above.

Finally, a few production series derived completely independently of official Soviet data tend to confirm the estimated rapidity of

* This view is supported by a recent study demonstrating the close correspondence between the officially published statistics on 1941 planned output and those found in the captured 1941 Plan. 1/ (Footnote references in arabic numerals are to sources listed in Appendix G.)

of Soviet postwar industrial growth. The following are examples of such series.

b. A plant-by-plant analysis of the heavy electrical machinery industry of the Soviet Bloc 3/ shows this industry's postwar annual rate of growth to be 12 percent. The study comprised every known major plant producing heavy electrical machinery in the Soviet Bloc in 1951. The primary source of information was interrogation of observers, mostly German prisoners of war who had been in close contact with the factories under consideration. Direct observations of output were, in general, confirmed by observations of input factors, such as conditions of machinery and numbers of workers. More than 1 year's production, however, could be estimated for only 6 of the 27 major producing plants.

c. A plant-by-plant analysis of the Soviet electron tube and electric lamp industry 4/ shows the annual increase in the value of electron tube production to be from 20 to 40 percent during the past few years and that of electric lamps to be approximately 11 percent. The primary materials used in this report were interrogation of observers formerly employed in the Soviet electronics industry and of prisoners of war; excerpts from Soviet newspapers, periodicals, and radio broadcasts giving pieces of information about inputs, outputs, and conditions of individual plants;

3. Source Materials for Production Data on the Satellites.

The data on the Satellites, including Communist China, were obtained more from covert sources than from published sources. Data on East Germany, Poland, and Czechoslovakia are especially abundant. Since ORR has not, however, devoted so much of its basic research to the Satellites as to the USSR, estimates of Satellite production are weaker than those of Soviet production.

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APPENDIX C

METHODOLOGY OF AGGREGATION

1. Production Indexes.

This appendix appraises the aggregation process employed to combine the historical and projected estimates into production and gross national product indexes.

a. Aggregation of Commodities into Industrial Branches.

The indexing technique employed in this report involves three levels of aggregation. The lowest level of aggregation is concerned with the construction of industrial and agricultural branch indexes on the basis of separate commodity output figures. For example, given physical output estimates of copper, lead, aluminum, and the like, how did production of nonferrous metals as a whole vary from one time period to another? The procedure used followed conventional indexing technique. Each commodity for which production was estimated was valued according to its 1949 ruble price quotation. The output of the commodity for a single year was multiplied by its 1949 price to obtain value of output. The same process was followed for subsequent years, using 1949 prices. The value figures for each year for all reported commodities in the branch were then added to obtain value of output for the portion of the branch reported during that year. The year 1948 was selected as the base year for the indexes. A time series was then derived by dividing total value of output of the portion of a branch reported in each year by 1948 value of output.

The commodity compositions of the industrial and agricultural branch indexes are listed under 4, below. The price weights used to convert the physical quantities of each commodity to value terms are noted.

Certain technical problems arose in the preparation of the indexes at this stage. For example, the wisdom of using 1949 prices is open to question. The distorting subsidy element inherent in prewar and perhaps in 1952 Soviet prices leaves only 1949 and 1950 prices as those which bear any relation to real cost factors. Some academic authorities engaged in Soviet research claim that 1949 prices over-

compensated for the removal of subsidies and that 1950 prices were set on a more realistic cost basis. If this argument were accepted (though no substantive proof is possible) and 1950 prices were used, the effect on the indexes would be minor, as prices were used as weights only within branches. Unless there were marked changes in relative prices between 1949 and 1950, the effects on any single index would be minor. Cursory inspection indicates no significant change in relative price relationships. Therefore, the distortions imparted to major sector indexes would be negligible.

The validity of using Soviet prices to weight Soviet Bloc production indexes is also open to question. The assumption upon which they were used was that the structure of relative prices in the Satellites was the same as in the USSR. Although the reality of this assumption cannot be absolutely verified, it is supported by the increasing tendency of the Satellites to quote export prices in terms of rubles. Furthermore, since well over half of the output of most items originates in the USSR, the use of Soviet price weights is realistic.

In several categories -- agricultural products, POL, railway equipment, agricultural machinery, textile machinery, processed foods, and textiles -- it was necessary to use US price weights as Soviet price weights, since Soviet price data were unavailable. The accuracy with which the substitute weights represent Soviet conditions is unknown. Earlier comparison of US and Soviet relative prices for like products indicates wide differences in patterns. In any case, any resulting relative price distortions would affect the aggregated major sector indexes much less than the separate industrial and agricultural branch indexes.

The choice of commodities in some of the indexes can be questioned on grounds of consistency. In most instances the aim was to get as close an approximation as possible to a "value added" measurement of total industrial production. This ideal was approximated by obtaining gross value of end-product output. In most indexes the components consisted of end products only. There are, however, departures from this norm which can be rationalized for institutional reasons. The ferrous metals index includes inputs of alloying materials.* These have been included to take account of the

* See 4b (4), below.

presence of quality steel in the rolled steel item given. Since no separate breakdown of ordinary and quality steel was submitted, alloying elements were included as indicators of quality steel production. Similarly, pig iron production was included to serve as an indicator of iron castings production, not otherwise reported. The seemingly inconsistent inclusion of bauxite in the nonferrous metals index* was made to permit the adjustment of nonferrous metals production to include only the domestic portion of an item which is also imported in large quantities. Inclusion of the value of aluminum produced in the USSR would overstate the value added by the Soviet industry by an amount equal to bauxite imported.

Several of the indexes have special features embodied in their construction. The transportation index components** are based on weighted ruble-per-ton-kilometer values for rail and water transport. The rail figure was derived from quoted costs of hauling several types of freight traffic. For each type of freight the average distance of haul for 1949 was secured from ORR transportation analysts. On this basis a 1949 ton-kilometer charge was derived. For each type of traffic the average ton-kilometer charge was weighted by the total tonnage of that group carried in 1949. The sum of the latter products was then divided by total tonnage carried to obtain the average ton-kilometer rail charge. An analogous technique was used to derive an average water-freightage figure.

