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ECONOMIC INTELLIGENCE REPORT

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POSTWAR INVESTMENT IN INDUSTRY  
IN THE USSR



CIA/RR 54

11 February 1955

CENTRAL INTELLIGENCE AGENCY

OFFICE OF RESEARCH AND REPORTS

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(ORR Project 32.218)

CENTRAL INTELLIGENCE AGENCY

Office of Research and Reports

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FOREWORD

The purpose of this report is to develop estimates of investment by branches of industry in the USSR during the postwar years and to analyze the postwar Soviet industrial investment policy. In addition to developing investment estimates by industry, a preliminary exploration of the relationships between postwar investment and changes in output is undertaken for certain industries.

The report is limited to the industrial sector of the Soviet economy, which is defined as including all manufacturing and mining activities and electric power generation. It does not cover investments in transportation, communications, agriculture, trade, and nonindustrial construction financed outside of the budgets of the industrial ministries.

Information pertaining to investment in industry in the USSR is scattered widely throughout the central and regional press, trade journals, and books. It is believed that further research in this material can eliminate many of the ambiguities and gaps in this report. Improved estimates of total investment in the USSR during the postwar years and improved price indexes for investment goods in the USSR are still being developed. The comparisons made in this report between total investment and investment in industry or particular branches of industry will be subject to change when the results of the current research on total investment are available. Similarly, the conversions of the estimates of investment in industry or in particular branches of industry from current prices to constant 1945 prices, or vice versa, will be subject to revision when the new price indexes become available. It is believed that the changes occasioned by the results of the new research will be minor in nature. Most of the new estimates of total investment and the new price indexes are expected to fall within a range of plus or minus 5 percent of those used in this report.

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POSTWAR INVESTMENT IN INDUSTRY IN THE USSR\*

Summary and Conclusions

One of the most significant features of postwar Soviet investment policy is that the proportion of total investment\*\* allocated to the industrial sector of the economy has been substantially larger than in any of the prewar years. The other sectors -- agriculture, transportation and communications, trade, and social-cultural and municipal construction -- have been receiving, as a group, a smaller share of investment allocations than during the prewar years. Even in the 1954 Plan, with its increased emphasis on the development of agriculture and trade, the proportion of total investment allocated to the industrial sector of the economy is larger than in any of the prewar years, including the 1941 Plan, which was a war preparedness plan.

During the 1946-53 period, investments in the light and food industries absorbed a smaller proportion of total investments in industry than during any of the prewar years, with the exception of the 1941 Plan. (For postwar figures, see Table 1.)\*\*\* Coupled with the fact that the industrial sector as a whole received a much larger share of total investments during the postwar years, this reduction in the proportion allocated to the light and food industries indicates the extent of the emphasis on the development of heavy industry during the postwar years.\*\*\*\*

\* The estimates and conclusions contained in this report represent the best judgment of ORR as of 1 October 1954.

\*\* Unless otherwise qualified, the term "investment" refers to realized investment in fixed capital assets; that is, the value of labor, materials, and equipment expended on fixed capital assets during a given period of time, usually a year. See Appendix A, Methodology.

\*\*\* Table 1 follows on p. 2.

\*\*\*\* Heavy industry includes all of the industrial sector with the exception of the light and food industries.

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Table 1

Investment by Branches of Industry in the USSR  
as Percentages of Total Investment a/  
1946-54

	Percent				
<u>Year</u>	<u>Electric Power</u>	<u>Petroleum</u>	<u>Coal</u>	<u>Metallurgy</u>	<u>Light and Food</u>
1946	3.6	3.4	8.1	N.A.	4.6
1947	3.5	4.7	8.2	8.3	5.6
1948	3.3	5.2	8.0	8.3	5.7
1949	4.5	6.1	10.0	9.7	6.7
1950	4.7	6.3	8.4	8.9	5.8
1951	6.1	7.4	8.1	10.0	4.7
1952	7.2	N.A.	N.A.	10.3	4.8
1953	6.8	N.A.	N.A.	10.0	4.7
1954(Plan)	7.0	N.A.	7.4	N.A.	7.6

a. From Table 2, p. 6, below.

During the postwar period, the most favored sector within heavy industry has been the fuel and energy sector. The proportion of total investment allocated to the coal, petroleum, and electric power industries in the postwar years has been about twice the average prewar proportion. In the early postwar years the greatest emphasis was

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placed on the development of the coal industry. Since 1949, investment in the coal industry has tended to level off, and the emphasis has shifted to the development of the petroleum and electric power industries. (See Tables 2 and 3).\*

Investments in the defense industry (conventional weapons) have not been at a high level during the postwar years; they have accounted for a considerably smaller proportion of total industrial investment than during the 1939-41 period. In 1953 the defense industry (conventional weapons) is estimated to have absorbed less than 15 percent of total industrial investment (or less than 12 billion rubles).

The postwar investment programs of the USSR have been very large-scale programs. They have probably absorbed a larger fraction of the gross national product than in most, if not all, of the prewar years. The allocation of investment among the various sectors of the economy has been quite stable during the postwar years. There have been, however, some moderate shifts in the emphasis of Soviet investment programs. (See Figs. 1-3.\*\*)

The postwar Soviet investment programs may be divided into three phases. The first phase, which covered the years 1946-50, was dominated by a strenuous effort to rebuild and expand heavy industrial capacity. Heavy industry absorbed about 50 percent of total investment as compared to only about 40 percent during the prewar years. The sectors of the economy oriented toward the consumer, that is, the light and food industries, agriculture, and trade, received a much smaller share of investment allocations than in the prewar years. As the Fourth Five Year Plan proceeded, however, and the Soviet leaders began to feel more comfortable with the restoration of heavy industry, small and very gradual increases in the proportion of investment funds allocated to the consumer-oriented sectors of the economy were permitted.

During the second phase, which covered the years 1951-52, the very gradual trend toward allocating a larger fraction of total investment to the consumer-oriented industries was reversed. Investments in the light and food industries declined in 1951 and are estimated to have remained substantially below the 1950 level in 1952. Investments in agriculture in 1952 are also estimated to have been substantially below the 1950 level. The reduction in investment in the light and food industries and agriculture between 1950 and 1952 occurred while total investment was increasing by more than 20 percent.

\* Tables 2 and 3 follow on pp. 5 and 6, respectively.

\*\* Following p. 6.

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This shift in investment policy during the 1951-52 period seems clearly to reflect an adjustment of investment plans occasioned by the Korean war toward investment undertakings which would make a greater contribution to the short-term military capabilities of the USSR.

The third phase of postwar Soviet investment policy dates from the death of Stalin and the announcement of the new economic program, with its new emphasis on investment in the light and food industries, agriculture, and trade. The new program got off to a most inauspicious start. The year 1953 was an abortive one for the investment program of the USSR. The revision of the investment plan resulted in a substantial sacrifice of heavy industrial growth in 1953, the increases in investment in the heavy industries being considerably smaller than the increases reported for any of the preceding postwar years. Yet, in exchange for this sacrifice in heavy industry, a relatively small increase in investment in the light and food industries and agriculture was actually achieved. This is undoubtedly attributable to the bottlenecks created by the midyear revision of the investment program.

The 1954 investment plan of the USSR is very ambitious. Total investment is to increase by more than 19 percent over the 1953 level, with a 12.5-percent increase in heavy industry and an 84-percent increase in the light and food industries. This large increase in industrial investment is to take place along with substantial increases in investment in agriculture and in the output of consumer goods and without substantial reductions in military expenditures. The 1954 investment plan does not, however, involve a radical departure from the investment policy of the preceding postwar years. Despite the increased emphasis on agriculture and trade in the 1954 investment plan, the proportion of total investment going to the industrial sector remains essentially unchanged; and, despite the increased allocations to the light and food industries, the proportion of total investment allocated to heavy industry is only slightly less than the proportion of the preceding postwar years. The proportion of total investment going to heavy industry is estimated at about 48 percent in 1948, 50 percent in 1953, and 47 percent in the 1954 investment plan. On the other hand, the modest reduction in the proportion of total investment going to heavy industry has permitted very large increases in investment in the light and food industries and agriculture.

The capability of the USSR to fulfill all of the ambitious 1954 investment plan is subject to question. An examination of the plan

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Table 2

Investment by Branches of Industry in the USSR a/  
1946-54

<u>Year</u>	<u>Billion Current Rubles</u>						
	<u>Electric Power</u>	<u>Petro- leum</u>	<u>Coal</u>	<u>Metal- lurgy</u>	<u>Light and Food</u>	<u>Total Investment in Industry</u>	<u>Total Investment</u>
1946	2.1	2.0	4.7	N.A.	2.7	N.A.	58.1
1947	2.3	3.1	5.4	5.5	3.7	N.A.	66.2
1948	2.8	4.5	6.9	7.1	4.9	46.4	85.8
1949	5.1	7.0	11.4	11.0	7.6	N.A.	113.9
1950	6.5	8.8	11.7	12.3	8.1	N.A.	138.9
1951	8.8	10.7	11.7	14.4	6.8	N.A.	144.0
1952	10.8	N.A.	N.A.	15.4	7.2	N.A.	149.3
1953	11.0	N.A.	N.A.	16.1	7.6	87.6	160.9
1954 (Plan)	13.3	N.A.	14.0	N.A.	14.4	104.4	190.0

a. From Tables 4, 7, 13, 21, and 26, pp. 14, 21, 33, 53, and 65, respectively, below.

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Table 3

Indexes of Investment by Branches of Industry in the USSR a/  
1946-54

1948 = 100 (1945 Rubles)

<u>Year</u>	<u>Electric Power</u>	<u>Petroleum</u>	<u>Coal</u>	<u>Metallurgy</u>	<u>Light and Food</u>	<u>Machine Building</u>	<u>Construction Materials</u>	<u>Total Investment in Industry</u>	<u>Total Investment</u>
1946	80	46	73	N.A.	55	N.A.	N.A.	N.A.	79
1947	84	68	79	77	76	87	N.A.	N.A.	82
1948	100	100	100	100	100	100	100	100	100
1949	140	117	126	117	155	110	112	N.A.	120
1950	184	151	134	136	165	120	130	N.A.	146
1951	256	190	137	164	139	132	175	N.A.	165
1952	324	N.A.	N.A.	181	147	148	191	N.A.	178
1953	340	N.A.	N.A.	195	155	160	203	161	192
1954 (Plan)	412	N.A.	176	N.A.	294	N.A.	N.A.	193	227

a. Based on estimates in Table 1 adjusted to a 1945 price base. Indexes for machine building and construction materials are from Table 30, p. 79, below. For information on the price index used in converting current prices to 1945 prices, see Appendix A, Section 4.



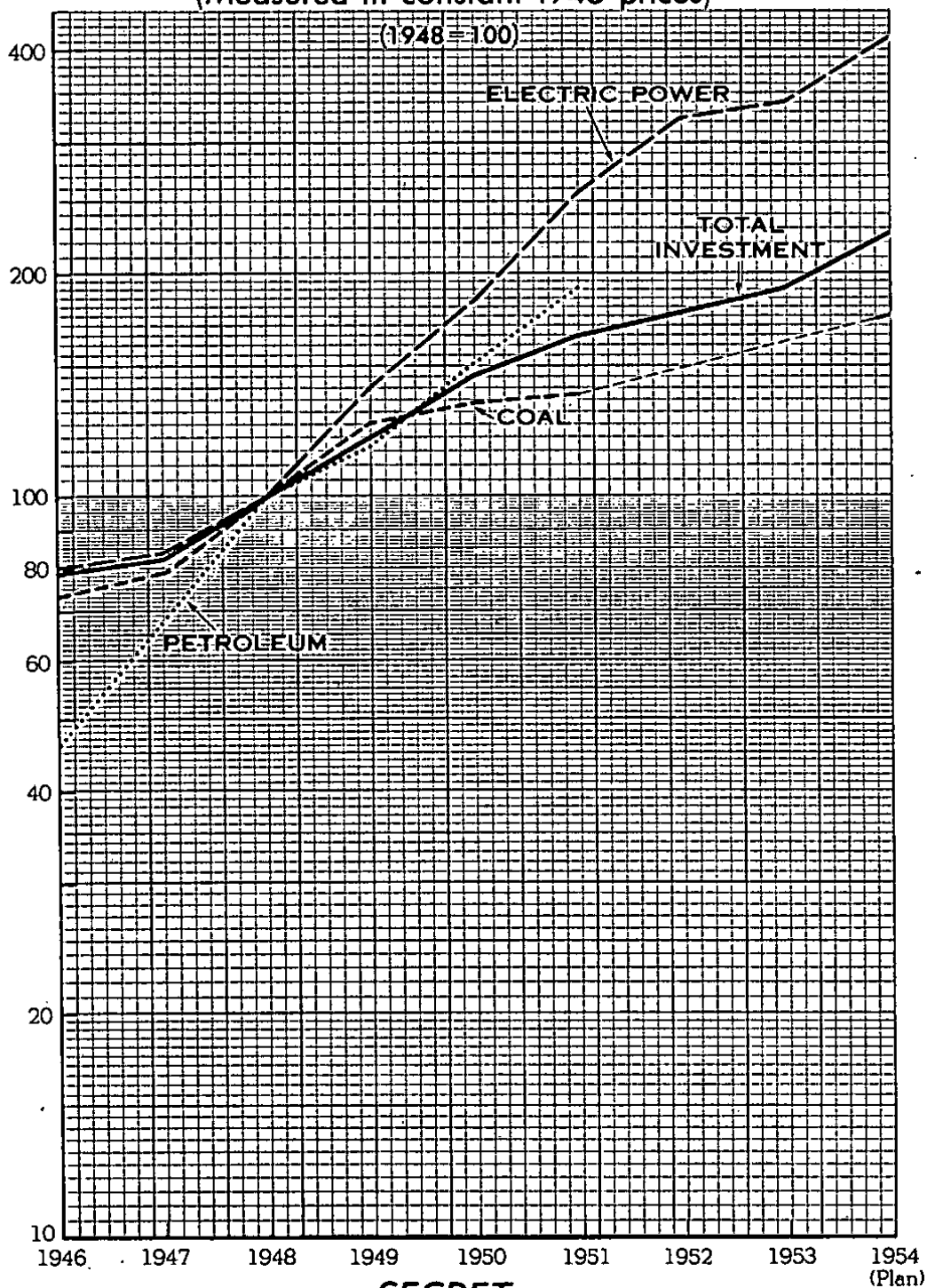
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Figure 1

### INDEXES OF INVESTMENT IN THE ELECTRIC POWER, PETROLEUM, AND COAL INDUSTRIES COMPARED TO THE INDEX OF TOTAL INVESTMENT

(Measured in constant 1945 prices)



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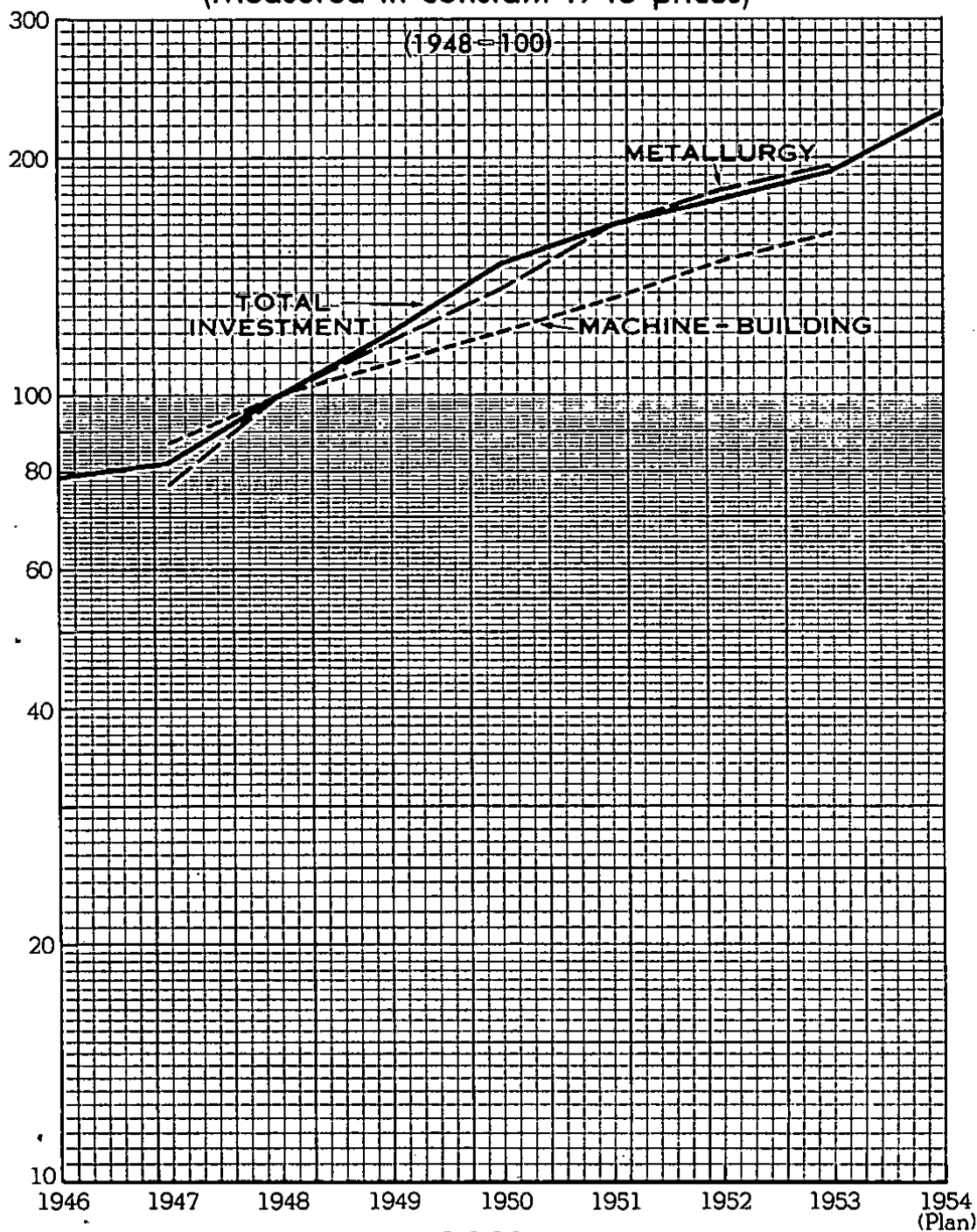
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(Plan)