The three components of the communications index*** are weighted by charges for representative amounts of the particular service. A representative quantum of service was derived by the ORR analysts responsible for communications.

The electrical machinery index**** has no weights noted except in the case of turbines, and the electronic equipment index***** has no weights at all. The production of electrical items was reported directly in value terms by ORR analysts, as the heterogeneous nature of their output did not make for meaningful physical quantities. Therefore, one step could be omitted in the preparation of this index.

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* See 4b (5), below.
** See 4a (8), below.
*** See 4a (9), below.
**** See 4b (10), below.
***** See 4b (11), below.

Several of the industrial branch indexes are based on single commodities or on single series.* The fundamental hypothesis assumed in these cases is that total industrial output either varies directly as the output of the single product, as in the case of excavators for construction equipment, or varies as does production recorded in an arbitrary system, such as "units" of sundry types of metalworking machinery. The indexing process here is the simple one of converting the physical production figures to relative terms.

The defense industry index was derived indirectly. No reliable estimates of military production were available. As a substitute, the military procurement components of Soviet defense budgets from 1947 to 1951 were used as a point of departure. 5/ Total military procurement was assumed to correspond to total military production. The procurement figures were then deflated by a machinery price index prepared by for a forthcoming Rand monograph. The deflated monetary magnitudes were then expressed as relatives with the standard base of 1948 as 100. The validity of the index can be challenged on grounds of both data and deflation technique. The procurement figures are residuals left after other components are deducted from a conjectural total defense figure and hence are subject to the usual reservations attached to residual estimates. Furthermore, the accuracy with which representative changes in machinery prices reflect price changes in military end items is not known. Machinery prices have been used for this purpose, since, in general, production of machinery is closely related to military production.

b. Aggregation of Industrial and Agricultural Branch Indexes into Major Sector Indexes.

Since more comprehensive measures of economic capabilities than indexes of separate industries are required, it was necessary to aggregate individual industrial and agricultural branch indexes into over-all industry and agriculture time series. The major sector indexes thus compiled, together with their components and weights, are listed under 4a, below.

The industry series was constructed by weighting and aggregating the indexes of output for industrial branches. The index number for each industrial component for each year was multiplied by

* See 4b (1), (6), (7), (8), (13), and (17), below.

its 1941 value added weight. For any 1 year the resultant products of all component industries were added. The 1948 sum was taken as a base with a value of 100, and the sums of all other years were expressed as percentages of 1948.

In constructing the producer goods and consumer goods indexes, it was necessary to include some industries in both indexes. The basis for splitting the industry weight to fit it into both major sectors was largely the use pattern of the Rand input-output table constructed from 1941 Plan data. 6/ In the case of construction materials it was necessary to make an intuitive judgment.

The agriculture, transportation, and communications indexes were compiled in a manner analogous to that used to obtain indexes of industrial and agricultural branches (see 1a, above). Since these sectors are less complex than industry, and since output data for them were relatively complete, their activity changes can be computed directly by using physical quantities and prices of their components. The special weighting used in the transportation index has been described in the preceding section.

The value-added weights used in the industrial indexes were taken from information provided in the Rand input-output table. 7/ Value added was obtained by adding together the payroll of an industry plus double its capital consumption allowance. In strict statistical procedure, value added should include labor cost, plus depreciation, plus profits. The arbitrary nature of Soviet industry profits, however, made them invalid for this purpose. In order to give some indication of services rendered by capital factors, the depreciation element has been included as a reasonable substitute. The official figures for depreciation allowance were doubled in order to make them realistic, the official allowances being gross underestimations.

No payroll or depreciation figures were given for the various machinery and metals fabrication industries, the group being treated as a whole. The distribution of the machinery value-added total among its components was made in proportion to the share each contributed to total value of machinery output in 1937. 8/ A rule-of-thumb adjustment of these percentages was made in order to account for shifts in machinery production between 1937 and 1941.

The absolute value-added figures for each industry were then expressed as percentages of gross national product. 9/ These percentages are the weights used to construct the major sector industry indexes.

At this level of aggregation the value-added weights employed in the Soviet indexes could not be used in the Soviet Bloc indexes, as the industrial structures of the Satellites do not resemble those of the USSR very closely. To derive Bloc weights, a composite breakdown of the Satellite labor force was constructed from Polish, East German, and Rumanian labor force information. The Satellite percentages were then combined with the Soviet proportions with a weighting of 1 to 3, respectively, to produce the Bloc value added weights.

The chief criticism of the weights used, other than a questioning of the value-added concept employed, is the relevance of 1941 weights to a 1952 industrial structure. Undoubtedly, important shifts in economic relationships occurred during the war, recovery, and rearmament of this period. The crucial question for purposes of this report is how a difference in weights would affect the direction of the index. During the period there was a much greater expansion of heavy industry than of consumer goods industries.* This differential growth pattern means that heavier weights should be given to the fast-growing sectors and smaller weights to the laggard industries. Unless this adjustment is made, the over-all rate of growth is biased downward, both by an understatement of the expansion effect of the rapid growth of heavy industry and by an overstatement of the retarding effect of the slow growth of consumer industry. It is difficult to make quantitative adjustments, because the coverage of most sectors is far from complete. All that can be contributed at present is a qualitative statement that the major sector indexes are biased downward. In all three periods under consideration the growth rates are probably larger than the indexes indicate.

2. Gross National Product Indexes.

The higher level of aggregation involved combining major sector indexes into a single index of gross national product. The procedure used resembled that applied in the combination of industries into major sector indexes. Each major sector index was given a value-added weight based on information taken from the Rand 1941 input-output

* See Appendix A.

table. The Rand data were adjusted to obtain the actual weights used. The gross national product index itself was constructed in the same way as the major sector indexes: that is, by (a) multiplying the weights by major sector indexes and (b) adding the products for all major sectors for the years 1948 through 1951 and expressing the results in terms of 1948. (See Table 2.)*

The construction index is based on construction figures provided in a recent monograph on Soviet investment. 10/ These monetary magnitudes were then deflated by a construction price index. 11/ The deflated time series is expressed in index form with the usual 1948 base. Both the original raw figures and the price index used to deflate them have tenuous validity, but the resultant index does not seem unrealistic in comparison with the industry and agriculture sector time series.

Since value added in both trade and services is almost entirely a labor factor, it was deemed justifiable to measure movements by employment in the sector, with a slight upward productivity adjustment. The assumption of homogeneity of labor in the services sector most likely understates the change in the levels of activity, particularly in health and education.

A severe limitation to the validity of the gross national product index lies in application of 1941 weights to the 1952 economic structure. Some indication of the degree to which shifts occurred between 1948 and 1951 in the relationship between major sectors is given in Table 2. The changes taking place between 1941 and 1948 must have been equally significant. The downward bias of the gross national product index arises from the same factors which affected the industry indexes. This bias arises from an understatement of growth attributable to underweighting the fast-growing industry sector and from an overstatement of retardation attributable to overweighting the declining agriculture sector. It is possible only to indicate a qualitative adjustment of the statistics. The growth of gross national product is understated, but not to a significant degree.

Lack of information regarding the service and trade sectors made it impossible to construct gross national product indexes for

* Table 2 follows on p. 36.

Table 2

Gross National Product Index for the USSR
1948-51, 1957

Sector	Weight	1948 Sector Index	Weight x 1948 Sector Index	1949 Sector Index	Weight x 1949 Sector Index	1950 Sector Index	Weight x 1950 Sector Index	1951 Sector Index	Weight x 1951 Sector Index	1957 Sector Index	Weight x 1957 Sector Index
Industry	36.2	100	3,620.0	119	4,307.8	139	5,031.8	159	5,755.8	256	9,267.2
Agriculture	23.4	100	2,340.0	105	2,457.0	110	2,574.0	116	2,714.4	144	3,369.6
Construction	5.6	100	560.0	111	621.6	122	683.2	137	767.2	190	1,064.0
Transportation	8.3	100	830.0	117	971.1	134	1,112.2	149	1,236.7	202	1,676.6
Communications	1.0	100	100.0	110	110.0	120	120.0	132	132.0	203	203.0
Trade a/	3.6	100	360.0	101	363.6	103	370.8	105	378.0	117	421.2
Services a/	21.8	100	2,180.0	104	2,267.2	108	2,354.4	112	2,441.6	136	2,964.8
Gross National Product b/ $\left(\frac{\Sigma \text{Weight}_{48} \times \text{Index}_{n}}{\Sigma \text{Weight}_{48} \times \text{Index}_{48}}\right)$		1948: 100		1949: 111		1950: 123		1951: 134		1957: 190	
Compound Growth Rate			11.0%		10.8%		8.9%		6.0%		

a. Based on ORR employment estimates. Productivity adjustments introduced.
b. Official gross national product indexes are as follows: 1948: 100; 1949: 117; 1950: 141; and 1951: 158.

key years prior to 1948. Instead, reliance had to be placed on secondary sources. A rough check was made on the borrowed indexes by using ORR index numbers for the producer, consumer, and military goods subsectors weighted by the 1941 weights used to devise the sector indexes. The conformity of results between the two sources is close.

3. Breakdown of Gross National Product by Use.

The breakdown of the gross national product by use for selected years also was derived from secondary sources. National economic aggregates rather than output were used as the basis for constructing these figures. The 1957 percentages are based on extrapolation of the 1948-52 trends of current ruble values of each component on an arithmetic scale. An almost identical pattern results if the extrapolations are based on data published in the official Five Year Plan announcement, after the data have been adjusted to account for conceptual differences in US and Soviet national economic accounting procedures.

4. Index Components and Weights Used in Constructing Indexes.

a. Major Sectors.

	USSR Value Added	Soviet Bloc Value Added
(1) Industry Index.	(% Industry)	
Shipbuilding	0.9	1.3
Electric Power	2.2	2.7
Bearings	0.1	0.1
Light and Textile Industry	10.3	5.5
Construction Equipment	0.6	0.9
Metalworking Machinery	0.9	1.3
Machine Tools	0.4	0.6
Automotive Equipment	3.5	5.1
Agricultural Machinery	1.2	1.8

	USSR Value Added	Soviet Bloc Value Added
(1) Industry Index. (Continued)	(% Industry)	
Railway Equipment	2.6	3.8
Mining Machinery	0.9	1.3
Textile Machinery	0.6	0.9
Electrical Machinery	1.4	2.0
Electronic Equipment	0.5	0.8
Chemicals	3.0	6.4
Forestry Products	11.5	5.6
Construction Materials	2.4	2.0
POL	2.2	1.2
Nonferrous Metals	2.9	1.9
Ferrous Metals	7.9	8.0
Solid Fuels	5.9	11.7
Food Industry	8.3	8.8
Defense Industry	18.3	13.0
(2) Producer Goods Index.		
Shipbuilding	0.9	1.3
Electric Power	1.8	2.2
Bearings	0.1	0.1
Construction Equipment	0.6	0.9
Metalworking Machinery	0.9	1.3
Machine Tools	0.4	0.6
Automotive Equipment	3.3	4.8
Agricultural Machinery	1.2	1.8
Railway Equipment	2.6	3.8
Mining Machinery	0.9	1.3
Textile Machinery	0.6	0.9
Electrical Machinery	1.4	2.0
Electronic Equipment	0.5	0.8
Chemicals	3.0	6.4
Forestry Products	8.7	4.2