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Figure 2

**USSR**  
**INDEXES OF INVESTMENT IN THE METALLURGICAL AND**  
**MACHINE-BUILDING INDUSTRIES COMPARED TO THE**  
**INDEX OF TOTAL INVESTMENT**  
(Measured in constant 1945 prices)



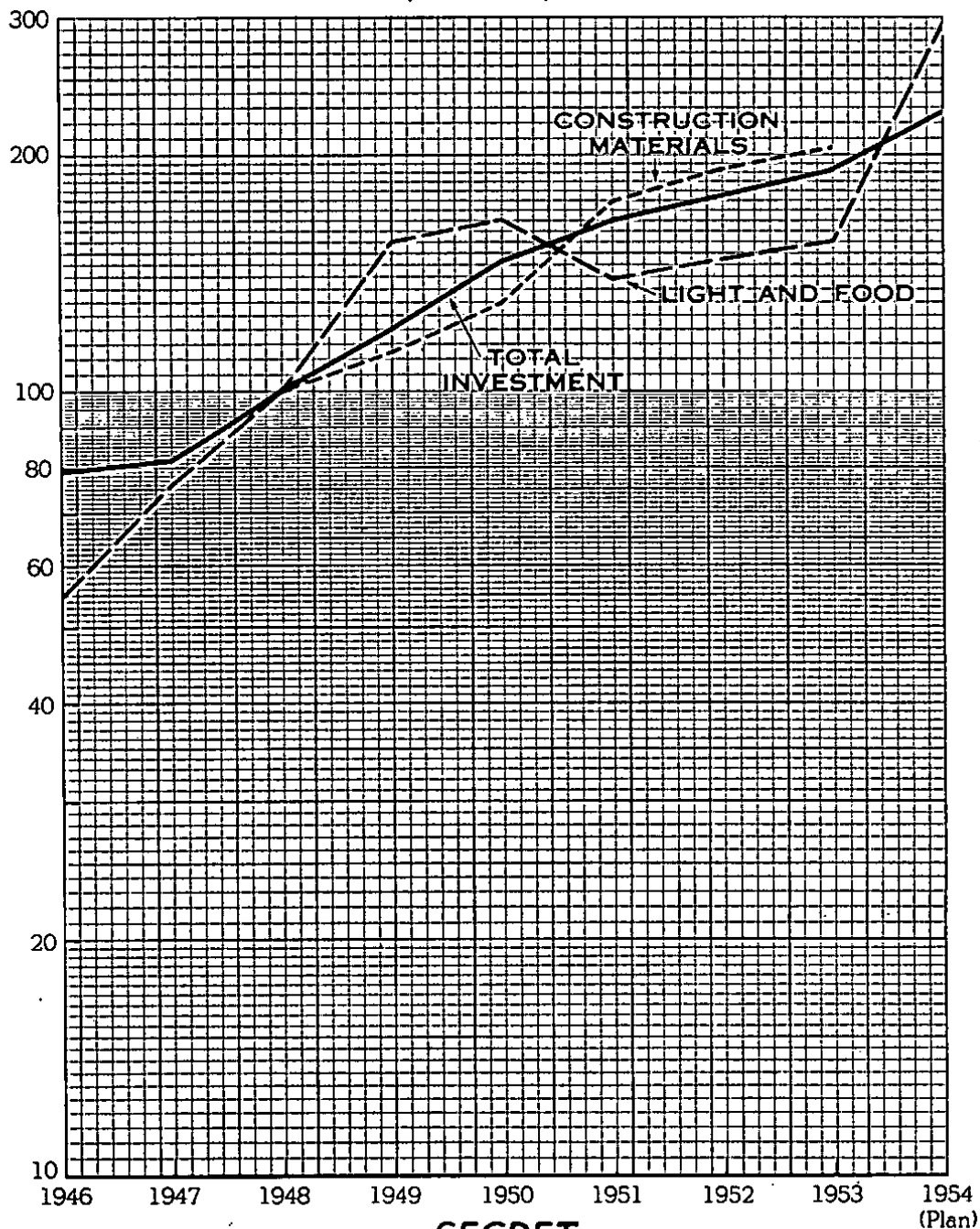
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Figure 3

USSR  
INDEXES OF INVESTMENT IN THE LIGHT AND  
FOOD AND CONSTRUCTION MATERIALS INDUSTRIES  
COMPARED TO THE INDEX OF TOTAL INVESTMENT  
(Measured in constant 1945 prices)  
(1948 = 100)



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fulfillment report for the first 6 months of 1954 indicates the following: (1) although a large number of the heavy industrial ministries were cited as having underfulfilled the investment plan, the degree of underfulfillment does not, in general, appear to be large, and the prospects for fulfilling the planned 12.5 percent increase in investment in heavy industry appear to be reasonably good; (2) it does not seem likely, however, that the planned increase of more than 80 percent in the light and food industries will be fulfilled; (3) the 3-percent increase in investment in ferrous metallurgy during the first 6 months of 1954 is estimated to be considerably less than the rate of increase necessary in 1954 and 1955 if the Fifth Five Year Plan production goals for ferrous metallurgy are to be met; (4) a new emphasis on the development of the coal industry is evidenced by the 6 months' plan fulfillment report, which indicated the first substantial increase in investment in the coal industry since 1949; (5) the 16-percent increase reported for investment in the machine-building industry is the largest increase reported for that industry in any comparable period during the postwar years; and (6) the relatively small increase of 10 percent in the construction materials industry indicates that the Fifth Five Year Plan for investment in that industry probably will not be fulfilled.

The postwar years have been characterized by an extreme effort to expand heavy industry, an effort which, from the standpoint of investment policy, exceeded in intensity that of the prewar years. This economic policy paralleled the military policy of the USSR during the postwar years, a policy which called for the maintenance of an advanced state of readiness for war. In the heavy industrial sector this policy was not reflected in extraordinarily large investment allocations to the defense industry (conventional weapons) but, rather, in large investments in the basic industries, with particular emphasis on the rapid development of the fuel and energy sector of the economy.

The new economic policy has not resulted in a drastic change in the allocation of investments in the USSR. It has, however, had the effect of slowing down the growth of heavy industrial capacity in 1953, and it has resulted in an investment program in 1954 which is probably less well-adapted to promote short-term war capabilities than the investment program of any other postwar year, particularly the investment programs of 1951-52.

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I. Introduction: Intelligence Value of Investment Analysis.

An analysis of investment information and investment policy should be of considerable value in studying the strategic intentions of the USSR and in forecasting the direction and rate of growth of the economy of the USSR. In addition, investment information is useful in analyzing the capital goods producing sector of the economy, providing an approach to aggregative estimates of capital goods production by major sectors.

Any rational investment program must be based on the resolution of a large number of conflicting goals. It must rest on a series of evaluations of the relative urgency of the needs of the present as compared to the needs of the future. Decisions must be reached concerning the amounts of the potential outputs of consumer end items and/or military end items which can be sacrificed in the current period for the sake of increases in productive capacities which will be realized only during future periods. Of the infinite number of possible investment undertakings, those which would not warrant the current sacrifice must be weeded out. Decisions must also be made with regard to the construction periods and the "pay-off" periods which can be permitted on investment undertakings. Since these decisions are centralized in the hands of the state in the USSR, the nature of the decisions made should reveal something about the nature of the policies and expectations which underlie such decisions.

Soviet writers have made it abundantly clear that the investment policy of the USSR reflects an attempt to maximize the strategic position of the state and is not guided by narrow economic considerations. Stalin himself, in commenting on investment policy determinations, stated: 1/\*

It is impossible to regard profitability in a mercantile spirit, from the point of view of the given moment. Profitability must be regarded from the viewpoint of the national economy as a whole over several years. Only such a viewpoint can be called really Leninist, really Marxist.

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It follows that the investment policy of the USSR should reflect the expectations of the leaders of the USSR and their best judgment as to the means by which the strategic position of the state can be maximized within the limits imposed by their expectations, one of the most important of which is their expectation as to the imminence of war.

The investment policy of the USSR in the 1937-41 period clearly indicated a growing belief in the imminence of war, and this belief was reflected in the allocation of investment among industries. Between 1936 and 1941 the share of total investments going to industry increased substantially and the share going to the other sectors of the economy (agriculture, trade, housing, and other nonindustrial construction) declined. 2/ Within the industrial sector between 1936 and 1941, the share of the total investment in industry allocated to heavy industry increased from 76.5 percent to 96.2 percent, and the share allocated to the light and food industries declined from 23.5 percent to 3.8 percent. Within the heavy industrial sector an increasing share of investment funds, particularly in the latter years of the 1936-41 period, was going into plant and equipment for the production of military end items. 3/

A belief in the imminence of war was also reflected in restrictions placed on the maximum time for construction of investment projects. In March 1937 the Council of Peoples' Commissars ordered all investment plans to be revised so that the construction time for any investment project would not exceed 2 or 3 years. Reflecting this policy, about 85 percent of all investment funds allocated to the ferrous metallurgical industry in 1937 were for new units to be placed in operation in the same year. 4/

An article in Voprosy ekonomiki in 1950 indicates that current decisions on the scale of new plants to be constructed are not to be based solely on economic considerations. Strategic considerations must also be weighed in the balance. After generalizing that the larger the plant, the longer the construction period is likely to be, the article states:

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The scale of construction and, most important, the directions and methods of its realization must be determined primarily by the need for winning time. 5/

This policy was reflected during World War II in the construction of medium- and small-scale plants which, while often extremely uneconomical to operate, had the great advantage of producing within a period of time that was relevant to the war effort.

The alterations in current and future investment policy in the USSR that would accompany a belief by its leaders that war is imminent would not necessarily parallel the adjustments in investment policy prior to World War II. The Soviet economy has changed considerably since the prewar years, the relative strengths of the various sectors of the economy have been altered, the state of readiness of the military forces is considerably different, and the nature of war itself has undergone revolutionary changes. It would seem likely, however, that the expectations of the leaders of the USSR as to the probability of a major war in the short-term future would be reflected in their investment policies.

the necessary qualities of a good indicator of Soviet intentions were stated as follows: 6/

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(1) They should be of strategic rather than tactical significance -- that is, they should have such a basic bearing on the Soviet power potential as to take them out of the category of mere "war of nerves" measures, or of preparations for purely local armed action.

(2) They should involve such large-scale readjustments of Soviet power resources, and should be either so costly, or so disruptive of long-range Soviet plans, that the Kremlin could ill afford to undertake them unless it was convinced that early general war was a very real possibility.

(3) They should be difficult to conceal from observation by Western intelligence.

(4) They should be of a sufficiently long-range character to give us at least several months' advance warning.

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Investment policy would seem to meet all of these criteria of a good indicator of strategic intentions. It should, perhaps, be emphasized that it is the pattern of investment that is significant for the study of intentions. It would be extremely hazardous to speculate about Soviet intentions solely on the basis of a small sector of the investment picture. Economic relationships are complex, and many factors could account for a deviation of investment policy in one sector away from the general pattern. The postponement of the completion dates for the "Great Construction Projects," which become clearly evident in the last 6 months of 1953, 7 is a case in point. Considered in isolation, this withdrawal of resources from projects requiring very long construction periods would seem ominous; but considered in conjunction with the plans for substantial increases in agricultural output and the output of consumer goods within a 3-year period, it may be seen in a different light.

Among the principal determinants of the economic growth of the USSR will be the rate and the allocation of capital investment. For this reason, studies of investment and of the relationships between investment and changes in output are essential for forecasting the economic growth of the USSR.

A number of other types of intelligence problems may be approached through estimates of industrial investment and through an analysis of their components. Among these are the following:

1. Estimating the value of the various components of investment.

The USSR occasionally publishes information on the structure of investment in the economy and in particular industries. This information, together with the investment estimates, could be used to estimate the total value of machinery and equipment being produced, the total value of machinery and equipment going to particular industries, and the value of the output of specific types of equipment.

2. Preparing indexes of the production of specialized industrial equipment.

In the absence of a reasonable sample of physical output estimates, an index of investment in an industry could be used as an index of the output of specialized equipment used solely by



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the industry. An index of investment in the petroleum industry, for example, should be a reasonably good gauge of changes in the output of oil field and petroleum refining equipment.

3. Estimating the regional development of particular industries.

Information on investment in industry pertaining to one area of the country, which is often found in the Soviet press, can be compared with the national investment figure for the industry to determine the regional pattern of growth of the industry.

II. Investment in Industry in the USSR.

A. Investment Trends.

One of the most significant features of postwar Soviet investment policy is that the share of total investment allocated to industry has been substantially larger than in any of the prewar years. The other sectors -- agriculture, transportation and communications, trade, and social-cultural and municipal construction -- have been receiving, as a group, a smaller share of investment allocations than during the prewar years. 8/

During the 1946-51 period, 64 percent of centralized investments were allocated to the industrial sector of the economy (see Table 4\*) as compared with only 50 to 60 percent during the 1937-41 period. The term "centralized investments" refers to those categories of investment which are included in the State plan for capital investments. The comparison of investment in industry with centralized investments, however, gives an exaggerated impression of allocations to industry, since a large part of investments in agriculture, the investments by collective farms from their own resources, is not included. The term "total investments," as used in this report, includes, in addition to centralized investments, investments by collective farms from their own resources and, prior to 1949, "extra-limit" investments. 9/ Capital repairs\*\* are excluded from the concept of "total investment" used in this report. Since the estimates of investment in particular industries and the data for total investment

\* P. 14, below.

\*\* Major repairs to equipment and structures.

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in industry do not include capital repairs, a concept of total investment which also excludes capital repairs is preferable for comparative purposes.

During the postwar years, investments in industry accounted for about 50 to 55 percent of total investment in the USSR, as compared to 40 to 45 percent during the 1938-41 period. Not even in the 1941 Plan, which was a war preparedness plan, were the allocations to industry so large a fraction of total investment as during the postwar years.

In the Fourth Five Year Plan, investments in industry were to absorb 157.5 billion rubles out of centralized investments of 250.3 billion rubles (in 1945 prices), or 62.8 percent of the total. That this planned distribution of investment was carried out is indicated by the report that, of the actual centralized investments during the 1946-51 period, about 64 percent went to the industrial sector.

Approximately the same distribution of investment was planned for the Fifth Five Year Plan. It was reported that about two-thirds of centralized investments during the 1951-55 period were to go into the industrial sector of the economy. 10/ The recent emphasis on the development of agriculture has not substantially affected this plan (see Table 4).\*

B. Industrial Investment Program, 1953-54.

The year 1953 was an abortive one for the industrial investment program of the USSR. Following Stalin's death, the revision of the investment plan, with its increased emphasis on the development of the light and food industries and agriculture, resulted in a substantial sacrifice of heavy industrial growth. The 1953 investment increases reported for all of the heavy industries were considerably smaller than the increases reported for any of the preceding postwar years. Yet in exchange for this sacrifice in heavy industry, a most unspectacular increase in investment in the light and food industries and agriculture was actually achieved. This is undoubtedly attributable to the bottlenecks created by the midyear revision of the investment program.

\* Table 4 follows on p. 14.