	USSR Value Added	Soviet Bloc Value Added
	(% Industry)	
(2) Producer Goods Index. (Continued)		
Construction Materials	1.6	1.3
POL	2.0	1.1
Nonferrous Metals	2.9	1.9
Ferrous Metals	7.9	8.0
Solid Fuels	5.9	11.7
Defense Industry	18.3	13.0
(3) Consumer Goods Index.		
Electric Power	0.4	0.5
Light and Textile Industry	10.3	5.5
Automotive Equipment	0.2	0.3
Forestry Products	2.8	1.4
Construction Materials	0.8	0.7
POL	0.2	0.1
Food Industry	8.3	8.8
(4) Energy Index.		
Electric Power	2.2	2.7
Solid Fuels	5.9	11.7
POL	2.2	1.2
(5) Metals Index.		
Ferrous Metals	7.9	8.0
Nonferrous Metals	2.9	1.9
(6) Machinery and Equipment Index.		
Shipbuilding	0.9	1.3
Bearings	0.1	0.1
Construction Equipment	0.6	0.9
Automotive Equipment	3.5	5.1

	USSR Value Added	Soviet Bloc Value Added
(6) Machinery and Equipment Index. (Continued)	(% Industry)	
Electrical Machinery	1.4	2.0
Electronic Equipment	0.5	0.8
Railway Equipment	2.6	3.8
Metalworking Machinery	0.9	1.3
Agricultural Machinery	1.2	1.8
Mining Machinery	0.9	1.3
Textile Machinery	0.6	0.9
Machine Tools	0.4	0.6

	USSR	Soviet Bloc
(7) Agriculture Index.	(Dollars per Metric Ton)	
Bread Grains	100.06	
Other Grains	46.79	
Rice	241.92	
Potatoes	50.50	
Horses	43.40 (per Unit)	
Sheep and Goats	7.61 (per Unit)	
Cattle	117.37 (per Unit)	
Hogs	41.94 (per Unit)	
Cotton Lint	583.66	
Wool	1,040.76	
Hemp Fiber	603.20	
Silk	6,416.55	
Flax	866.90	

(8) Transportation Index.	(Rubles per Ton-Kilometer)
Railroads	0.05
Water Transport (Internal)	0.04

(9) Communications Index.	(Rubles per Unit)
Telephone Subscription	500.0
Long-Distance Phone Calls	5.5
Telegrams	11.0

b. Industrial and Agricultural Branches.

	USSR	Soviet Bloc
(1) Electric Power Index.*		
Electric Power Generation		
(2) Solid Fuels Index.	(Rubles per Metric Ton)	
Anthracite and Bituminous Coal	125	
Lignite	33	
Peat	49	
(3) POL Index.	(Dollars per Metric Ton)	
Crude Oil	33.72	
	(Dollars per Thousand Cubic Meters)	
Natural Gas	1.35	
Manufactured Gas	0.70	
(4) Ferrous Metals Index.	(Rubles per Metric Ton)	
Manganese	1,760	
Molybdenum	370,000	
Tungsten	276,000	
Metallurgical Coke	700	
Pig Iron	476	
Rolled Steel	1,200	
Vanadium	10,300	
Cobalt	480,000	
(5) Nonferrous Metals Index.		
Bauxite	449	
Platinum Group	15.7 (Troy Ounces)	
Tin	105,000	
Fluorspar	3,715	

* Index constructed on the basis of a single commodity.

	USSR	Soviet Bloc
(5) Nonferrous Metals Index. (Continued)	(Rubles per Metric Ton)	
Primary Copper		7,100
Secondary Copper		5,000
Primary Aluminum		7,430
Secondary Aluminum		4,000
Lead (Refined)		4,025
Zinc (Refined)		3,040
(6) Shipbuilding Index.*		
Merchant Ships		
(7) Bearings Index.*		
Ball and Roller Bearings		
(8) Construction Equipment Index.*		
Excavators		
(9) Automotive Equipment Index.	(Rubles per Unit)	
Trucks		33,000
Passenger Cars		24,000
Tractors		40,000
(10) Electrical Machinery Index.**	(Rubles per Kilowatt-Hour)	
Turbine Production (Steam, Hydro)		150
Motors (Electrical)		
Generators (Electrical)		
Power and Distribution Transformers		
Electric Lamps		

* Index constructed on the basis of a single commodity.
** All items except turbines reported in value terms.

(11) Electronic Equipment Index.*	USSR	Soviet Bloc
Radio and Television Receivers		
Electron Tubes		
Telephone and Telegraph Equipment		
Professional Electronic Equipment		
Electronics Components		
Electrical and Electronic Test Equipment		

(12) Railway Equipment Index.	(Dollars per Unit)
Steam Locomotives	119,000
Electric Locomotives	177,000
Diesel Locomotives	161,000
Freight Cars and Parts	2,000
Railway Passenger Cars and Parts	45,000

(13) Metalworking Machinery Index.**

Metalworking Machinery (Other than Machine Tools)	(Dollars per Unit)	
(14) Agricultural Machinery Index.		
Tractor Plows (Moldboard Type)	175	No Bloc Data
Combines	2,500	
Tractor Seed Drills	280	
Tractor Cultivators	165	

(15) Mining Machinery Index.	(Rubles per Unit)
Coal Cutters	39,800
Coal Combines	77,000
Coal Loaders	50,000
Mining Locomotives (Coal)	31,000

* All items reported in value terms.
** Index constructed on the basis of a single commodity.

	USSR	Soviet Bloc
(16) Textile Machinery Index.	(Dollars per Unit)	
Looms	1,200	No Bloc Data
Spindles	20	
(17) Machine Tools Index.*		
Machine Tools		
(18) Chemicals Index.	(Rubles per Metric Ton)	
Rubber Tires	670 (per Unit)	
Reclaimed Rubber	3,620 (per Long Ton)	
Sulfuric Acid	362	
Nitric Acid	900	
Ammonia (Synthetic)	1,650	
Caustic Soda	2,300	
Chlorine	450	
Calcium Carbide	1,600	
Benzol (Refined)	1,710	
Toluol	2,178	
Phenol (Refined)	3,168	
Cresols	2,970	
Xylol	2,079	
Naphthalene	2,500	
Synthetic Rubber	11,500 (per Long Ton)	
(19) Construction Materials Index.	(Rubles per Metric Ton)	
Gypsum	95	
Asbestos	50,227	
Cement	209	
Unglazed Brick**	275 (per Thousand Units)	
Flat Glass**	14.5 (per Square Meter)	

* Index constructed on the basis of a single commodity.

** Not included in Soviet Bloc index.

	USSR	Soviet Bloc
(20) Forestry Products Index.	(Rubles per Cubic Meter)	
Timber (Pitprops)	98	
Timber (Pulpwood)	85	
Softwood Lumber (Sawn)	1,121	
Hardwood Lumber (Sawn)	423	
Plywood	3,000	
Fuelwood	46	
	(Rubles per Metric Ton)	
Woodpulp (Mechanical)	940	
Woodpulp (Chemical)	1,505	
Paper Products (Other Papers)	1,000	
Paper Products (Newsprint)	1,395	
Paper Products (Paper Board)	2,120	
(21) Food Processing Industry Index.	(Dollars per Metric Ton)	
Fish Catch	250.82	
Meat Production	1,307.57	
Sugar (Raw Value)	157.95	
Vegetable Oils	374.85	
Animal Fats	725.76	
(22) Light and Textile Industry Index.		
Cotton Yarn Production	1,378.13	
Wool Yarn Production	8,489.25	
Rayon Production	2,208.60	
Boots and Shoes Production	1,700.00	
(23) Defense Industry Index.		
(24) Food Crops and Livestock Index.		
Bread Grains	100.06	
Other Grains	46.79	
Rice	241.92	
Potatoes	50.50	
Horses	43.40	(per Unit)

	USSR	Soviet Bloc
(24) Food Crops and Livestock Index. (Continued)	(Dollars per Metric Ton)	
Sheep and Goats	7.61 (per Unit)	
Cattle	117.37 (per Unit)	
Hogs	41.94 (per Unit)	
(25) Industrial Crops Index.		
Cotton Lint	583.66	
Wool	1,040.76	
Hemp Fiber	603.20	
Silk	6,416.55	
Flax	866.90	

APPENDIX D

METHODOLOGY OF EXTRAPOLATION

This appendix reviews the methodology used in projecting past trends forward to 1957. As no single criterion could be discovered which could be applied to extrapolate all trends, various methods were employed. In some branches, 1957 output of individual commodities or services was first estimated, and a 1957 index of branch output was computed from such estimates. In others the future trend of output in an entire branch was first established, and, using it as a guide, production of individual commodities in 1957 was then estimated. Where the commodity-by-commodity approach was employed, the method for assessing future output usually assumed either that absolute annual increases achieved during recent years would be a continuing phenomenon until 1957 or that the Fifth Five Year Plan (1951-55) goals were realizable and thus reliable indicators of future output. When branch trends were used, the procedure was one either of ascertaining the recent annual rate of growth of branch production and increasing the index by this rate each year from 1951 through 1957 or, in several branches which manufacture machinery and equipment, of estimating 1957 industrial requirements for their products. Agriculture and industries closely allied to it presented particular difficulties, which are discussed separately. Special procedures followed in projecting the expansion of defense production also are reviewed.

Soviet Bloc trends were extrapolated to account simultaneously for estimated Soviet trends and for estimated growth of output in the Satellites. The methodology for extrapolating Bloc trends was the same as for Soviet trends, except in sectors where Soviet Plan figures are the basis for estimating growth. In these sectors the Satellite component of Bloc production was projected in accordance with absolute annual increases of recent years.

1. Extrapolation in Accordance with the Fifth Five Year Plan.

The description of the Fifth Five Year Plan (1951-55) recently released by the Kremlin provides a comprehensive outline of Soviet economic intentions. There is evidence in the historical performance of the Soviet economy that the Fifth Five Year Plan objectives will be attained. The Fourth Five Year Plan (1946-50) was fulfilled in most

sectors, and the Fifth Five Year Plan has been overfulfilled during its first 1-3/4 years. Therefore, where Fifth Five Year Plan goals were known, extrapolations were usually adjusted in accordance with them. Following this, the 1957 output of other commodities whose production growth would tend to parallel those for which Plan figures were available was similarly adjusted.

This technique was applied to extrapolate production trends in the following branches of Soviet economic activity: transportation, energy, ferrous metals, nonferrous metals, construction materials, machine tools, and automotive equipment.

Although numerous Fifth Five Year Plan figures are available for agriculture and consumer goods, ORR has rejected these figures as guides to future output. In past Plans, goals for agricultural commodities and industries closely tied to agriculture were consistently underfulfilled by large margins, and goals of the present Plan are also too high for achievement. The difficulties of estimating the degree of their underfulfillment are explained in 5, below.

2. Extrapolation in Accordance with Absolute Increases of Recent Years.

In most industrial branches, as in most individual commodities, in the 3 years following 1948 absolute annual increases in production tended to remain constant. Output curves for many commodities and branches if measured on linear scales are a straight line over recent years. With a large number of the commodities, constancy of absolute increases existed throughout the entire postwar period. This is an unusual phenomenon for such long periods of time in so many segments of an economy or group of economies and is probably explained by Communist economic and social controls designed both to prohibit cyclical fluctuation and to produce short-run growth in a nonvarying fashion.

This characteristic provides an obvious method for extrapolating: a straight-line projection to 1957 of each straight-line slope. Its justification is twofold: first, absolute expansion which has been realized year after year can probably be maintained for six more years; and second, since Soviet postwar planning has

tended to conform to this characteristic, it would seem a reliable guide where Plan data are missing.

Straight-line extrapolations appeared to be the appropriate method for projecting trends in the following branches: communications, forest products, electric machinery, electronic equipment, and mining machinery. In addition, straight-line extrapolation of Satellite trends was the primary technique used to project the Satellite component of Soviet Bloc trends in branches where Soviet Plan data provided the indicator for extrapolating the Soviet component.