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Table 4

Investment in Industry in the USSR Compared with Total Investment  
and with Total Centralized Investment  
1946-53, 1954 Plan

Period	Total Investment <sup>a/</sup> (Billion Current Rubles) <sup>b/</sup>	Centralized Investment (Billion Current Rubles) <sup>b/</sup>	Total Investment in Industry (Billion Current Rubles) <sup>b/</sup>	Total Investment in Industry as a Percentage of:	
				Total Investment	Centralized Investment
1946-50 (Plan) (1945 Prices)	N.A.	250.3 <sup>c/</sup>	157.5 <sup>d/</sup>	N.A.	62.8
1946-51	N.A.	500.0 <sup>e/</sup>	320.0 <sup>f/</sup>	N.A.	64.0
1946	58.1 <sup>g/</sup>	48.7 <sup>h/</sup>	N.A.	N.A.	N.A.
1947	66.2 <sup>g/</sup>	58.4 <sup>h/</sup>	N.A.	N.A.	N.A.
1948	85.8 <sup>g/</sup>	77.0 <sup>h/</sup>	46.4 <sup>d/</sup>	54.1	60.3
1949 (Plan)	N.A.	105.5 <sup>h/</sup>	72.2 <sup>g/</sup>	N.A.	68.4
1949	113.9 <sup>g/</sup>	102.2 <sup>h/</sup>	N.A.	N.A.	N.A.
1950	138.9 <sup>g/</sup>	125.7 <sup>h/</sup>	N.A.	N.A.	N.A.
1951	144.0 <sup>g/</sup>	129.7 <sup>h/</sup>	N.A.	N.A.	N.A.
1952	149.3 <sup>g/</sup>	138.0 <sup>h/</sup>	N.A.	N.A.	N.A.
1953	160.9 <sup>i/</sup>	143.5	87.6 <sup>f/</sup>	54.4	61.0
1954 (Plan)	190.0 <sup>j/</sup>	169.0 <sup>j/</sup>	104.4 <sup>k/</sup>	54.9	61.8

a. Excludes capital repairs.

b. Except for 1946-50 Plan.

c. 11/.d. 12/.e. 13/.f. 14/.g. Based on the centralized investment estimates in 15/ and the collective farm investment estimates in 16/.h. 15/.i. Based in part on 16/.j. 17/.k. 18/.

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A very ambitious industrial investment program is planned for 1954. Total investment in industry is to increase by more than 19 percent over the 1953 level, with a 12.5-percent increase in heavy industry and an 84-percent increase in the light and food industries. 19/ This substantial increase in industrial investment is to take place along with substantial increases in investments in agriculture and in the output of consumer goods, and without substantial reductions in military expenditures.

Viewed in the aggregate, the 1954 investment plan does not involve a substantial departure from the investment policy of the preceding postwar years. Despite the increased emphasis on agriculture and trade in the 1954 investment plan, the proportion of total investment going to the industrial sector remains essentially unchanged; and, despite the increased allocations to the light and food industries, the proportion of total investment allocated to heavy industry is only slightly below the proportion of the preceding postwar years. The proportion of total investment going to heavy industry is estimated at about 48 percent in 1948, 50 percent in 1953, and about 47 percent in the 1954 investment plan.\*

On the other hand, it should not be concluded that the new economic program has had no significant effect on heavy industrial growth in the USSR. As noted earlier, the revision of the investment program itself had the effect of delaying heavy industrial growth in 1953. In addition, if the 1954 investment program is viewed from the standpoint of the increment of investment growth, it is clear that the 1954 investment plan involves an inconsiderable diversion of resources away from heavy industry. The extent of the diversion is indicated by the fact that the ruble amount of the planned increases in investment in the light and food industries and agriculture together substantially exceed the amount of the planned increase in investment in heavy industry. The planned increase in investment in the light and food industries alone is more than two-thirds of the planned increase in investment in all heavy industry. 20/

\* These figures were derived by deducting the estimated investment in the light and food industries (see Table 26, p. 65, below) from the published figure for total investment in industry (see Table 4) and comparing the resulting estimate of investment in heavy industry to the estimate of total investment for the year.

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The capability of the USSR to fulfill all of the ambitious 1954 investment plan is subject to question. Although the investment increases reported for the first 6 months of 1954 are impressive, it is evident that the investment plan was behind schedule. 21/ A large number of the heavy industrial ministries were cited as having underfulfilled the investment plan. However, the degree of underfulfillment in heavy industry does not appear to be large, and the prospects for fulfilling the planned 12.5-percent increase in investment in heavy industry appear to be reasonably good. On the other hand, it does not seem likely, in view of the first 6 months' performance, that the planned increase of more than 80 percent in investment in the light and food industries will be fulfilled.

C. Structure of Investment.

Total investment in the USSR in the postwar years may be broken down approximately as follows: 22/ construction and installation of equipment, 60 percent; machinery and equipment, 30 to 35 percent; other, 5 to 10 percent. The construction element, it should be noted, includes housing and social-cultural and municipal construction. The "other" category includes such items as geological surveys, support of the management of enterprises under construction, and, before 1951, the planning of investment projects.\*

Of the machinery and equipment component of investment, approximately two-thirds, or about 20 percent of total investment, is in machinery and equipment that does not require installation, such as locomotives and rolling stock, automobiles and trucks, tractors, agricultural equipment, and ships and boats. The remaining one-third, or about 10 percent of total investment, is in machinery and equipment requiring installation, such as machine tools, rolling mills, or textile machinery. 23/

\* The "other" category of investment expenditures covers expenditures that do not result in the production of fixed capital assets. Such expenditures are not reflected in the value of the fixed capital assets of industry. See Table 5, p. 18, below.

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In April 1954, Premier Malenkov announced that during the postwar years [1946-53] the Soviet economy received the following amounts of new machinery and equipment: 24/ industry, over 150 billion rubles; transport, 50 billion rubles; agriculture, 60 billion rubles. These magnitudes are consistent with the investment estimates in Table 4\* and with the information that machinery and equipment account for about 30 to 35 percent of total investment.

Only fragmentary information is available on the postwar structure of investment within the various industries. Soviet data on the 1937 structure of productive fixed capital stocks in Soviet industry as a whole and in certain branches of industry are shown in Table 5.\*\* Although some significant changes may be expected to have occurred in the postwar years, the data shown in Table 5 may be of some value in interpreting the estimates of investment by industry. Postwar information on the proportion of total investment in machine-building plants represented by machinery and equipment is shown in Table 6.\*\*\* An intensive search of Soviet trade journals and books should yield considerably more information on the postwar structure of investment in industry in the USSR.

D. Nonproductive Investment by Industrial Ministries.

In the USSR the bulk of the housing construction and a large part of other nonindustrial construction are financed through the budgets of economic organizations. In 1953 it is estimated that these so-called nonproductive investments accounted for about 20 percent of total investments in industry.\*\*\*\* For the purposes of this report the interest in the nonproductive investments undertaken by the industrial ministries is an indirect interest only. For a number of purposes it is desirable to have estimates of investment by industry which exclude nonproductive investments, and, in some cases, the estimates of nonproductive investments, since they are derived independently, are used to test the reasonableness of the total investment estimate for an industry.

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\* P. 14, above.

\*\* Table 5 follows on p. 18.

\*\*\* Table 6 follows on p. 19.

\*\*\*\* See Appendix A, Methodology, for the basis of this estimate.

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Table 5

Distribution of Productive Fixed Capital Stocks  
of Industry in the USSR by Major Components 25/  
1937

<u>Industry</u>						<u>Percent</u>
	<u>Build-ings</u>	<u>Con-struction Other Than Build-ings a/</u>	<u>Machin-ery</u>	<u>Power Instal-lations</u>	<u>Trans- portation Equip- ment and All Other</u>	<u>Total</u>
All Industry	30.6	21.5	24.1	9.4	14.4	100.0
Ferrous Metallurgy	25.8	33.1	20.0	9.6	11.5	100.0
Coal	11.1	55.2	15.4	5.3	13.0	100.0
Textile	39.0	6.3	37.7	9.3	7.7	100.0

a. Includes the construction of coal mines, oil wells, blast furnaces, ore mines, and similar types of construction.

Since a common methodology will be used in estimating nonproductive investments for all industries, it may be appropriate to state that methodology at the outset. In the typical case the only information available on nonproductive investments by an industrial ministry will be the square meters of housing completed during a period. In producing the estimate of nonproductive investment, a value factor is applied to the figure for housing construction in square meters, and the resulting value figure is then adjusted to reflect nonproductive investments other than housing.

The value factor used throughout this report for valuing housing construction by industrial ministries during the period 1949-54 is 1,400 rubles per square meter. This factor is based on several pieces of

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Table 6

Investment in Machinery and Equipment as Percentages  
of Total Investment in Machine-Building Plants in the USSR 26/  
1949

<u>Type of Plant</u>	<u>Percent</u>
Heavy Machine Building	
New Construction	27.4
Reconstruction	25.3
Rehabilitation	30.7
Locomotive a/	
New Construction	21.4
Rehabilitation	25.4 to 26.7
Turbine	
New Construction	34.9
Rehabilitation	35.1
Steam Power Boiler	
New Construction	25.7
Industrial Boiler	
New Construction	18.5 to 22.2
Power Boiler	
Rehabilitation	30.6
Diesel	
Reconstruction	29.0
Rehabilitation	30.3 to 32.9
Hoisting and Conveying Machine Building	
Reconstruction	24.9 to 28.9
Rehabilitation	25.8 to 27.7
Boiler-Turbine with Individual Production	
Rehabilitation	34.4 to 39.2

a. Portable steam generator and engine set.



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information. The Minister of the Consumer Goods Industry indicated in a recent statement that housing construction undertaken by that Ministry during the period 1951-53 cost about 1,400 rubles per square meter, and that housing planned for 1954 would cost something more than 1,460 rubles per square meter. 27/ In a reference to housing construction for workers of machine-building enterprises, it was stated that 189 million rubles were appropriated for that purpose in 1949 and that 135,000 square meters of housing would be constructed in that year. 28/ This indicates a factor of 1,400 rubles per square meter for 1949 as well. In another reference to housing construction in 1949, it was stated that more than 1 billion rubles had been allocated for the construction of housing in the Ministry of the Metallurgical Industry and that 760,000 square meters of housing would be produced. 29/ This would indicate a factor of something more than 1,315 rubles per square meter in 1949.

Housing, however, does not constitute all of the nonproductive investments of industrial ministries. Also included are schools, hospitals, and other types of social-cultural and municipal construction. Total nonproductive investment estimates are derived by assuming that investments in housing construction constitute 80 percent of total nonproductive investments.\* This is the approximate relationship of housing to other nonproductive investments that prevailed in the prewar years.

The methodology used in estimating nonproductive investments offers a number of possibilities for error. The most important of these are the following: (1) the valuation factor of 1,400 rubles per square meter, which is founded upon very fragmentary information, may be faulty; (2) there may be substantial differences between the value of housing completed during a period and the amount invested in housing construction during the same period; and (3) the prewar relationship of housing to other nonproductive investments may not prevail in the postwar years. For these reasons, the estimates of nonproductive investment presented in this report are to be considered only as gross orders of magnitude.

\* See Appendix A, Methodology.

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III. Investment in the Electric Power Industry.

A. Coverage of the Estimates.

The investment estimates for the electric power industry in Table 7 include investments in electric power installations by all ministries. Of the total investment in the industry during the postwar years, about 80 percent is estimated to have been made by the Ministry of Electric Power Stations. The remaining 20 percent is accounted for by municipal power stations and rural electrification stations, which are outside of the Ministry of Electric Power Stations and are financed through the "Social-Cultural Services and Administration" and "Agricultural" sectors of the investment budget, and by electric power installations constructed by other industrial ministries for the generation of power for their own use. 30/

Table 7

Investment in the Electric Power Industry in the USSR  
1946-53, 1954 Plan

<u>Year</u>	<u>Billion Rubles</u>	
	<u>Constant 1945 Prices</u>	<u>Current Prices</u>
1946	2.0	2.1
1947	2.1	2.3
1948	2.5	2.8
1949	3.5	5.1
1950	4.6	6.5
1951	6.4	8.8
1952	8.1	10.8
1953	8.5	11.0
1954 (Plan)	10.3	13.3

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B. Investment Trends.

The most significant finding of the study of investment in the electric power industry is that the proportion of total investment going to electric power development has increased very sharply in recent years. Since 1950 the electric power and petroleum industries have been the most favored industrial sectors from the standpoint of investment policy. Between 1949 and 1953 the rate of growth of investments in electric power installations has been more than twice the rate of growth of total investment in the economy or total investment in the industrial sector of the economy.

Investments in the electric power industry as a percentage of total investments and as a percentage of total investments in industry during the postwar years are shown in Table 8. In 1953, investment in the electric power industry accounted for 6.8 percent of total investments and 12.6 percent of total investments in industry; in 1948 the corresponding percentages were only 3.3 percent and 6.0 percent. In the prewar years, 1938-41, the allocations to electric power amounted to only 2 to 3 percent of total investment and 5 to 7 percent of total investment in industry. 31/

Table 8

Investment in the Electric Power Industry in the USSR  
as Percentages of Total Investment and Total Investment in Industry  
1946-53, 1954 Plan

<u>Year</u>	<u>Percentage of Total Investment</u>	<u>Percentage of Total Investment in Industry</u>
1946	3.6	N.A.
1947	3.5	N.A.
1948	3.3	6.0
1949 (Plan)	N.A.	7.1
1949	4.5	N.A.
1950	4.7	N.A.
1951	6.1	N.A.
1952	7.2	N.A.
1953	6.8	12.6
1954 (Plan)	7.0	12.7

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The trend is continuing in the 1954 plan. Due to the planned 84-percent increase in investments in the light and food industries in 1954, investments in the electric power industry will account only for approximately the same proportion of total investments in industry as in 1953. Investments in the electric power industry in 1954, however, will account for a larger proportion of total investment in heavy industry than in 1953. The planned growth rate of 21 percent in investment in the electric power industry in 1954 is more than 50 percent greater than the planned 12.5-percent growth of investment in heavy industry as a whole. 32/ The 6 months' plan fulfillment report, which showed an 18-percent increase in investment in the electric power industry over the corresponding period of 1953, indicates that the 1954 investment plan for electric power is being fulfilled approximately on schedule. 33/

C. Capital-Capacity Ratios.

Incremental capital-capacity ratios for the electric power industry of the USSR in millions of rubles invested per million kilowatt increase in capacity are shown in Table 9.\* These ratios are derived from the estimates of investment in the electric power industry in Table 7\*\* and the estimates of changes in installed rated capacity shown in Table 10.\*\*\* These ratios show the gross capital investment that has been associated with increases in electric power capacity in the USSR during the postwar years.

Before commenting upon them, it may be useful to distinguish clearly the meaning of the ratios in Table 9 from the usual meaning of the term "capital coefficient." The term "capital coefficient" has often been used rather loosely in the economic literature. In general, however, the term refers to the net capital investment required for a given increase in the productive capacity of an industry, with a given state of technology; and, usually, it is based on the cost of a complete new plant or a "balanced addition" to an existing plant. The capital-capacity ratios in Table 9 differ from this concept of a

\* Table 9 follows on p. 24.

\*\* P. 21, above.

\*\*\* Table 10 follows on p. 25.

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"capital coefficient" in the following ways: (1) they are ratios of gross (rather than net) investment to the increases in capacity; (2) they reflect changes in technology that occurred during the period; and (3) they reflect "unbalanced additions" to plants as well as complete new plants or "balanced additions."

Table 9

Incremental Capital-Capacity Ratios for Investment  
in the Electric Power Industry in the USSR a/  
1946-50, 1949-52

Million Rubles per Million Kilowatt Increase in Capacity

Gross Investment Divided by Increase in Capacity

	<u>1946-50 ÷ 1947-51 b/</u>	<u>1949-52 ÷ 1950-53</u>
Constant 1945 Prices	1,250	2,050
Current Prices	1,550	2,850

a. Based on the investment estimates in Table 7 and the estimates of installed rated kilowatt capacity in Table 10. A lag of 1 year is used. Figures are rounded to the nearest 50 million rubles.

b. An estimated 1 million kilowatts of new capacity placed in operation in 1946 was subtracted from the 1946-50 figure shown in Table 10.

In the following section, capital-output ratios are developed for the coal and petroleum industries.\* In the case of these industries no capacity estimates were available. For this reason, investment had to be related to changes in output. The capital-output ratios for the coal and petroleum industries depart from the usual concept of the term "capital coefficient" for the same reasons that were enumerated for the capital-capacity ratios for the electric power industry in Table 9; but, in addition, they will diverge from this usual concept to the extent, if at all, that the level of output is not an adequate measure of the capacities of those industries.

\* See Tables 16 and 17, pp. 39 and 40, respectively, below.

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Measured in constant 1945 prices, investment per million kilowatt capacity, as shown in Table 9, has increased by more than 60 percent during the postwar years. A 1-year lag between investment and changes in capacity was used in making the computations. Although this is too short a lag for the electric power industry, the data on changes in kilowatt capacity were not adequate to permit a comparison between the earlier and later postwar years using a longer lag period.

The relatively low capital-capacity ratio for the 1946-50 period is largely attributable to the fact that a large proportion of investment funds in the early postwar years was devoted to restoring and modernizing damaged plants and to maintenance operations that were deferred during the war. The continuing increase in the capital-capacity ratio in the period after 1948 is largely attributable to the increased emphasis on hydroelectric power development. In the Fifth Five Year Plan the total capacity of thermal electric power stations was to double, largely through the expansion of existing power stations, while the capacity of hydroelectric power stations was to triple. 34/

Table 10

Increase in Installed Rated Electric Power Capacity in the USSR  
1946-53

<u>Period</u>	<u>Increase in Installed Rated Capacity</u>	<u>Million Kilowatts</u>
1946-50	10.0	
1950-53	11.0	
1951	3.0	
1953	2.8	

The increased emphasis on hydroelectric power development is noted in the report that investment in hydroelectric power stations in 1952 amounted to 182 percent of the 1950 investment. 35/ The estimates in Table 7 indicate that total investment in the electric power industry as a whole in 1952 was only 166 percent of the 1950 level, measured in

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current prices, and 176 percent of the 1950 level measured in constant prices. The increased emphasis on hydroelectric power would tend to raise the capital-capacity ratio for electric power, as computed in Table 9, not only because the investment per kilowatt is greater than for thermal power stations but also because the construction time is longer.

Investment in the electric power industry in the most recent postwar years is continuing to increase at a faster rate than installed kilowatt capacity. A comparison of the 1952 investment with the 1953 increase in capacity indicates a capital-capacity ratio of about 4 million rubles per million kilowatt capacity in 1952 prices, or about 3 million rubles per million kilowatt capacity in 1945 prices. Although a ratio based on a single year and using a lag of only 1 year is of questionable value, it does indicate that the trend is continuing.

The former Minister of Electric Power Stations, M.G. Pervukhin, discussed the relative capital costs of hydroelectric and thermal power stations in a speech in April 1954. 36/ He stated that capital investment per kilowatt capacity in the Kuybyshev hydroelectric power station was about 5,000 rubles and that capital investment per kilowatt capacity in the Cherepetsky thermal power station was less than this amount. He added, however, that if the capital investment in the coal mines necessary to supply the Cherepetsky station were included, the total investment per kilowatt capacity would be 5,340 rubles. In comparing the capital-capacity ratios in Table 9\* with the investment per kilowatt capacity figures in Pervukhin's statement, it should be borne in mind that most of the expanded capacity in thermal power plants in the Fifth Five Year Plan period was to take place through the expansion of existing plants. This should involve some rather substantial capital economies as compared with achieving the same expansion of capacity through the construction of entirely new plants.

D. Structure of Investment.

Estimates of investment in the electric power industry in 1949 and 1950 which exclude nonproductive investments by the Ministry of Electric Power Stations are shown in Table 11.\*\* These estimates were

\* P. 24, above.

\*\* Table 11 follows on p. 27.

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derived as follows: A value factor of 1,400 rubles per square meter was applied to the estimates of housing construction in square meters and the resulting figure multiplied by 125 percent to reflect non-productive investments other than housing. The estimates show that in 1949 and 1950 nonproductive investments by the Ministry of Electric Power Stations accounted for about 15 percent of total investments in the electric power industry.

Table 11

Derivation of Estimates of Investment in the Electric Power Industry  
in the USSR, Excluding Nonproductive Investment by the Ministry  
of Electric Power Stations  
1949-50

Billion Current Rubles

Year	Square Meters of Housing Construc- ted a/	Value of Housing Construc- ted b/	Total Non- productive Investment c/	Total Invest- ment d/	Total Investment Excluding Nonpro- ductive Investment
1949	435,000	0.6	0.8	5.1	4.3
1950	535,000	0.7	0.9	6.5	5.6

a. 37/.

b. A factor of 1,400 rubles per square meter was applied. See p. 26.

c. Value of Housing Constructed multiplied by 125 percent.

d. From Table 7, p. 21, above.

It was noted earlier that investments by the Ministry of Electric Power Stations would account for about 80 percent of the investments in the electric power branch of industry. In addition to this, the Ministry also makes investments in the peat industry and in plants that produce spare parts for its own equipment. The Ministry of Electric Power Stations produces about 40 percent of the total output of peat in the

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USSR. Estimates of investments in the peat industry in 1947 and 1948 by the Ministry of Electric Power Stations indicate that such investments account for only about 3 percent of total investments in the Ministry. (See Table 12.) No information is available on investments in plants producing spare parts, but they probably constitute a very small fraction of total investments by the Ministry.

Table 12

Investment in the Peat Industry in the USSR  
by the Ministry of Electric Power Stations a/ 38/  
1947-48

	Million Rubles	
<u>Year</u>	<u>Planned Investment</u>	<u>Actual Investment</u>
1947	64.5	51.5
1948	77.0	70.0

a. Capital investment in the peat industry undertaken by Glavtorfostroy (Main Administration for the Construction of Peat Enterprises) of the Ministry of Electric Power Stations.

E. Derivation of the Estimates.

The estimates of investment in the electric power branch of industry are based on the ruble figures for planned investment announced for 1947 and 1953 and the percentage increases in investment reported for the intervening years. (See Table 7.\*) Since the Ministry of Electric Power Stations is estimated to account for 80 percent of the total investment in the electric power branch of industry, information pertaining to the Ministry has been used in adjusting and checking the validity of the estimates.

\* P. 21, above.

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The 1947 Plan called for the investment of 3 billion rubles in 1945 prices in the electric power industry. The Ministry of Electric Power Stations was to place into operation 30 percent more new capacity than it had placed in operation in 1946. 39/ The plan was not fulfilled; it was announced that the plan for placing new electric power station capacity in operation was only 70 percent fulfilled. 40/ This means that capacity placed in operation in 1947 was only about 90 percent of the capacity placed in operation in 1946.

No direct information is available regarding the degree of fulfillment of the 3 billion ruble investment plan, but it is known that investment in the electric power industry in 1947 was only 4 percent greater than in 1946. 41/ This, coupled with the fact that the plan for putting new capacity into operation was only 70 percent fulfilled, indicates that the investment plan of 3 billion rubles was not fulfilled.

It is assumed that the investment plan for 1947 was underfulfilled by the same percentage as the plan for putting new capacity into operation; that is, by 30 percent. Using this assumption, the actual 1947 investment is estimated at 2.1 billion rubles in 1945 prices. This assumption is consistent with information which will be introduced at a later point in the analysis.

The investment estimate for 1946 of 2.0 billion rubles in 1945 prices is based on the announcement that investment in 1947 was 4 percent greater than in 1946. 42/ The 1946 investment plan of the Ministry of Electric Power Stations was fulfilled by only 90.5 percent. 43/ The plan for placing new capacity in operation was also underfulfilled in 1946.

The estimate for 1948 of 2.5 billion rubles in 1945 prices is based on the statement that capital investment in the electric power industry in 1948 was 20 percent greater than in 1947. 44/ For the third straight year the plan for placing new capacity into operation was underfulfilled. The plan called for an increase of 35 percent over the capacity placed in operation in 1947, while the actual increase was 30 percent. 45/

The estimate for 1949 of 3.5 billion rubles in 1945 prices is based on the announcement that investment in the electric power industry was 39 percent greater than in 1948. 46/ The 1949 investment plan for the Ministry of Electric Power Stations, which called for a 40-percent

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increase over 1948, 47/ was apparently fulfilled. However, the planned increase of 46 percent over 1948 in new capacity placed in operation was not fulfilled. 48/

The 1950 estimate of 4.6 billion rubles in 1945 prices is based on the report that investment in the electric power industry in 1950 was 32 percent greater than in 1949. 49/

The 1951 estimate of 6.4 billion rubles in 1945 prices is based on the report that the volume of capital investment in the electric power industry was 40 percent greater than in 1950. 50/ Despite this impressive increase, however, the investment plan was not fulfilled. 51/

A check on the validity of the estimates for the years 1946-51 is provided by the statement that the volume of capital investment by the Ministry of Electric Power Stations in the first 9 months of 1951 exceeded the volume of capital investment in 1946 and 1947 combined. 52/ This comparison is probably between investment for the first 9 months of 1951 in 1951 prices and investments in 1946 and 1947 in 1945 prices. It is possible, however, that the comparison is in constant prices. In either case the investment estimates are consistent with the statement. If we assume that three-quarters of the estimated 1951 investment took place in the first 9 months of 1951, then investment for the first 9 months of 1951 would be 4.8 billion rubles in 1945 prices, or 6.6 billion rubles in 1951 prices. Both figures are higher than the 4.1 billion rubles in 1945 prices estimated for 1946 and 1947 combined.

The 1952 estimate of 8.1 billion rubles in 1945 prices is based on the announcement that investment in the electric power industry was 26 percent greater than in 1951. 53/ The value of new installations placed into operation in 1952 was reported to be 23 percent greater than the value of those placed in operation in 1951. 54/

An additional check on the validity of the estimates is provided in a statement by D. Zhimerin, former Minister of Electric Power Stations, in Pravda of 13 October 1952. 55/ Minister Zhimerin stated:

As a result of the particular concern of the Party and of Comrade Stalin personally in regard to electrification, capital investments in power development by the Ministry

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of Electric Power Stations have increased 2.2 times  
in the last 3 years alone.

This statement is not without ambiguities. One interpretation is that it is a comparison of the 1952 investment plan with 1949 investment, both stated in current prices. Assuming that the actual 1952 investment plan was fulfilled, the estimates are consistent with the statement, so interpreted. The 10.8 billion ruble estimate for 1952 is 2.1 times the 1949 estimate of 5.1 billion rubles, both being measured in current prices. If the comparison was made in constant 1945 prices, the estimated 1952 investment is 2.3 times the estimated 1949 investment.

It is possible that the comparison in Minister Zhimerin's statement is between investment in 1948 and investment in 1951. Under this interpretation, the estimates do not fare as well. Measured in current prices, the 1951 estimate of 8.8 billion rubles is 3.1 times the 1948 estimate of 2.8 billion rubles. Measured in constant 1945 prices, the 1951 estimate of 6.4 billion rubles is 2.6 times the 1948 estimate of 2.5 billion rubles.

The plan fulfillment report for the first 6 months of 1953 stated that investments in electric power stations and in the electrical industry were 5 percent greater than in the corresponding 6 months of 1952. 56/ No reference was made to investment in the electric power industry in the 1953 annual plan fulfillment report except the statement that the plan for completing industrial installations was not fulfilled by the Ministry of Electric Power Stations and Electrical Industry. 57/ The only reference to investment in the electric power industry alone in 1953 was the modest statement that investment in electric power stations was greater in 1953 than in 1952. 58/ [redacted] the degree of underfulfillment of the investment plan by the Ministry of Electric Power Stations and Electrical Industry was quite large. In view of these statements it would seem that the 5-percent increase reported for investment in electric power stations and in the electrical industry for the first 6 months of 1953 is probably a reasonably good measure of the increase in investment in the electric power industry for the entire year. Of course, the estimate for 1953, so derived, is less well founded than are the estimates for the earlier years.

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50X1

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In a speech in April 1954, M.G. Pervukhin, the former Minister of Electric Power Stations, made the following statement with regard to planned investment in electric power installations in 1954 59/:

The national economic plan and the State budget for 1954 provide for capital investment in the construction of electric power stations and networks of all ministries of more than 13 billion rubles, i.e., 21 percent more than in 1953.

Applying the 21-percent increase mentioned to the previously derived 1953 estimate would result in a 1954 plan estimate of 13.3 billion rubles in current prices for investment in the electric power industry. The close correspondence of the 1954 plan estimate, as derived from the adjusted 1947 plan figure and the percentage increases for subsequent years, with the figure in Pervukhin's statement tends to support the validity of both the estimates for the earlier years and the method used in deriving the estimates.

F. Reliability of the Estimates.

In view of the consistency of the series of investment estimates with the announced 1954 investment plans and with the other checks on the validity of the estimates discussed earlier, the range of error should not exceed plus or minus 20 percent.

IV. Investment in the Coal and Petroleum Industries.

A. Coverage of the Estimates.

The estimates in Table 13\* refer to investment in the coal and petroleum branches of industry in the USSR. The coal and petroleum branches of industry are substantially identical in coverage with the Ministries of the Coal and Petroleum Industries, and investment in the branches of industry should be of substantially the same magnitudes as investment by the corresponding Ministries. The two main differences in coverage are relatively small. First, investment in machine-building plants subordinate to the Ministries of the Coal and Petroleum Industries are placed under the machine-building industry rather than

\* Table 13 follows on p. 33.

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under the coal and petroleum industries in the branch of industry classification. Second, investments by coal mining enterprises subordinate to Republic Ministries of Local and Fuel Industry would be included in the branch classification. It is estimated that at present 92 percent of the total output of coal is produced by the Ministry of the Coal Industry and only 8 percent is produced by local fuel enterprises. Moreover, it is believed that more than 92 percent of postwar investments in the coal industry have been in the Ministry of the Coal Industry. There is no petroleum production in the USSR outside the jurisdiction of the Ministry of the Petroleum Industry.

Table 13

Capital Investment in the Coal and Petroleum Industries in the USSR  
 1946-53, 1954 Plan

<u>Year</u>	<u>Billion Rubles</u>					
	<u>1945 Prices</u>			<u>Current Prices</u>		
	<u>Coal</u>	<u>Petro- leum</u>	<u>Total</u>	<u>Coal</u>	<u>Petro- leum</u>	<u>Total</u>
1946	4.5	1.9	6.4	4.7	2.0	6.7
1947	4.9	2.8	7.7	5.4	3.1	8.5
1948	6.2	4.1	10.3	6.9	4.5	11.4
1949	7.8	4.8	12.6	11.4	7.0	18.4
1950	8.3	6.2	14.5	11.7	8.8	20.5
1951	8.5	7.8	16.3	11.7	10.7	22.4
1952	N.A.	N.A.	17.1	N.A.	N.A.	22.7
1953	N.A.	N.A.	17.4	N.A.	N.A.	22.4
1954 (Plan) <u>a/</u>	10.9	N.A.	N.A.	14.0	N.A.	N.A.

a. Investment planned for 1954 by the Ministry of the Coal Industry; not precisely comparable with the estimates for the earlier years, which relate to the coal branch of industry.

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B. Investment Trends.

The fuel and energy industries have been the most favored sectors of industry from the standpoint of postwar investment policy. In the early postwar years, 1946-49, the greatest emphasis was placed on the development of the coal industry. Since 1949, investment in the coal industry has tended to level off, and the emphasis has shifted to the development of the petroleum and electric power industries.

During the 1946-49 period, between 8 and 10 percent of total investment and about 15 percent of total investment in industry went to the coal industry (see Table 14).<sup>\*</sup> This is about twice the proportion of total investment going to the coal industry prior to the war. <sup>60/</sup> Since 1949, however, investments in the coal industry have tended to level off and the proportion of total investment going to the coal industry has declined.

On the other hand, investments in the petroleum industry have absorbed a continually increasing share of total investments in the postwar years. In 1946 the proportion of total investments allocated to the petroleum industries was about the same as in prewar years, but this proportion steadily increased until in 1951 the proportion of total investments allocated to the petroleum industry was more than twice the 1946 proportion.

The available information is not adequate to permit estimating investment in the petroleum industry for the years after 1951. It is known, however, that investment in the petroleum industry in the Fifth Five Year Plan was to increase at a faster rate than total investment in the economy or total investment in industry. The directives of the Plan provide that total state capital investments are to be 90 percent greater and investments in industry are to be approximately twice those during 1946-50. <sup>61/</sup> By comparison, capital investment in the petroleum industry in the Fifth Five Year Plan is to be more than double the investment during 1946-50. <sup>62/</sup>

The big shift in the allocation of investment between the coal and petroleum industries started in 1950. The magnitude of the shift may be indicated by a comparison of 1946-47 with 1951 investment. In 1946 and in the 1947 Plan, investment in the petroleum industry was less than 45 percent of the investment in the coal industry. By 1951

\* Table 14 follows on p. 35.

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Table 14

Investment in the Coal and Petroleum Industries in the USSR  
Compared with Total Investment and Total Investment in Industry a/  
1946-53, 1954 Plan

Year	Investment in the Coal Industry as a Percentage of:		Investment in the Petroleum Industry as a Percentage of:		Investment in the Coal and Petroleum Industries Combined as a Percentage of:	
	Total Investment	Total Investment in Industry	Total Investment	Total Investment in Industry	Total Investment	Total Investment in Industry
1946	8.1	N.A.	3.4	N.A.	11.5	N.A.
1947	8.2	N.A.	4.7	N.A.	12.8	N.A.
1948	8.0	14.9	5.2	9.7	13.3	24.6
1949	10.0	N.A.	6.1	N.A.	16.2	N.A.
1950	8.4	N.A.	6.3	N.A.	14.8	N.A.
1951	8.1	N.A.	7.4	N.A.	15.6	N.A.
1952	N.A.	N.A.	N.A.	N.A.	15.2	N.A.
1953	N.A.	N.A.	N.A.	N.A.	13.9	25.6
1954 (Plan) <u>b/</u>	7.4	13.4	N.A.	N.A.	N.A.	N.A.

a. Based on information in Tables 4 and 13, pp. 14 and 33, respectively, above.

b. Based on the 14 billion ruble planned investment in the Ministry of the Coal Industry. It is not precisely comparable with the percentages for the earlier years, which relate to the coal branch of industry.



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investment in the petroleum industry amounted to more than 90 percent of the investment in the coal industry. It seems very likely that investment allocations to the petroleum industry in the 1954 Plan are equal to or exceed the 14 billion rubles planned for the coal industry.

The evidence of a shift in the allocation of investment between the coal and petroleum industries is supported by estimates of the growth of production of coal and crude oil. The growth rate of coal output has declined very sharply since 1950, and the decline in the growth rate of crude oil output has been less severe. (See Table 15.) In addition, it is known that the output of light refined petroleum products, which require large capital investments in refining, transport, and storage facilities, has been increasing at a faster rate than crude oil output.