3. Extrapolation Accounting for New Commodities and Improved Quality.

The weakness of straight-line extrapolation is the downward bias which it imparts to general economic growth. The limited number of commodities selected to construct a branch index are the established and relatively mature elements produced in the branch. Yet in reality a significant portion of production in many branches consists of newer products whose output has been increasing rapidly in recent years. By 1957 the importance of these and other new products will be even greater than at present. Because intelligence on these elements is scarce, they are not accounted for in the ORR indexes, and many branch indexes therefore understate true growth. Another cause of downward bias in several indexes is the inability to account for improved quality of product. In other words, although branch index series purport to demonstrate growth of the branch as a whole, many indexes fail, in fact, to demonstrate the full increase in branch output from year to year, because the sample of commodities aggregated is not representative.

Faulty sampling is particularly serious in branches with complex manufacturing processes, a wide variety of products, and rapidly changing technology. In such branches of industry, growth, in the sense of annual increments to total value of production, is not so apt to parallel the output of a few commodities as in other branches of the economy. From a knowledge of similar US industries, it is probable that annual growth of these branches more nearly approximates a constant ratio than any other phenomenon.

The branches extrapolated in this fashion -- that is, by constant percentage increases -- are listed below. The growth rates

for the first three are based on average annual growth shown in the 1948-51 portion of their respective indexes. This period was selected as normal for postwar growth. The chemicals rate is based on a trend indicated by Plan goals for basic chemicals, with the computed annual rate of growth for this trend adjusted upward by 2 percent to account for new commodities and improved quality.

Branch	Average Annual Rate of Growth 1951-57 (Percent)
Metalworking Machinery	13.7
Machine Tools	11.0
POL	11.8
Chemicals	11.7

The 1957 branch index numbers derived by this procedure appear plausible. Furthermore, the upward bias resulting from this procedure is probably offset by the downward bias in indexes projected by straight-line extrapolation.

4. Extrapolation in Accordance with Demand for Products.

In several branches of industry producing capital goods, it has been possible to establish trends of output by estimating Soviet and Soviet Bloc requirements for these capital goods. These branches consist of manufacturers of specialized types of machinery and equipment whose distribution patterns are narrow. The production of railway equipment is, for instance, directly related to conditions such as the size, obsolescence, depreciation, and traffic load in one other branch of industry -- railways. Had intelligence materials been more complete or research in ORR further advanced, still other branches would have been included in the following branches, whose 1957 output was estimated on the basis of demand for their products: railway equipment, agricultural machinery, construction equipment, textile machinery, antifriction bearings, and shipbuilding.

5. Extrapolation of Agricultural and Consumer Goods Branches.

Quite aside from fluctuations caused by weather, it is impossible to predict production trends of agricultural commodities and consumer goods with a high degree of confidence. Soviet Bloc agricultural activity is in a transitional stage. Efforts to increase productivity probably will be strengthened in the USSR during the period of this estimate. Agricultural output, however, may be affected if rapid changes are made in institutional arrangements in the USSR and in the Bloc. For example, there is evidence that the Kremlin may move in the near future to eliminate collective farms and the free market for peasants' surplus produce, whereas collectivization may be accelerated in the European Satellites. In China, Communist controls may result in radical changes in agricultural technology and organization. The speed with which the changes will occur, as well as their net effect, cannot be forecast.

Probably the best indicator to be discerned from past agricultural performance is habitual Plan underfulfillment by large margins. Therefore, underfulfillment is predicted for most commodities, and the ORR projection falls well beneath Fifth Five Year Plan goals. Such a prediction is supported by the limitations of Soviet technological and organizational skills, as well as limitations of climate, soil, and terrain.

The agricultural projections used in this report are based on the assumption that the Russians will be partially successful in their intensified efforts to increase agricultural output. The projections for each commodity were established by the "free-hand" technique. No attempt was made to assess specifically the effect of developments such as soil improvement, irrigation, mechanization, reorganization of farms, or new policies on food distribution. It is estimated that their net effect will be beneficial and that heavy investment planned for agriculture will bring greater yields.

The projections reflect the belief that most of the gains will occur in the USSR. The average annual gain in Soviet agriculture estimated for the 6-year period is about 3 to 4 percent; for the Satellites, it is less than 1 percent.

These differing rates of growth are based on the belief that Soviet agriculture is now in a developmental stage where changes in organization and technology will tend to be more effective, whereas

in the Satellites, obstacles to successful change are more formidable.

Food processing and the light and textile industries were projected in conformity with growth in agriculture. Although projections for individual commodities are beneath Plan goals, estimated rates of growth for these industries as a whole are high. As in agriculture, the largest Soviet Bloc gains in these industries are estimated for the USSR.

6. Extrapolation of the Defense Industry.

Extrapolation of the defense industry index was derived indirectly, as physical production estimates were not obtainable. For this purpose, two approaches were utilized. Primary reliance was placed upon the projection of the defense component of gross national product, as described in Appendix C. The basic assumption behind the use of this indicator is that military procurement, an identity with military production, is a constant proportion of total defense expenditures. Actually procurement was a rising proportion during the period 1947-51. 12/ During the 6-year period of the estimate, however, there will be changes in the factors affecting the composition of military expenditures which will tend to prevent a significant increase in the relative share of these outlays for procurement of military end items. First, the accelerated re-equipment of the armed forces, which was occasioned by the intensification of the cold war and the outbreak of hostilities in Korea, will tend to moderate as procurement goals are achieved. Second, as re-equipment with current models of weapons is achieved, it is reasonable to anticipate a relative expansion in outlays for military research. Third, the high proportion of outlays going to procurement in the earlier period is explained in part by the relative decline in maintenance costs -- pay, subsistence, and clothing -- of the armed forces. Consumer goods prices declined more rapidly than did prices of capital goods and, by assumption, prices of military end items. A further decline in consumer goods prices relative to prices of military end items is not anticipated during the period of the estimate.