Table 15

Rates of Growth of the Output of Coal and Crude Oil in the USSR 63/  
1946-53

<u>Year</u>	<u>Percentage Increase over Preceding Year</u>	
	<u>Coal a/</u>	<u>Crude Oil</u>
1947	12.0	19.8
1948	14.0	13.1
1949	12.6	14.3
1950	11.0	11.9
1951	7.8	10.6
1952	6.7	9.6
1953	6.0 <u>64/</u>	8.8

a. Includes lignite.

The shift in the investment pattern is also reflected in data for housing construction by the Ministries of the Coal and Petroleum Industries. In the Fifth Five Year Plan, housing construction by the petroleum industry is to increase by 150 percent over the actual volume of housing constructed

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during 1946-50, while the comparable increase planned for the coal industry is only 15 percent. (See Table 20.\*)

C. Investment Program, 1954.

A renewed emphasis on the development of the coal industry is evident in the 1954 investment plan. The plan fulfillment report for the first 6 months of 1954 stated that investment in the coal industry had increased by 23 percent over the corresponding period of 1953. <sup>65/</sup> This is the largest increase in investment reported for the coal industry since 1949. Despite this sizable increase, however, the Ministry of the Coal Industry was cited as one of the ministries which failed to fulfill the investment plan for the first 6 months of 1954. This would indicate that the planned increase was somewhere in the neighborhood of 30 percent over the 1953 level.

It was recently announced that planned investment by the Ministry of the Coal Industry in 1954 is 14 billion rubles. <sup>66/</sup> Although this sum represents a very substantial increase over the 1953 level of investment, it represents a smaller share of total investment than the coal industry received during any year of the 1946-51 period (see Table 14). The 14 billion ruble figure, coupled with the fact that the 1954 investment plan for the coal industry represents an increase of more than 23 percent over the 1953 level, also indicates that the level of investment in the coal industry remained approximately unchanged between 1951 and 1953.\*\*

Only fragmentary information is available with regard to the level of investment in the petroleum industry, and no information is available with regard to planned investment in the petroleum industry in 1954. It seems quite certain, however, that investment in the petroleum industry in 1953 was greater than the level of investment in the coal industry and very likely that the planned investment in the petroleum industry in 1954 exceeds the 14 billion rubles allocated to the coal industry.

\* P. 44, below.

\*\* For the basis for this statement, see p. 51, below.

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D. Regional Petroleum Investment Pattern.

The heavy emphasis on developing the petroleum industry in the eastern areas of the USSR is indicated by the pattern of investment planned for 1949. In a year when total investment in the petroleum industry was to increase by probably 30 to 40 percent, planned investment in the petroleum industry in the eastern areas was almost double. 67/ The eastward shift of investment in the petroleum industry is again illustrated by the fact that, although investment in the petroleum industry as a whole is estimated to have increased by 30 percent in 1950, investment in the petroleum industry in Azerbaydzhan increased by only 20.2 percent. 68/

E. Capital-Output Ratios.

Ratios between investments and changes in the output of coal and crude oil in the postwar years are shown in Tables 16 and 17.\* The ratios in Table 16 are based on estimates of total investments in those industries; those in Table 17 are based on investment estimates which exclude nonproductive investments by the Ministries of the Coal and Petroleum Industries.

Physical measures of the output of coal and crude oil are not completely satisfactory measures for studying changes in capital-output relationships, since they ignore qualitative differences in outputs. This is a problem of some concern both in the case of the coal and of the petroleum industries, but it is probably more serious in the case of the petroleum industry. Changes in crude oil output would constitute satisfactory measures of changes in the value of output of the petroleum industry only if the composition of refined products remained unchanged. It is known, however, that the proportion of light fractions in refined petroleum products has been increasing in the postwar years. It should therefore be kept in mind that one of the important causes of the changes in the capital-output ratio in the petroleum industry is the change in the composition of the output of the industry (see Table 18).\*\*

The most striking feature of the capital-output ratios for the coal and petroleum industries is the sharp increase in investment per million metric ton increase in output during the postwar years.

\* Tables 16 and 17 follow on pp. 39 and 40, respectively.

\*\* Table 18 follows on p. 41.

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Table 16

Incremental Capital-Output Ratios in the Coal and Petroleum Industries  
 in the USSR, Including Nonproductive Investment a/  
 1946-51

Million Rubles per Million Metric Ton Increase in Output

	Coal		Crude Oil	
	<u>1945 Prices</u>	<u>Current Prices</u>	<u>1945 Prices</u>	<u>Current Prices</u>
1946-51 Average <u>b/</u>	300	400	1,150	1,500
<u>One-Year Lag c/</u>				
1946	250	250	450	450
1947	200	200	800	900
1948	250	250	1,000	1,050
1949	300	450	1,200	1,750
1950	400	550	1,550	2,200
1951	450	600	1,950	2,700
<u>Two-Year Lag d/</u>				
1946	200	200	500	500
1947	200	200	750	800
1948	250	250	1,000	1,100
1949	350	500	1,200	1,750
1950	400	600	1,550	2,200
1951	450	600	1,950	2,700

a. Rounded to the nearest 50 million rubles. Based on output estimates in Table 18, p. 41, below, and investment estimates in Table 13, p. 33, above.

b. Relates gross investment during the period 1946-51 to change in output 1946-52.

c. Investment in Year Y related to output in Year Y plus 1 minus output in Year Y.

d. Investment in Year Y related to the average output in Years Y plus 1 and Y plus 2 minus output in Year Y.

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Table 17

Incremental Capital-Output Ratios in the Coal and Petroleum Industries  
in the USSR, Excluding Nonproductive Investment  
by the Ministries of the Coal and Petroleum Industries a/  
1949-51

Million Rubles per Million Metric Ton Increase in Output

	<u>Coal</u>	<u>Crude Oil</u>
1949-51 Average <u>b/</u>	400	2,000
<u>One-Year Lag c/</u>		
1949	300	1,550
1950	500	1,950
1951	500	2,450
<u>Two-Year Lag d/</u>		
1949	350	1,550
1950	500	1,950
1951	500	2,450

- a. Rounded to the nearest 50 million rubles. Based on output estimates in Table 18 and investment estimates in Table 19, p. 43, below.
- b. Relates gross investment, excluding nonproductive investments by the Ministries of the Coal and Petroleum Industries, during the period 1949-51 to change in output 1949-52.
- c. Investment in Year Y related to output in Year Y plus 1 minus output in Year Y.
- d. Investment in Year Y related to the average output in Years Y plus 1 and Y plus 2 minus output in Year Y.

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Table 18

Output of Coal and Crude Oil in the USSR  
1946-53

<u>Million Metric Tons</u>		
<u>Year</u>	<u>Coal a/</u>	<u>Crude Oil b/</u>
1946	164.2	21.7
1947	183.9	26.0
1948	209.7	29.4
1949	236.1	33.6
1950	262.0	37.6
1951	282.4	41.6
1952	301.3	45.6
1953	320.0	49.6

a. Estimated. See also 69/.

b. Estimated.

Investment per million metric ton increase in output, measured in constant prices, approximately doubled in the coal industry and more than tripled in the petroleum industry between 1946 and 1951. The reasons for these large increases may be classified as follows: (1) the large proportion of investment in reconstruction and restoration of existing plants in the early postwar years, (2) a decline in the scarcity of capital relative to labor, (3) changes in the product mix, and (4) changes in natural conditions which may affect all extractive industries.

In the early postwar years a large proportion of the investment funds of all Soviet industries were directed toward restoring plants damaged during the war or modernizing plants that had suffered from a lack of normal maintenance during the war. Investment funds so expended would be expected to result in proportionately greater increases in output than investment in completely new plants, which constituted a much larger fraction of total investment in the later postwar years.

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As the Soviet economy expands and capital becomes less scarce, it is to be expected that capital will be employed more extensively than in earlier periods. The continuing emphasis on the mechanization of additional processes in the coal industry is illustrative of this more extensive use of capital. The Minister of the Coal Industry in 1952 stated that in a number of the basic processes in coal extraction, hewing, removal, hauling, and loading into railroad cars, mechanization had been completed and that in the future more funds would be devoted to mechanizing surface operations. 70/ This continuing substitution of capital for labor in the coal industry is undoubtedly largely responsible for the fact that between 1947 and 1951 the output of coal increased by more than 50 percent with only a 5 percent increase in the labor force in the coal industry.

In the petroleum industry the shift toward a proportionately greater output of light fractions has undoubtedly entailed substantially increased capital requirements in refining capacity and in storage and transport facilities. Qualitative changes in coal output have also contributed toward increasing capital requirements per unit of output. Efforts to improve the quality of coal have succeeded in reducing the ash content in coal shipped to the Ministry of Electric Power Stations from 17.1 percent in 1945 to 15.9 percent in 1950 and reducing the ash content of coal shipped to the Ministry of Transportation from 24.21 percent to 23.05 percent during the same period. These improvements in quality have required substantial increases in investments in coal cleaning plants. The plan for 1951 called for placing into operation new mines with a total capacity 38 percent greater than those placed in operation in 1950 and for coal cleaning and briquetting plants with a total capacity 184 percent greater than those placed in operation in 1950. 71/

Generally speaking, in the extractive industries the expansion of output requires the utilization of less and less favorable natural resources, for example, in the present cases, relatively less productive coal mines and oil fields. Under such conditions, increased output requires relatively greater inputs of both capital and labor. New discoveries, however, may make it possible to expand output without the use of relatively inferior coal and oil deposits. The extent to which the exploitation of less productive natural resources has been a factor in increasing capital requirements per unit of output is not known.

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F. Structure of Investment.

Investment estimates for the coal and petroleum industries excluding nonproductive investment by the Ministries of the Coal and Petroleum Industries are shown in Table 19. In producing these estimates the factor of 1,400 rubles per square meter was applied to the estimates of housing construction by those Ministries (see Table 20),\* and the resulting figure was multiplied by 125 percent to reflect other nonproductive investments besides housing.

Table 19

Investment in the Coal and Petroleum Industries in the USSR  
Excluding Nonproductive Investment  
by the Ministries of the Coal and Petroleum Industries  
1949-51

Billions Current Rubles

<u>Year</u>	<u>Coal Industry</u>		
	<u>Total Investment</u>	<u>Nonproductive Investment</u>	<u>Total Investment Excluding Nonproductive Investment</u>
1949	11.4	3.0	8.4
1950	11.7	1.9	9.8
1951	11.7	2.5	9.2

<u>Year</u>	<u>Petroleum Industry</u>		
	<u>Total Investment</u>	<u>Nonproductive Investment</u>	<u>Total Investment Excluding Nonproductive Investment</u>
1949	7.0	0.8	6.2
1950	8.8	1.1	7.7
1951	10.7	0.9	9.8

\* Table 20 follows on p. 44.



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Table 20

Housing Construction in the USSR by the  
 Ministries of the Coal and Petroleum Industries  
 1946-53, 1954 Plan

Period	Square Meters	
	Coal Industry	Petroleum Industry
1946-50	6,500,000 <u>72/</u>	1,770,000 <u>73/</u>
1951-55 (Plan)	7,500,000 <u>74/</u>	4,500,000 <u>75/</u>
1946	{ 2,200,000 <u>a/</u>	{ 700,000 <u>a/</u>
1947		
1948	1,500,000 <u>76/</u>	{ 440,000 <u>78/ b/</u>
1949	1,700,000 <u>77/</u>	
1950	1,100,000 <u>79/ c/</u>	628,000 <u>80/</u>
1951	1,400,000 <u>81/</u>	500,000 <u>82/ d/</u>
1952	1,300,000 <u>83/</u>	
1953	1,400,000 <u>84/</u>	1,000,000 <u>85/</u>
1954 (Plan)	2,100,000 <u>86/</u>	

a. Derived by subtracting the figures for 1948, 1949, and 1950 from the 1946-50 total.

b. Derived from the 1950 estimate.

c. Derived by subtracting estimates for 1948-49 and 1951-52 from the announced total for 1948-52.

d. Extrapolated from first 9 months' production.

Nonproductive investments by the Ministry of the Coal Industry constituted about 21 percent of total investments in the coal industry during the 1949-51 period, whereas nonproductive investments by the Ministry of the Petroleum Industry constituted about 11 percent of total investments in the petroleum industry during the same period. It should be expected that capital intensive industries, like petroleum and electric power, where capital investment is high relative to the size of the labor force, would devote a smaller proportion of their investment funds to housing than would other sectors of industry.

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G. Derivation of the Estimates.

Since the coverage of the Ministries of the Coal and Petroleum Industries is substantially identical with the coal and petroleum branches of industries, information pertaining to the ministries has been used along with information pertaining to the coal and petroleum branches of industry in producing the estimates. All of the estimates are derived from the planned 1947 investments. With the exception of the recent announcement of the 1954 investment plan for the Ministry of the Coal Industry, 1947 was the last year for which the Soviet authorities published ruble investment figures for the coal and petroleum industries.

Planned investment in 1947 amounted to 6.3 billion rubles in 1945 prices for the coal industry and 2.8 billion rubles for the petroleum industry. 87/ The investment plan for the coal industry, however, was substantially underfulfilled. Planned investment in the coal industry in 1947 was to exceed the actual 1946 investment by 40 percent. 88/ The actual volume of investment in the coal industry exceeded the 1946 level by only 9 percent. 89/ This means that the actual 1947 investment was 4.9 billion rubles in 1945 prices and the 1946 investment, 4.5 billion rubles.

No information is available as to the degree of fulfillment of the investment plan in the petroleum industry. Unlike a number of other industries, the petroleum industry was not cited as underfulfilling the 1947 plan. It is assumed, therefore, that the planned investment of 2.8 billion rubles was fulfilled. The estimate of 1.9 billion rubles in 1945 prices for investment in the petroleum industry in 1946 was derived from the report that planned investment in 1947 was 44 percent greater than the 1946 investment. 90/

Some support for the assumption of fulfillment of the investment plan in the petroleum industry is found in the reports of drilling and prospecting operations in 1947. In the southern and western areas in 1947, oil well drilling increased by 56 percent over 1946, including a 44 percent increase in prospecting drilling. In the eastern areas production drilling increased by 43.4 percent and prospecting drilling by 46.8 percent over 1946. 91/ Since oil field exploration and development probably accounted for 60 percent or more of the total investment in the petroleum industry in 1947, oil field operations should constitute a reasonably good gauge of total investment in the industry. 92/

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The 1948 estimate for investment in the coal industry, 6.2 billion rubles in 1945 prices, is based on the announcement that the volume of capital work in the coal industry in 1948 exceeded the 1947 level by 29 percent. 93/ Even this substantial increase, however, was not sufficient to fulfill the plan. 94/ The 1948 estimate for the petroleum industry -- 4.1 billion rubles in 1945 prices -- is based on a statement by the Minister of the Petroleum Industry, N.K. Baibakov, that the volume of capital work exceeded the 1947 level by 45 percent. 95/ He stated, however, that the investment plan for the petroleum industry was fulfilled by only 91.3 percent in 1948.

The plan fulfillment report for 1949 stated that the volume of capital construction in the coal and petroleum industries increased by 22 percent over 1947. 96/ Separate figures for the coal and petroleum industry were not given. It is known, however, that the plan for capital investment in the coal industry called for an increase of more than 25 percent over the 1948 level, and the plan was fulfilled. 97/ It was reported that the volume of construction work undertaken by the construction organizations of the coal industry was 24.5 percent greater than in 1948. 98/ This statement has reference to construction in the narrower sense. The plan fulfillment report for the first 9 months of 1949 indicated, however, that the volume of investment in the coal industry, including equipment as well as construction, was 22 percent greater than during the first 9 months of 1948. 99/

Comprehensive investment data are not available for the petroleum industry for 1949. It is known, however, that the investment plan was not fulfilled. 100/ The investment plan called for an increase in the volume of construction and installation work of 40.5 percent over 1948. 101/ Minister Baibakov announced that in 1949 "constructors in the petroleum industry carried out 30 percent more construction and assembly work than they did in 1948." 102/ Given a 22-percent increase in investment in the coal and petroleum industries combined and a 25-percent increase in investment in the coal industry, the estimates for the preceding year would indicate an increase in investment in the petroleum industry of about 17 percent. This is the basis for the estimate of the 4.8 billion 1945 ruble investment in the petroleum industry in 1949. It is not necessarily inconsistent with Minister Baibakov's claim of a 30-percent increase in the volume of construction and assembly work carried out by "constructors in the petroleum industry" since his figure does not include purchases of equipment and may not include contract construction.

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The plan fulfillment report for 1950 stated that the volume of capital investment in the coal and petroleum industries was 15 percent greater than 1949. <sup>103/</sup> Separate figures for the coal and petroleum industries were not given, but the plan fulfillment report for the first 9 months of 1950 stated that the volume of capital investment in the coal industry was 8 percent greater and the volume of capital investment in the petroleum industry 30 percent greater than in the corresponding period of 1949. <sup>104/</sup> In addition, this report stated that the volumes of construction and installation work of the building organizations of the coal and petroleum ministries were 14 and 21 percent greater respectively, than in the corresponding 9 months of 1949.