If the relative increase in defense expenditures is accepted as a valid indicator of the rise in defense output, an average annual rate of growth of 11.4 percent is obtained.

The second and more arbitrary approach involves the use of a complexity factor. The rationale behind such a complexity factor is the fact that the bulk (some two-thirds) of rising defense production has been accounted for by the increasing complexity of military end items rather than by any expansion of the Soviet military establishment. The remaining one-third of the growth of military production is assumed to be accounted for by increased military stockpiling and by larger military transfers to Satellite armed forces.

The complexity factor is based on US experience, with adjustment to suit Soviet conditions. The costs of producing selected military end items at 1942 rates of output expressed in 1942 and 1953 prices were compared. The items were grouped into major categories such as aircraft, ships, weapons, and ammunition. With 1942 as the base, 1952 price indexes were computed for each group. In deriving a general price index for military end items as a whole in 1952, the groups were weighted by the proportions of total values of military production they represented. The proportions reflected implicit judgments regarding military outlays in the USSR. The resulting general price increase amounted to 296 percent. From this figure it was necessary to deduct increases in cost common to industry as a whole. The remaining price increase was assumed to be accounted for by the more complex nature of military hardware.

Changes in wage rates in US ordnance and aircraft plants and changes in prices of a weighted list of steel products used in armaments were assumed to represent general price increases. The price rise for these factors is 90 percent. If the rise in defense production arising from other factors is assumed to be half as large, the total annual average compound growth of military production becomes 11.7 percent.

The procedure used to obtain defense industry indexes for 1928, 1937, 1940, and 1944, as in the case of the extrapolations into the future, utilizes the defense component of gross national product. The real value of defense expenditures in each selected year (as derived from Table 2 in Appendix C*) was expressed as percentages of the 1948 value. Again the arbitrary assumption that military procurement remained a constant proportion of total defense expenditures prevailed. No independent check was attempted.

* P. 36, above.

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APPENDIX E

POPULATION AND LABOR FORCE ESTIMATES FOR THE SOVIET BLOC

Table 3

Soviet Bloc Population Estimates

Thousands

	1946	1947	1948	1949	1950	1951	1957
USSR	189,000	191,100	193,400	196,900	200,400	203,800	224,500
Albania	1,130	1,160	1,175	1,190	1,210	1,235	1,415
Bulgaria	6,965	7,020	7,075	7,130	7,219	7,264	7,707
Czechoslovakia	12,916	12,164	12,252	12,396	12,536	12,671	13,387
East Germany	18,500	18,800	19,100	19,100	18,800	18,500	18,500
Hungary	9,025	9,076	9,136	9,207	9,258	9,311	9,616
Poland	23,930	23,700	23,700	24,377	24,697	25,014	26,847
Rumania	15,762	15,848	15,935	16,023	16,111	16,198	16,710
Communist China	480,000	480,000	480,000	480,000	480,000	480,000	480,000
Total	757,228	758,868	761,773	766,323	770,231	773,993	798,682

Table 4

Soviet Bloc Labor Force Estimates

Thousands

	1947	1948	1949	1950	1951	1957
USSR						
Agricultural Labor Force	52,000	52,000	51,000	50,000	49,000	47,000
Total Nonagricultural Labor Force	32,200	33,400	35,400	37,200	39,200	46,175
Unskilled Urban Workers	23,640	33,790	24,160	25,410	26,700	28,365
Skilled Urban Workers	5,500	6,190	7,060	7,650	8,000	10,110
Professional Managerial Personnel	3,060	3,420	3,780	4,140	4,500	7,700
Albania						
Agricultural Labor Force	480	480	478	467	464	443
Total Nonagricultural Labor Force	46	53	64	83	96	171
Unskilled Urban Workers	38	45	54	71	81	130
Skilled Urban Workers	4	4	5	6	8	23
Professional Managerial Personnel	4	4	5	6	7	18
Bulgaria						
Agricultural Labor Force	2,700	2,700	2,700	2,650	2,600	2,500
Total Nonagricultural Labor Force	719	781	809	865	891	1,030
Unskilled Urban Workers	472	515	524	562	568	581
Skilled Urban Workers	160	170	180	190	200	260
Professional Managerial Personnel	87	96	105	113	123	189

Table 4

Soviet Bloc Labor Force Estimates
(Continued)

Thousands

	1947	1948	1949	1950	1951	1957
Czechoslovakia						
Agricultural Labor Force	2,200	2,200	2,200	2,127	2,050	1,900
Total Nonagricultural Labor Force	3,200	3,000	3,089	3,169	3,319	4,100
Unskilled Urban Workers	1,972	2,093	2,103	2,133	2,225	2,583
Skilled Urban Workers	600	649	698	735	771	1,011
Professional Managerial Personnel	228	258	288	301	323	506
East Germany						
Agricultural Labor Force	2,200	2,200	2,200	2,150	2,100	1,800
Total Nonagricultural Labor Force	5,782	5,400	5,400	5,805	6,055	7,300
Unskilled Urban Workers	4,597	4,183	4,150	4,481	4,640	5,190
Skilled Urban Workers	885	900	918	976	1,049	1,563
Professional Managerial Personnel	300	317	332	348	366	547
Hungary						
Agricultural Labor Force	2,100	2,050	2,000	1,950	1,900	1,700
Total Nonagricultural Labor Force	1,400	1,500	1,700	1,920	2,143	2,750
Unskilled Urban Workers	881	981	1,164	1,374	1,582	2,006
Skilled Urban Workers	349	349	349	352	360	474
Professional Managerial Personnel	170	170	187	194	201	270

Table 4

Soviet Bloc Labor Force Estimates
(Continued)