The combined estimate of investment in the coal and petroleum industries in 1949 is 12.6 billion rubles in 1945 prices. If this total is multiplied by 115 percent (the reported 1950 fulfillment), the estimate for 1950 would be 14.5 billion rubles. If the 9-month fulfillment rates for the coal and petroleum industries were applied to the 1949 estimates, the resulting total investment in the coal and petroleum industries would be 14.6 billion rubles, or 100 million rubles higher.

There is some evidence that the pace of investment in the coal and petroleum industries was lower in the last quarter of 1950 than in the preceding 3 quarters. The plan fulfillment report for 1950 stated that the volumes of construction and installation work by building organizations of the Ministries of the Coal and Petroleum Industries were 7 percent and 19 percent greater, respectively, than the 1949 levels. As compared with the 9-month fulfillment report, which gave comparable percentage increases of 14 percent and 21 percent, this indicates a marked slackening of the investment rate in the fourth quarter, particularly in the case of the coal industry. It is on the basis of this evidence that the growth of investment in the coal industry is estimated at 7 percent for 1950 and the growth of investment in the petroleum industry at 30 percent, resulting in investment estimates in 1945 prices of 8.3 billion rubles and 6.2 billion rubles, respectively.

The close correspondence between the estimate of the combined investment in the coal and petroleum industries derived from the annual plan fulfillment report and the estimate derived by aggregating the separate estimates on the coal and petroleum industry tends to indicate that the relative sizes of the estimates of investment in the coal and petroleum industries in 1949 are correct. This does not substantiate, however, the correctness of the absolute investment levels indicated.

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Nevertheless, it tends to support, to a limited degree, the validity of the assumptions used for the earlier years.

It is clear that the plan for capital investment in the coal industry in 1950 was grossly underfulfilled. Planned investment was to exceed the 1949 level by 29 percent. 105/ The estimate indicates an underfulfillment of the investment plan of more than 17 percent. With regard to the year's performance, the Soviet authorities limited themselves to the mild statement that the volume of capital investment in the coal industry in 1950 exceeded the 1949 level. 106/

The 1951 plan fulfillment report stated that the volume of capital investment in the coal and petroleum industries was 12 percent greater than 1950. 107/ Again no separate figures were cited, but a considerable amount of information was made public concerning various segments of investment in the petroleum industry. The Minister of the Petroleum Industry, N. Baibakov, reported that the volume of construction and installation work in the petroleum industry was 25 percent above 1950. 108/ The Deputy Minister of the Petroleum Industry, V. Kalamkarov, stated that the volume of construction and installation work of the construction organizations of the Ministry was 24 percent higher than 1950. 109/ Kalamkarov's statement appeared in Izvestiya on 29 December 1951. On the same day, Pravda carried an article by N. Baibakov in which he stated that the volume of construction and assembly work by the construction organizations of the Ministry was 30 percent greater than in 1950. 110/ The gross production of the machine-building enterprises of the Ministry of the Petroleum Industry was reported as being 22 percent greater in 1951 than in 1950. 111/ Finally, Minister Baibakov reported that the volume of capital investment in geological and exploratory work was 25.5 percent above that of 1950. 112/

All of this information indicates a level of capital investment in the petroleum industry in 1951 about 25 percent greater than in 1950. This would make the investment estimate for the petroleum industry in 1951 about 7.8 billion rubles in 1945 prices. Together with the 12-percent increase in capital investment in the coal and petroleum industries combined given by the plan fulfillment report, this would indicate an investment in the coal industry in 1951 of 8.5 billion rubles in 1945 prices, or an increase of only 2.5 percent over the 1950 level.

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The investment plan for the coal industry in 1951 called for a volume of capital investment 18.6 percent greater than 1950. 113/ The plan was not fulfilled, 114/ but the extent of the underfulfillment has not been reported. If the estimates are correct, the investment plan in the coal industry was underfulfilled by 13.5 percent. Despite the impressive 25-percent increase in investment in the petroleum industry in 1951, the investment plan for that industry was also underfulfilled. 115/

The 1952 plan fulfillment report stated that the volume of capital investment in the coal and petroleum industries was 5 percent greater than the 1951 level, 116/ which would make the combined investment estimate 17.2 billion rubles in 1945 prices. Information with regard to the level of capital investment in the coal and petroleum industries separately is not available for 1952.

The 1953 plan fulfillment report did not mention investment in the coal and petroleum industries except to state that the investment plan for completing industrial installations was considerably underfulfilled both by the Ministry of the Coal Industry and the Ministry of the Petroleum Industry. 117/ The fulfillment report for the first 6 months of 1953, however, stated that investment in the "fuel industry" was 2 percent greater than during the corresponding 6 months of 1952. 118/ It is not known whether the "fuel industry" in the report for the first 6 months of 1953 is strictly comparable to the "coal and petroleum industries" of the earlier reports. However, the Soviet authorities have used the term "fuel industry" with reference to the coal and petroleum industry in other contexts; for example, during the period 24 January 1939 to 12 October 1939, the coal and petroleum industries were combined in the All-Union Peoples' Commissariat of the Fuel Industry. 119/ No organizational changes are known to have occurred in 1953 that would account for a change in the reporting of investments in these industries. It is assumed therefore that the term "fuel industry" refers to the coal and petroleum industries, and further, that the increase in investment in the coal and petroleum industries for the year 1953 was at the same rate as investment in the first 6 months of 1953.

The latter assumption appears to be reasonably valid for the industrial sector of the Soviet economy as a whole, although it is less well founded with reference to any particular industrial sector. Total investments in the national economy in 1953 were reported to have increased by 4 percent over the corresponding periods of 1952 in both

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the 6-month report and the annual report. The only sectors of investment for which information was published in both the annual and the 6-month reports were light and food industry, cultural and service construction, and housing construction. The increase in investment in the light and food industries was reported as 8 percent in both the 6-month and the annual report.\* Cultural and service construction was reported as 22 percent greater than in 1952 in the annual report, while the 6-month report stated that various segments of cultural and service construction had increased from 16 to 30 percent over the corresponding period of 1952. Housing construction was reported as having increased by 11 percent in the annual report and by 7 percent in the 6-month report. The magnitudes of the increases in investment in these sectors, as stated in the 1953 annual report, and the relative importance of these sectors in total investment suggest that the level of investment in the unreported sectors was approximately at the rate of the first 6 months of 1953. On the basis of the assumptions noted above, the combined investment in the coal and petroleum industries in 1953 would amount to 17.6 billion rubles in 1945 prices. Of course, this estimate is considerably more conjectural in nature than the estimates for preceding years.

Nothing is known concerning the level of investment in the coal industry in 1952 and 1953 except that the investment plan was not fulfilled in either year. 121/ Fragmentary information relating to investment in the petroleum industry in 1952 and 1953 would indicate that investment in that industry probably increased at a faster rate than the

\* The annual report for 1953 stated that "state capital investments in the construction of light and food industries during 1953 exceeded the preceding years' capital investments by 8 percent, while in the second half year capital investments increased by 10 percent, in comparison with the corresponding period for 1952." This statement is clearly inconsistent with the statement in the fulfillment report for the first 6 months that investment in the light and food industries in the first 6 months of 1953 exceeded the level of the corresponding period of 1952 by 8 percent. This is the only significant example of internal inconsistency found in Soviet investment announcements. 120/

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rate of increase of investment in the coal and petroleum industries combined in those years. The production of "oil equipment" was reported to have increased by 44 percent in 1952 and 17 percent in 1953 over the preceding year's production. 122/ The volume of construction and assembly work completed by construction organizations of the Ministry of the Petroleum Industry in 1953 was reported to have been 12 percent above the 1952 level. 123/ Operational drilling was reported to have increased 5 percent and exploratory drilling 10 percent in 1953 over 1952. 124/

In April 1954, the Minister of the Coal Industry, A.F. Zasyadko, stated that the volume of investment planned by his ministry for 1954 amounted to about 14 billion rubles. 125/ As noted above,\* the 6-month plan fulfillment report for 1954 stated that investment in the coal industry exceeded the level of the corresponding 6 months of 1953 by 23 percent. At the same time, it stated that the Ministry of the Coal Industry had not fulfilled the investment plan for the first 6 months of 1954, leading to the speculation that the planned increase was probably in the neighborhood of 30 percent. If the planned increase in 1954 is assumed to be 30 percent, then the actual 1953 investment in the coal industry was about 10.8 billion rubles in current prices (or about 8.4 billion rubles in 1945 prices). This is approximately the same level of investment, in real terms, that was estimated for the coal industry in 1951 (see Table 13\*\*).

If this 1953 estimate for investment in the coal industry is subtracted from the combined estimate of investment in the coal and petroleum industries in 1953 (see Table 13\*\*), it leaves 11.6 billion rubles in current prices (or 9.0 billion rubles in 1945 prices) for investment in the petroleum industry in 1953. This would indicate a real increase of about 15 percent in investment in the petroleum industry between 1951 and 1953. The investment estimates for the coal and petroleum industries in 1953, so derived, are considered much too tenuous for inclusion in the tables. The indicated increase of about 15 percent in investment in the petroleum industry between 1951 and 1953 appears to be on the low side in view of the other information available. The estimates are probably good enough, however, to support the conclusion that investment in the petroleum industry in 1953 was greater than the investment in the coal industry in that year. In view of this and the great exertions made to increase investment in the petroleum industry

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\* P. 37.

\*\* P. 33, above.



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in recent years, it seems very likely that the 1954 investment plan for the petroleum industry calls for a greater volume of investment than the 14 billion rubles planned for the coal industry. Further research should be able to clarify the course of investment in the coal and petroleum industries in 1952 and 1953.

H. Reliability of the Estimates.

The best check on the reliability of the estimates is the 1954 investment plan for the Ministry of the Coal Industry. No gross inconsistency is apparent between the planned 1954 investment of 14 billion rubles and the 11.7 billion rubles estimated for the coal industry in 1951. In view of this, the range of error should not exceed plus or minus 20 percent for the coal industry estimates and plus or minus 30 percent for the petroleum industry estimates.

V. Investment in the Metallurgical Industry.

A. Coverage of the Estimates.

The term "metallurgical industry" refers to the ferrous and nonferrous metallurgical branches of industry. The metallurgical industry is substantially identical in coverage with the Ministries of Ferrous and Nonferrous Metallurgy. The principal differences in coverage are the following:

1. The metallurgical industry does not include iron ore and manganese ore mining, both of which are under the Ministry of Ferrous Metallurgy. It does, however, include all nonferrous ore mining with the exception of manganese. 126/ Some impression of the relative magnitude of investment in iron ore and manganese mining may be obtained from estimates of the fixed capital stock of Soviet industry in 1940. It is estimated that the productive fixed capital stock in iron ore and manganese mining in 1940 was about 5 percent of the productive fixed capital stock of the ferrous and nonferrous metallurgical branches of industry. 127/

2. The metallurgical industry includes all plants primarily engaged in processing ferrous and nonferrous metals. A substantial portion of basic, processed ferrous metals, about 20 percent of the

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total, is produced outside of the jurisdiction of the Ministry of Ferrous Metallurgy. It is estimated, however, that less than 10 percent of the total investment in ferrous metallurgical processing capacity in the postwar years was in plants not belonging to the Ministry of Ferrous Metallurgy. All of the significant production of basic nonferrous metals in the USSR falls within the Ministry of Nonferrous Metallurgy, with the important exception of the rolling and drawing of aluminum and magnesium, which is under the Ministry of the Aviation Industry. No estimate is available of the proportion of the total postwar investment in nonferrous metallurgy made in plants outside the jurisdiction of the Ministry of Nonferrous Metallurgy. Investments in the ferrous and nonferrous branches of industry are shown in Table 21.

Table 21

Investment in the Metallurgical Industry in the USSR  
 1946-53

Billion Rubles

Period	1945 Prices			Current Prices		
	Ferrous	Non-ferrous	Total Metallurgy	Ferrous	Non-ferrous	Total Metallurgy
1946-50 (Plan)	27.0	12.0	39.0	N.A.	N.A.	N.A.
1946	3.8	N.A.	N.A.	4.0	N.A.	N.A.
1947 (Plan)	4.9	2.2	7.1	N.A.	N.A.	N.A.
1947	3.4	1.5	4.9	3.8	1.7	5.5
1948	N.A.	N.A.	6.4	N.A.	N.A.	7.1
1949	N.A.	N.A.	7.5	N.A.	N.A.	11.0
1950	N.A.	N.A.	8.7	N.A.	N.A.	12.3
1951	N.A.	N.A.	10.5	N.A.	N.A.	14.4
1952	N.A.	N.A.	11.6	N.A.	N.A.	15.4
1953	N.A.	N.A.	12.5	N.A.	N.A.	16.1

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B. Investment Trends.

Investment in the metallurgical industry in the postwar years has been a fairly constant proportion of total investment (about 8 to 10 percent), and no sharp changes in investment allocations to the metallurgical industry occurred during this period (see Table 22). Of the total planned investment in the metallurgical industry in the Fourth Five Year Plan, 70 percent was for ferrous metallurgy and 30 percent for nonferrous metallurgy. In the Fifth Five Year Plan nonferrous metallurgy is to expand at a considerably faster rate than ferrous metallurgy. This is indicated by the comparison of planned output goals in the Fourth and Fifth Five Year Plans shown in Table 23.\* In the Fifth Five Year Plan,

Table 22

Investment in the Metallurgical Industry in the USSR as Percentages  
of Total Investment and Total Investment in Industry a/  
1947-53

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<u>Year</u>	<u>Percent of Total Investment</u>	<u>Percent of Total Investment in Industry</u>
1947	8.3	N.A.
1948	8.3	15.3
1949	9.7	N.A.
1950	8.9	N.A.
1951	10.0	N.A.
1952	10.3	N.A.
1953	10.0	18.4

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a. Based on the metallurgical industry investment estimates in Table 21 and the estimates of total investment and total investment in industry found in Table 4, p. 14, above.

\* Table 23 follows on p. 55.

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investment in the metallurgical industry will probably be divided approximately 60 percent to ferrous metallurgy and 40 percent to non-ferrous metallurgy. Some support is given to this estimate by the housing construction plan for the metallurgical industry during 1951-55, under which 5 million square meters is to be constructed for workers in ferrous metallurgy and about 3 million square meters for workers in nonferrous metallurgy. 128/ This is a ratio of about 60 percent to 40 percent.

Table 23

Planned Increases in the Production of Certain Metals in the USSR  
under the Fourth and Fifth Five Year Plans

<u>Product</u>	<u>Planned 1950 as Percent of Actual 1945 Production 129/</u>	<u>Planned 1955 as Percent of Actual 1950 Production 130/</u>
Ferrous		
Pig Iron	217	176
Ingot Steel	206	162
Rolled Steel	245	164
Nonferrous		
Copper	160	190
Aluminum	200	260
Lead	260	270
Zinc	250	250
Tin	270	180
Nickel	190	153

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C. Investment Program, 1954.

The 6-month fulfillment report for 1954 stated that investment in the ferrous metallurgical industry was 3 percent greater than in the corresponding period of 1953. 131/ It also stated that both the Ministry of Ferrous Metallurgy and the Ministry of Nonferrous Metallurgy failed to fulfill the investment plan for the first 6 months of 1954. Since no information is available with regard to the 1954 investment plan for ferrous metallurgy, it is difficult to assess the degree of underfulfillment reflected in the very small increase reported for investment in that industry. According to estimates that have been made of the capital requirements necessary to fulfill the Fifth Five Year output goals in ferrous metallurgy\*, however, an 11-percent increase in investment in ferrous metallurgy is required in 1954.\*\* In view of this it is concluded that the 3-percent increase in investment reported for ferrous metallurgy in the first 6 months of 1954 reflects either a downward revision of investment plans for that industry or, more probably, a substantial underfulfillment of the plan.

D. Capital-Output Ratios.

No attempt will be made to develop capital-output ratios for the metallurgical industry in this report. There is, however, a considerable amount of information which indicates that the capital-output ratio is declining in the ferrous metallurgical industry of the USSR. Despite the fact that the Fourth Five Year Plan for expanding productive capacity in ferrous metallurgy was only about 70 to 75 percent fulfilled, the output plan was fulfilled. This was possible because the actual increase in effectiveness of the utilization of capacity was substantially greater than the planned increase. 133/ That such an underestimation occurred is borne out by a recent Russian article which criticized the "underrated planning" of "assignments for utilization of productive capacities in certain branches of industry, primarily ferrous metallurgy and the chemical field" during the Fourth Five Year Plan. 134/ Such "underrated planning," the article states, "forces the state to set aside, out of the total available resources

\* More precisely, the estimated capital requirements are based on CIA's forecast of 1955 production, which is slightly below the Fifth Five Year Plan goals.

\*\* Estimate based on 132/.

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of the country, a certain amount of additional and uncalled for resources for the construction and expansion of capital equipment and stock for the particular branch involved, to the detriment of other branches of industry and the entire national economy."

The Soviet authorities planned a substantial decline in the capital-output ratio in ferrous metallurgy in the Fifth Five Year Plan. The bulk of the planned increase in the output of ferrous metals was to result from the more effective utilization of existing plant and equipment and a lesser role in increasing output was to be played by new capacity to be constructed. 135/ It appears, however, that the Soviet planners made the opposite mistake in the Fifth Five Year Plan and overestimated the increase in effectiveness of the utilization of capacity that could be achieved. It is believed that, in order to meet the Fifth Five Year Plan goals, larger than planned increases in new blast furnace and steel smelting capacity will have to be made. 136/

E. Structure of Investment.

In addition to nonproductive investments, the estimates of investment in the metallurgical industry include investments in non-ferrous ore mining (except manganese). Some information is available which throws some light on the relative importance of these elements in total investment in the industry. In 1949 more than 1 billion rubles was allocated for construction of housing in the Ministry of Metallurgical Industry. The plan was probably underfulfilled, since in the first 6 months only 27.4 percent of the planned construction had been completed. 137/ The head of the Housing and Public Services Department of the Central Committee of the Metalworkers' Trade Union reported that more than 3 billion rubles had been allocated for increasing housing for workers in the metallurgical industry during 1948-50. He stated, however, that the funds had not been fully utilized. 138/ The planned investments in housing construction during the 1948-50 period amounted to about 8 to 9 percent of the estimated total investment in the metallurgical industry during that period. Since the housing plan was not fulfilled, housing probably constituted only about 6 to 7 percent of the estimated total investment during the 1948-50 period. On the assumption that housing constituted 80 percent of total nonproductive investments, total nonproductive investments would account for about 8 to 9 percent of total investment in the metallurgical industry during this period.

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Some impression of the share of total investment in the non-ferrous metallurgical industry going into ore mining may be obtained from estimates of the fixed capital stock of Soviet industry in 1940. It is estimated that in 1940 ore mining (excluding manganese) accounted for about 25 percent of total productive fixed capital in the non-ferrous metallurgical industry. 139/

F. A Capital Coefficients Approach.

A recently completed report on the production of ferrous metallurgical equipment in the USSR provides a basis for testing the validity of the investment estimates for ferrous metallurgy. Estimates of the annual dollar value of ferrous metallurgical capacity placed in operation during the postwar years were derived by applying US capital coefficients to the estimated physical capacities placed in operation in each year. (See Table 24.)\* These estimates of the annual value of capacities placed in operation were converted into an index and compared with an index of the estimated annual investment in ferrous metallurgy (see Table 25\*\* and Fig. 4\*\*\*). The index of annual investment in ferrous metallurgy is based on the investment estimates for ferrous metallurgy in 1946 and 1947 and on the assumptions that ferrous metallurgy accounted for 70 percent of the total investment in the metallurgical industry during the 1947-50 period and 60 percent of the total during the 1951-53 period. The index of the annual value of capacities placed in operation is based on a moving average of the value of capacities placed in operation during the index year and the following 2 years. For example, the 1948 index is based on the average of the value of capacities placed in operation in 1948, 1949, and 1950. The index was formulated in this manner to take into account the time lag between investment and the placing into operation of new productive capacities and thus place the two indexes on a more comparable basis.

The indexes show that, from the standpoint of their movements during the postwar years, the estimates of annual investment in ferrous metallurgy during the postwar years are consistent with the estimates of the annual value of capacities placed in operation. The movements of the two indexes are similar during the 1947-51 period but diverge somewhat in 1952 and 1953. A possible explanation for this divergence is that the assumed allocation of 60 percent of the total investment

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\* Table 24 follows on p. 59.

\*\* Table 25 follows on p. 60.

\*\*\* Following p. 60.

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in the metallurgical industry to ferrous metallurgy is too high. If different time lags were used, the index of the value of capacities placed in operation would not parallel the index of investment quite as closely as in Figure 4.\* The differences would not be very substantial, however, and the conclusion that the movement of the indexes are consistent would not be altered.

Table 24

Estimated Value of Ferrous Metallurgical Capacity  
Placed in Operation in the USSR a/  
1946-55

Million 1952 US \$

<u>Year</u>	<u>New Capacity 141/</u>	<u>Replacement 142/</u>	<u>Total</u>
1946	367.4	332.4	699.8
1947	217.7	355.4	573.1
1948	356.5	408.2	764.7
1949	264.5	436.3	700.8
1950	415.0	472.6	887.6
1951	799.2	517.8	1,317.0
1952	539.2	560.9	1,100.1
1953	517.2	603.3	1,120.5
1954	586.5	653.0	1,239.5
1955	672.0	704.0	1,376.0

a. Capital coefficients in US 1952 dollars. 140/ Reconstructed units were arbitrarily valued at 50 percent of the value of new units.

The estimates of the value of capacities placed in operation can also be used as a rough check on the estimated absolute values of investment. The total value of ferrous metallurgical capacities placed in operation during the Fourth Five Year Plan period is estimated at about US \$3.6 billion in 1952 prices. The estimated investment in ferrous metallurgy during the Fourth Five Year Plan period, on the assumption that ferrous metallurgy accounted for 70 percent of total investment in the metallurgical industry during 1948-50, is 30.6 billion rubles.

\* Following p. 60.



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in 1952 prices. If 8 percent of this total was in nonproductive investments, then productive investments would be 28.1 billion rubles in 1952 prices. If a ruble-dollar conversion factor of 8 to 1 is assumed to be appropriate, this estimate of productive investments would be consistent with the US \$3.6 billion estimate of capacities placed into operation. No ruble-dollar price studies are available for ferrous metallurgical processing capacity. However, a 1952 ruble-dollar ratio of 8 to 1 does not appear to be unreasonable in view of the general information available on ruble-dollar ratios for industrial equipment and construction. 143/

Table 25

Indexes of Investment in Ferrous Metallurgy and the Value of Ferrous Metallurgical Productive Capacities Placed in Operation in the USSR 1946-53

1946 = 100

<u>Year</u>	<u>Investment in Ferrous Metallurgy a/</u>	<u>Three-Year Average of the Value of Ferrous Metallurgical Productive Capacities Placed in Operation b/</u>
1946	100	100
1947	90	100
1948	118	116
1949	139	143
1950	161	162
1951	166	174
1952	184	170
1953	197	183

a. Based on the estimates in Table 21, p. 53, above. It is assumed that investments in ferrous metallurgy accounted for 70 percent of total investments in the metallurgical industry in the 1948-50 period and 60 percent of the total in the 1951-53 period.

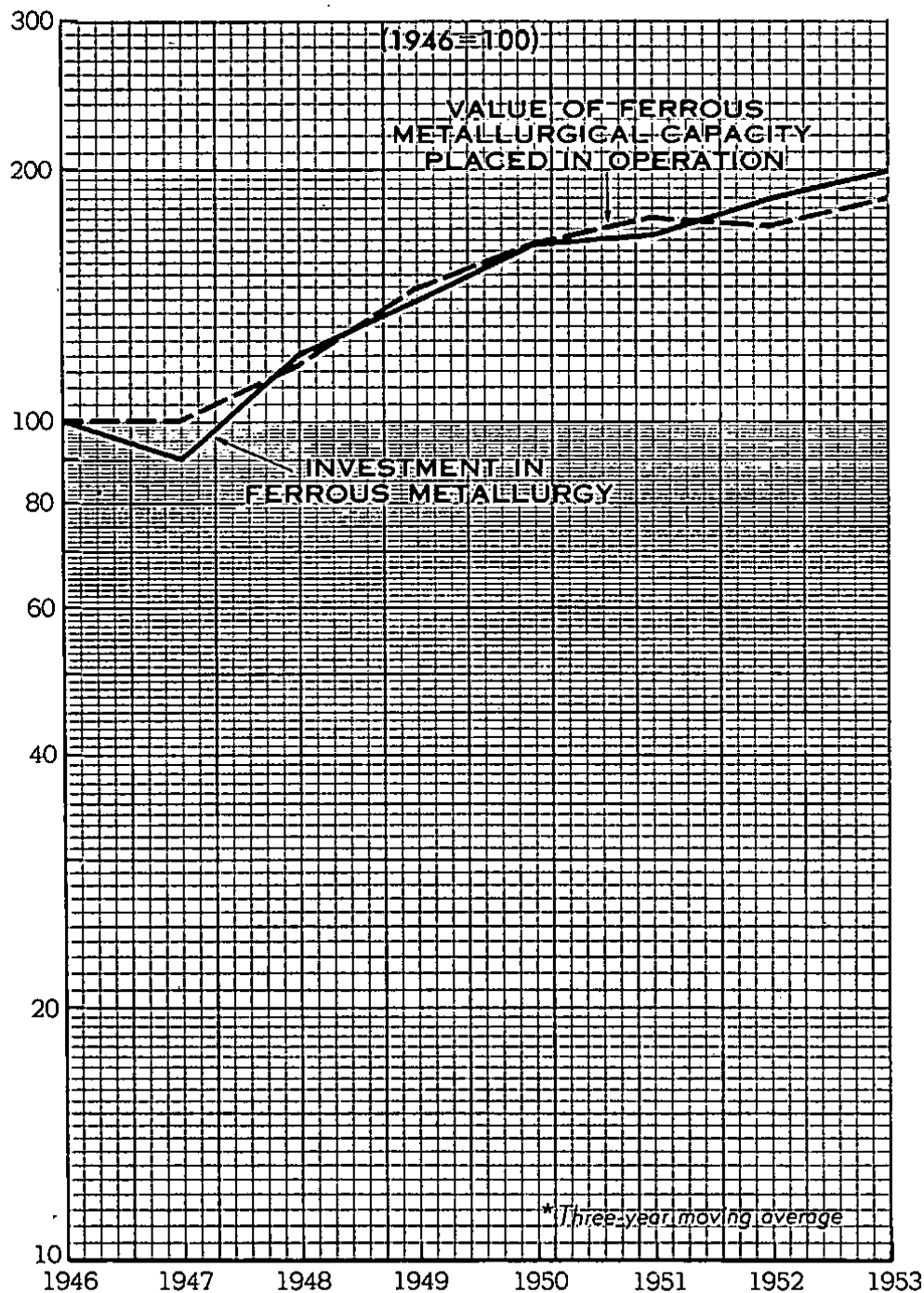
b. Based on the estimates in Table 24. The index for each year is based on the average value of capacities placed in operation in that year and the following 2 years.

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Figure 4

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### INDEX OF ESTIMATED INVESTMENT IN FERROUS METALLURGY COMPARED WITH INDEX OF ESTIMATED VALUE OF FERROUS METALLURGICAL CAPACITIES PLACED IN OPERATION



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G. Derivation of the Estimates.

The investment plan for the ferrous metallurgical industry called for an investment of 4.9 billion rubles in 1947 and about 27 billion rubles during 1946-50, both figures being stated in 1945 prices. 144/ Twelve billion rubles in 1945 prices were to be invested in the nonferrous metallurgical industry during the 1946-50 period. 145/ A 1947 figure for planned investment in nonferrous metallurgy is not available. It seems probable, however, that planned investment in nonferrous metallurgy in 1947 was approximately the same proportion of planned investment in 1946-50 as was the case in ferrous metallurgy. On this basis, planned investment in nonferrous metallurgy in 1947 is estimated at about 2.2 billion rubles in 1945 prices.

The 1947 investment plan was not fulfilled in either ferrous or nonferrous metallurgy 146/, but the degree of underfulfillment was not reported. Some information is available, however, on the degree of fulfillment of the plan for placing new capacities into operation in ferrous metallurgy. The 1947 plan for ferrous metallurgy called for placing in operation the following processing capacities: 147/ pig iron, 2.1 million metric tons; ingot steel, 2.9 million metric tons; rolled steel, 3.6 million metric tons. The estimated capacities actually placed in operation in 1947 are: pig iron, 0.84 million metric tons, or 40 percent of the planned capacity; ingot steel, 0.76 million metric tons, or 26 percent of the planned capacity; and rolled steel, 3.29 million metric tons, or 91 percent of the planned capacity.

To estimate the fulfillment of the plan for expanding ferrous metallurgical capacity as a whole, figures for actual increases in capacity by type of capacity were weighted both by the value of equipment required and by the man-hours required for erection.\* Based on the value of equipment weights, the over-all plan for placing new capacities in operation was fulfilled by 69 percent; based on the erection of man-hour weights, the plan was also 69 percent fulfilled. On the basis of this information, a 70-percent fulfillment of the investment plan was assumed for ferrous metallurgy in 1947. In the absence of any specific information relating to the degree of underfulfillment of the investment plan for nonferrous metallurgy, it was

\* The value of equipment and man-hour weights are from 148/.

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assumed that the investment plan was fulfilled by the same percentage as ferrous metallurgy. The 1947 estimates, so derived, are 3.4 billion rubles for ferrous metallurgy and 1.5 billion rubles for nonferrous metallurgy, both stated in 1945 prices. The total estimated 1947 investment in the metallurgical industry is 4.9 billion rubles in 1945 prices.

The planned investment in ferrous metallurgy in 1947 of 4.9 billion rubles in 1945 prices was reported to be 30 percent greater than the actual 1946 investment. 149/ This would mean that the actual investment in 1946 was 3.8 billion rubles in 1945 prices. No information is available regarding investment in nonferrous metallurgy in 1946.

The estimated investment in ferrous metallurgy in 1946 is about 10 percent greater than the estimated investment in 1947. The decline in investment in 1947 is supported by the estimates of the value of capacities placed in operation (see Table 24), which show that the value of capacities placed in operation in 1947 was about 18 percent less than the value of capacities placed in operation in 1946.

The 1948 estimate of 6.4 billion rubles in 1945 prices is based on the report that investments in the metallurgical industry were 31 percent greater than in 1947. 150/ No separate investment information on the ferrous and nonferrous metallurgical industries is available for 1948 or for any subsequent year. Percentage increases in investment since 1947 have been reported only for the metallurgical industry as a whole. It was reported, however, that the 1948 capital investment plan for the Ministry of Nonferrous Metallurgy provided a considerable increase over the actual 1947 investment. 151/

The estimated investment in the metallurgical industry in 1949 is 7.5 billion rubles in 1945 prices. It is based on the report that in 1949 investment in the metallurgical industry was 18 percent greater than in 1948. 152/ It seems probable that the 1949 plan for investment in the metallurgical industry was underfulfilled. The Ministry of Construction of Heavy Industry Enterprises, which devotes a large part of its efforts to the construction of plants for the Ministries of Ferrous and Nonferrous Metallurgy, was reported as having increased its volume of capital construction over 1948 but as having underfulfilled the 1949 plan. 153/

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The 1950 estimate of 8.7 billion rubles in 1945 prices is based on the report that investments in ferrous and nonferrous metallurgy in 1950 were 16 percent greater than in 1949. 154/

The estimates would indicate that the investment plan for ferrous and nonferrous metallurgy during the Fourth Five Year Plan period was not fulfilled. The Plan called for a total investment of 39 billion rubles in 1945 prices. The actual investment is estimated at about 33 billion rubles in 1945 prices, or about 85 percent of the planned volume. The underfulfillment of the investment plan is supported by plant studies of the ferrous metallurgical industry, which show that the planned increases in capacities placed in operation during the Fourth Five Year Plan were fulfilled by only 70 to 75 percent. 155/

The 1951 estimate of 10.5 billion rubles in 1945 prices is based on the report that investments in ferrous and nonferrous metallurgy in 1951 were 20 percent greater than in 1950. 156/ The 1951 investment plans for the Ministries of Ferrous Metallurgy and Nonferrous Metallurgy were not fulfilled. 157/

The 1952 estimate of 11.6 billion rubles in 1945 prices is based on the report that investments in ferrous and nonferrous metallurgy were 11 percent greater than in 1951. 158/

The 1953 plan fulfillment report stated that capital investments in ferrous and nonferrous metallurgy were greater than in 1952, but that the investment plan for completing industrial installations was not fulfilled by the Ministry of Metallurgical Industry. 159/ The plan fulfillment report for the first 6 months of 1953 stated that the volume of investment in the metallurgical industry was 8 percent greater than in the first 6 months of 1952. 160/ This 8-percent increase was used in estimating 1953 investment at 12.5 billion rubles in 1945 prices. (See IV, G, above, for rationale for applying the 6-month percentage increase to the entire year.)

H. Reliability of the Estimates.

The only check on the validity of the estimates is their consistency with the independently derived estimates of the value of capacities placed in operation in ferrous metallurgy. In view of this consistency, the range of error in the investment estimates should not exceed plus or minus 30 percent.

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VI. Investment in the Light and Food Industries.

A. Coverage of the Estimates.

The investment estimates for the light and food industries (Table 26)\* are derived from two different bases. The estimates for the 1946-50 period are derived from the 1947 planned investment in the light and food branches of industry. The estimates for the 1951-54 period are derived from 1953-54 investment data for the Ministry of the Foodstuffs Industry and the Ministry of the Manufactured Consumer Goods Industry.\*\* The Ministry of the Foodstuffs Industry was split into three Ministries in the reorganization of April 1954: The Ministry of the Food Industry, the Ministry of the Meat and Dairy Industry, and the Ministry of the Fish Industry. 161/ For convenience, the former designation, the Ministry of the Foodstuffs Industry, will be used in this report to cover enterprises now under these three Ministries.