Thousands

	1947	1948	1949	1950	1951	1957
Poland						
Agricultural Labor Force	7,400	7,400	7,400	7,350	7,350	7,100
Total Nonagricultural Labor Force	3,180	3,228	3,755	4,450	4,640	5,900
Unskilled Urban Workers	2,180	2,163	2,610	3,226	3,294	3,220
Skilled Urban Workers	700	750	800	849	936	1,850
Professional Managerial Personnel	300	315	345	375	410	930
Rumania						
Agricultural Labor Force	6,000	6,000	6,000	5,950	5,900	5,600
Total Nonagricultural Labor Force	1,100	1,200	1,400	1,713	2,143	3,200
Unskilled Urban Workers	680	732	892	1,157	1,531	2,145
Skilled Urban Workers	260	280	300	327	359	617
Professional Managerial Personnel	160	188	208	229	253	438

Table 5

Soviet Workers and Employees Estimates

Thousands

	1947	1948	1949	1950	1951	1957
Industry	9,900	10,700	11,800	12,500	13,700	15,775
Electric Power	273	286	299	312	325	355
Petroleum	300	300	300	300	300	342
Coal	280	380	915	930	950	950
Ferrous Metallurgy	300	465	627	785	890	998
Nonferrous Metallurgy	235	270	310	345	375	435
Metalworking Machine Construction	3,700	3,900	4,100	4,300	4,500	5,210
Timber	420	430	440	450	460	516
Chemical	132	198	264	328	390	436
Textile	500	600	800	900	1,000	1,084
Fish	141	152	167	178	189	211
Food	725	850	975	1,100	1,200	1,344
Meat and Dairy	210	220	235	245	254	284
Paper	85	90	100	105	110	110
Industry Not Elsewhere Classified	2,599	2,559	2,268	2,222	2,757	3,500
Construction	2,600	2,600	2,750	2,950	3,000	3,300
Rail Transport	1,750	1,800	1,850	1,950	2,000	2,225
Water Transport	215	215	220	225	230	243
Other Transport	2,425	2,425	2,450	2,475	2,500	2,800
Education	2,550	2,650	2,800	3,000	3,200	4,400
Public Health	1,300	1,350	1,400	1,450	1,500	1,870
Trade	2,970	2,970	2,980	3,040	3,100	3,580
Public Feeding	970	970	980	990	1,000	1,500

Table 5

Soviet Workers and Employees Estimates
(Continued)

Thousands

	1947	1948	1949	1950	1951	1957
Credit	335	335	340	345	350	415
Dwelling, Communal Economy	1,140	1,140	1,160	1,180	1,200	1,445
State and Public Institutions	2,170	2,170	2,180	2,190	2,200	2,325
Art	235	235	240	245	250	315
Communications	570	570	580	590	600	760
State Agriculture, Forestry	1,600	1,800	2,200	2,600	2,900	3,410
Other Not Elsewhere Classified	1,470	1,470	1,470	1,470	1,470	1,812
Total	32,200	33,400	35,400	37,200	39,200	46,175

APPENDIX F

ORR ESTIMATES COMPARED WITH OFFICIAL RESULTS OF SOVIET PLAN FULFILLMENT IN 1952

On 22 January 1953, after ORR had already established its estimates for the period 1951-57, Tass published a limited number of Fifth Five Year Plan fulfillment figures. This announcement provides a check on the reliability of ORR estimates of output of a limited number of commodities. Table 6* reproduces that portion of the Tass announcements that can be compared with ORR estimates incorporated in this report.

For most of the commodities, ORR estimates do not differ significantly from the Plan fulfillment figures. The most serious ORR failures to estimate output accurately** are zinc and meat production, both of which were underestimated. Brick production, numbers of cattle and horses, and railway freight turnover were also underestimated. There were no instances of ORR estimates being greatly in excess of Plan fulfillment.

The announcement included several more commodities, largely manufactured items, that could not be compared with ORR estimates, because the Tass description did not permit their being classified precisely. The announced increase in gross production, 11 percent, is close to the increase in the ORR index of industrial output, 10.1 percent.

* Table 6 follows on p. 62.

** Throughout this report it has been assumed that Soviet official announcements are accurate.

Table 6

Comparison of ORR Estimates with the Tass Announcement of Fifth Five Year Plan Fulfillment Figures

Economic Sector and Commodity	1952 Output as a Percentage of 1951 Output	
	ORR Estimate	Official Soviet Announcement
Ferrous Metals		
Pig Iron	115.9	114
Steel	109.7	110
Nonferrous Metals		
Copper	116.7	115
Zinc	111.9	124
Lead	120.0	117
Energy		
Coal	107.2	107
Oil	111.8	112
Electric Power	112.1	113
Chemicals		
Caustic Soda	113.3	111
Synthetic Rubber	109.7	109
Construction Materials		
Cement	116.9	115
Bricks	114.9	119
Food Processing		
Cotton Fiber	107.4	107
Meat	109.2	115
Vegetable Oil	110.1	109
Sugar	110.4	103

Table 6

Comparison of ORR Estimates with the Tass Announcement
of Fifth Five Year Plan Fulfillment Figures
(Continued)

Economic Sector and Commodity	1952 Output as a Percentage of 1951 Output	
	ORR Estimate	Official Soviet Announcement
Agriculture		
Cattle	103.7	106
Hogs	104.1	104
Horses	101.6	104
Transportation		
Railway Freight	105.9	109
Water Transport	114.1	112

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APPENDIX G

SOURCES

The sources listed below are those cited in Appendixes B, C, and D with reference to illustrative data or methodological discussions. Otherwise the information used in preparing this report was drawn from current ORR research projects, many of which are available, with appropriate documentation, in manuscript form.

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2.
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4.
5.
6. A Tentative Input-Output Table for the USSR 1941 Plan, Project Rand RM-924, 2 Sep 1952, p. 7.
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8. Alexander Gershenkron, A Dollar Index of Soviet Machinery Output, 1927-28 to 1937, Project Rand R-197, 6 Apr 1952, pp. 76-77.
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10. Norman Kaplan, Capital Investments in the Soviet Union, Project Rand RM-735, 28 Nov 1951.
11. Naum Jasny, Soviet Prices of Producer Goods, Stanford University Press. 1952.
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