The estimates of investment in the light and food branches of industry in 1946-50 are not strictly comparable in coverage with the 1951-54 estimates of investment in the Ministries of the Foodstuffs and Manufactured Consumer Goods Industries. The principal differences in coverage are the following: (1) The branch of industry estimates for 1946-50 include investments in light and food enterprises subordinate to Republic Ministries of Local and Fuel Industry. They may or may not also include investments by industrial cooperatives. (2) The estimates for 1951-54 include investments in machine-building plants and other activities of the Ministries of the Foodstuffs and Manufactured Consumer Goods Industries which would not be included as investments in the light and food branches of industry. Among the investments in "other activities" would be investments in the 869 State farms under the jurisdiction of the Ministry of the Foodstuffs Industry. 162/

The information necessary to adjust the investment estimates to a single, completely comparable basis is not available. The differences in the coverage of the estimates, however, are probably not substantial relative to the whole, and to some extent the differences will offset each other. For these reasons the 1946-50 investment series will be considered to be substantially comparable with the 1951-54 series.

\* Table 26 follows on p. 65.

\*\* Sometimes referred to as the Ministry of the Consumers Goods Industry.

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Table 26

Investment in the Light and Food Industries in the USSR  
 1946-53, 1946-50 Plan, 1951-55 Plan, 1954 Plan

Billion Rubles

<u>Year</u>	<u>1953 Prices a/</u>			<u>Current Prices a/</u>		
	<u>Light</u>	<u>Food</u>	<u>Total</u>	<u>Light</u>	<u>Food</u>	<u>Total</u>
1946-50 (Plan) b/	N.A.	N.A.	N.A.	10.2	N.A.	N.A.
1946-50 (Actual)	N.A.	N.A.	N.A.	9.5	17.5	27.0
1951-55 (Plan) c/	N.A.	N.A.	N.A.	25.5	28.0	53.5
1946	N.A.	N.A.	3.3	N.A.	N.A.	2.7
1947	N.A.	N.A.	4.3	N.A.	N.A.	3.7
1948	N.A.	N.A.	5.7	N.A.	N.A.	4.9
1949	N.A.	N.A.	6.7	N.A.	N.A.	7.6
1950	N.A.	N.A.	7.4	N.A.	N.A.	8.1
1951			6.4			6.8
1952	{5.3	{8.1	7.0	{5.5	{8.5	7.2
1953 (Plan)	3.1	5.6	8.7	3.1	5.6	8.7
1953 (Actual)	2.8	4.8	7.6	2.8	4.8	7.6
1954 (Plan)	5.9	8.5	14.4	5.9	8.5	14.4

- a. Except as noted.  
 b. 1945 prices.  
 c. Possibly 1950 planning prices.

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B. Investment Trends.

During the 1946-53 period, investments in the light and food industries accounted for from 4 to 6 percent of total investments and from 8 to 12 percent of total investments in the industrial sector of the economy (see Table 27). This represents a smaller share of investment allocations than the light and food industries received in the prewar years.

Table 27

Investment in the Light and Food Industries in the USSR as Percentages of Total Investment and Total Investment in Industry a/  
1946-53, 1954 Plan

<u>Year</u>	<u>Percent of Total Investment</u>	<u>Percent of Total Investment in Industry</u>
1946	4.6	N.A.
1947	5.6	N.A.
1948	5.7	10.6
1949	6.7	N.A.
1950	5.8	N.A.
1951	4.7	N.A.
1952	4.8	N.A.
1953	4.7	8.7
1954 (Plan)	7.6	13.8

a. Based on estimates of investment in the light and food industries in Table 26 and the estimates of total investment and total investment in industry in Table 4, p. 14, above.

During the 1933-39 period, investments in the light and food industries accounted for 6 to 7 percent of total investments and 14 to 23 percent of investments in the industrial sector of the economy. 163/ The decline in the share of total investments allocated to the light and food industries in the postwar years, coupled with the fact that the industrial sector as a whole received a larger share of total



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investments during the postwar years, illustrates the extent of the emphasis on the development of heavy industry during the postwar years. Even in the 1954 Plan, with its emphasis on increasing the output of consumer goods, the share of total investments going to the light and food industries will not exceed the normal prewar share of about 7 percent.

1. Decline in Investment in 1951.

The absolute decline in investment in the light and food industries in 1951 is very significant. The decline in investment in the light and food industries between 1950 and 1951 is estimated at 13 percent, measured in constant prices. The exact extent of the decline is not firmly established, but it seems certain that a decline did occur. The decline of investment in the light and food industries in 1951 is one of a number of adjustments in investment allocations that appear to have resulted from the outbreak of war in Korea. The Korean war does not appear to have had any marked effect on the level of total investment, but it did result in a diversion of an increased proportion of the total to heavy industry. The shift in the allocation of investment which began in 1951 was continued into 1952. It is estimated that investment in agriculture declined by about 15 percent between 1951 and 1952. 164/ In 1952 investments in both the light and food industries and agriculture are estimated to have been below the 1950 levels, despite the fact that total investment is estimated to have increased by more than 20 percent between 1950 and 1952.

2. Investment Program, 1953-54.

As noted above\*, the revision of the 1953 investment program in midyear resulted in a substantial curtailment of the growth of heavy industry. Yet, the actual increase achieved in investment in the light and food industries was very small. The 1953 investment plan called for an increase of 24 percent in investment in the light and food industries\*\*; the actual increase achieved was only 8 percent. 165/

\* See II, above.

\*\* The 24-percent-increase figure was derived as follows. The planned 1953 investment in the light and food industries was 8.73 billion rubles. The actual investment was 7.6 billion rubles, and this represented an 8-percent increase over 1952. It follows that the planned increase was 24 percent (see pp. 71-72, below, for source references).

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This poor showing is undoubtedly attributable to the bottlenecks created by the midyear revision of the investment program. With respect to the investment program of the light and food industries, one of the more important bottlenecks appears to have been in the production of specialized machinery for those industries. It was reported, for example, that the USSR Ministry of Machine Building had supplied only about one-third of the assortment of light industrial machinery scheduled for delivery during the first 9 months of 1953. 166/

The plan fulfillment report for the first 6 months of 1954 stated that investment in the light and food industries in the first 6 months of 1954 was 48 percent greater than during the corresponding period of 1953. Although this represents a very substantial increase over 1953, it is far below the rate of increase necessary to fulfill the 1954 investment plan. It seems very unlikely that the planned increase of more than 80 percent in investment in the light and food industries will be fulfilled.

C. Structure of Investment.

During the 1946-50 period, investment in the food industry was allocated approximately as follows: fish industry, 28 percent; meat and dairy industry, 26 percent; other food industry, 46 percent. According to the revised Fourth Five Year Plan, the allocation of investment in light industry was to be as follows: textiles, 72 percent; other light industry, 28 percent.

Based on these breakdowns and the estimates of investment for the light and food industries, the allocation of total investment in the light and food industries during the Fourth Five Year Plan period would be approximately as shown in Table 28.\*

The distribution of investment between the light and food industries was altered in the Fifth Five Year Plan. The estimates indicate that investment in the Fourth Five Year Plan period was divided approximately 35 percent to light industry and 65 percent to the food industry. In the Fifth Five Year Plan the allocations of investment to the light and food industries will be approximately equal.

\* Table 28 follows on p. 69.

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Table 28

Percentage Distribution of Investment in the Light and Food Industries  
in the USSR under the Fourth Five Year Plan

<u>Industry</u>	<u>Percent</u>
Fish	18
Meat and Dairy	17
Other Food	30
Textile	25
Other Light	10
Total Light and Food	<u>100</u>

Nonproductive investments are estimated to account for about 14 percent of total investments in light industry during the 1946-50 period, 19 percent during the 1951-53 period, and 22 percent in the 1954 Plan (see Table 29).\* In the food industry, nonproductive investments are estimated to account for 12 percent of total investment in 1953 and 18 percent in the 1954 Plan. Most of the estimates of nonproductive investments by the light industry are based on the following statement by A.N. Kosygin, Minister of the Manufactured Consumer Goods Industry, in Pravda, 15 November 1953: 167/

As a result of the continuing concern of the Communist Party and Soviet Government for a constant improvement in the material well-being of our country's working people, the housing situation and working conditions of textile workers and all workers, engineers, technicians, and light industry employees are being improved.

Housing construction grants are increasing yearly. During the Fourth Five Year Plan about 1,000,000,000 rubles were invested in housing construction, and 1,400,000,000 rubles have been so invested during the

\* Table 29 follows on p. 71.

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3 years of the current Five Year Plan. In 3 years alone our industrial workers have received about 1,000,000 square meters of floor space as against 1,300,000 square meters during the entire Fourth Five Year Plan.

The government has laid great tasks in housing construction before us. Housing construction grants for 1954 total more than 1,000,000,000 rubles, which exceeds grants for such construction for the entire Fourth Five Year Plan. Next year we are to provide 685,000 square meters of floor space, or almost 50 percent more than has been opened to tenancy this year.

The 1.4 billion ruble figure for investment in housing construction in light industry during 1951-53 probably represents the actual 1951-52 investment and planned investment in 1953. It was later announced that the housing plan for the Ministry of the Manufactured Consumer Goods Industry, which called for the construction of 444,000 square meters of housing, was underfulfilled by 100,000 square meters. 168/ The estimate of investment in housing for 1951-53 was, therefore, adjusted to 1.3 billion rubles.

In 1953, housing construction by the Ministry of the Foodstuffs Industry was to exceed 500,000 square meters, but the plan was only 73.4 percent fulfilled. 169/ It was reported that 1.5 billion rubles would be invested in housing and service construction in 1954 by the Ministry of the Foodstuffs Industry. 170/

The estimates of nonproductive investments in the light and food industries, found in Table 29, were derived by multiplying the estimates of investment in housing by 125 percent to reflect other nonproductive investments. No adjustment of the 1954 Plan figure for the Ministry of the Foodstuffs Industry was necessary. Where the housing information was given in square meters rather than in rubles, a value estimate for housing was derived by applying the factor of 1,400 rubles per square meter.

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Table 29

Investment in the Light and Food Industries in the USSR  
 Excluding Nonproductive Investment  
 1946-53, 1953, 1954 Plan

Billions Current Rubles

<u>Light Industry</u>			
<u>Period</u>	<u>Total Investment</u>	<u>Nonproductive Investment</u>	<u>Total Investment Excluding Nonproductive Investment</u>
1946-50	9.5	1.3	8.2
1951-53	8.3	1.6	6.7
1953 (Plan)	3.1	0.8	2.3
1953	2.8	0.6	2.2
1954 (Plan)	5.9	1.3	4.6

<u>Food Industry</u>			
<u>Period</u>	<u>Total Investment</u>	<u>Nonproductive Investment</u>	<u>Total Investment Excluding Nonproductive Investment</u>
1953 (Plan)	5.6	0.9	4.7
1953	4.8	0.6	4.2
1954 (Plan)	8.5	1.5	7.0

D. Derivation of the Estimates.

In connection with the new consumer goods program, the Soviet authorities announced the actual 1953 investment and planned 1954 investment by the Ministries of the Foodstuffs Industry and the Manufactured Consumer Goods Industry. The combined investment by these Ministries in 1953 was 7.6 billion rubles. 171/ Of this total, 4.8 billion rubles was invested by the Ministry of the Foodstuffs Industry

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and 2.8 billion rubles was invested by the Ministry of Manufactured Consumer Goods. The latter estimates are derived from the announcements that planned 1953 investment in the Ministry of the Foodstuffs Industry was 5.63 billion rubles 172/ and that this plan was underfulfilled by 15.3 percent. 173/ The planned investment by the Ministry of Manufactured Consumer Goods in 1953 of 3.1 billion rubles was underfulfilled by 9.6 percent. 174/

Investment planned for 1954 amounts to 5.9 billion rubles for the Ministry of Manufactured Consumer Goods and 8.5 billion rubles for the Ministry of the Foodstuffs Industry, making a total for the light and food industries under Union jurisdiction of 14.4 billion rubles. 175/

The total investment estimate of 7.0 billion rubles for 1952 in 1953 prices is derived from the announcement that capital investment in the light and food industries in 1953 was 8 percent greater than in 1952. 176/ Similarly, the 1951 investment estimate of 6.4 billion rubles in 1953 prices is derived from the announcement that capital investment in the light and food industries in 1952 was 9 percent greater than in 1951. 177/ The Soviet authorities announced that 8.5 billion rubles were invested in the food industry in 1951 and 1952. 178/ This figure was adjusted for price level changes for inclusion in Table 26.

The estimates for the period 1946-50 are not as well established as the estimates for 1951-54; and, as explained earlier, they are not strictly comparable with the 1951-54 estimates. The 1946-50 estimates cannot be directly linked to the 1951 estimate, because information relating the volume of investment in 1951 to the volume of investment in 1950 is not available. The estimates for 1946-50 are based on the following information: (1) planned investment in the light and food industries in 1947; (2) percentage increases in investment for the subsequent years; (3) actual investment in the food industry during the period 1946-50; and (4) planned investment in light industry in 1946-50.

Planned investment in the light and food industries in 1947 was 3.3 billion rubles in 1945 prices. 179/ Of this total, 1.8 billion rubles was allotted to light industry and the remaining 1.5 billion rubles was allotted to the food industry. 180/ The only fact that is known with regard to the fulfillment of this plan was that the Ministry of Light Industry, which had been allocated 600 million rubles of the total of 3.3 billion rubles, fulfilled the investment plan by 55.4 percent. 181/ For reasons which shall be discussed later, it is

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assumed that planned investment in the light and food industries as a whole was fulfilled in 1947. The 1947 estimate converted to 1953 prices would amount to 4.3 billion rubles.

The 1946 estimate for investment in the light and food industries is 3.3 billion rubles in 1953 prices. It is based on the announcement that investment in the light and food industries in 1947 was 30 percent greater than in 1946. 182/ The 1948 estimate of 5.7 billion rubles in 1953 prices is based on the announcement that the volume of capital work in the light and food industries in 1948 was 32 percent greater than in 1947. 183/

No information is available regarding the 1949 level of investment in the light and food industries combined. The plan fulfillment report stated that investment in the food industry was 21 percent greater than in 1948. 184/ However, the fulfillment report for the first 9 months of the year stated that investment in the light and food industries was 13 percent greater than in the corresponding 9 months of 1948. 185/ The decision to report only investment for the food industry in the annual plan fulfillment report indicates that the volume of investment for the light and food industry combined was probably less than 21 percent, although it may have been higher than the 13-percent increase reported for the first 9 months of 1949. A 17-percent increase is used in estimating the 1949 volume of investment at 6.7 billion rubles in 1953 prices.

The 1950 estimated investment of 7.4 billion rubles in 1953 prices is based on the statement that investment in the light and food industries was 10 percent greater than in 1949. 186/

Investment in the light and food industries is estimated to have declined by about 13 percent between 1950 and 1951 measured in constant prices. The precise magnitude of the decline cannot be firmly established, but it seems certain that a decline did occur. The year 1951 was the only postwar year for which the Soviet authorities failed to announce the level of investment in the light and food industries as a percentage of investment in the preceding year. This fact alone, in view of the reluctance of the Soviet authorities to report declines in anything, would indicate that the absolute level of investment in 1951 may have been less than in 1950. The contention that investment in the light and food industries was reduced in 1951 is supported by the estimate, cited earlier, that there was also a reduction in investment in agriculture, although the latter did not occur until 1952.

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The declines in investment in the light and food industries and agriculture in 1951 and 1952 appear to be consequences of a readjustment of the investment plan following the outbreak of war in Korea.

The weak links in the analysis supporting the 1946-50 estimates are as follows: (1) the absence of any information relating the level of investment in 1951 to the level of investment in 1950; (2) the assumption of plan fulfillment in 1947; and (3) the assumption of a 17-percent increase in investment in 1949. Certain additional information will throw some light on the validity of the assumptions used.

It was reported in 1953 that investment in the food, meat, dairy, and fish industries during the postwar years was 26 billion rubles and that investment in these industries in 1951 and 1952 was 8.5 billion rubles. 187/ Thus, investment in these industries during 1946-50 was 17.5 billion rubles. In 1950 the Deputy Minister of the Ministry of the Food Industry (which at that time did not include the meat, dairy, and fish industry) stated that investment in the Ministry during the Fourth Five Year Plan exceeded 8 billion rubles. 188/ It was later announced that 7.4 billion rubles had been invested in the fish industry between 1946 and 1952. 189/ If the same proportion of the total investment in the fish industry is allocable to the years 1951-52 as was the case in the food industry as a whole, then investment in the fish industry in 1946-50 would amount to about 5 billion rubles. This would leave about 4.5 billion rubles for investment in the meat and dairy industries during the Fourth Five Year Plan period.

It is not known whether these figures are stated in planning prices or in current prices. During 1945-48, investments were planned in prices which prevailed on 31 December 1945. In 1949 and 1950 investments were planned in current prices. 190/ Since 1951, investments have been planned in 1 July 1950 prices. 191/ The use of planning prices would slightly understate investments during 1946-48 relative to later years and would overstate investment during the 1951-52 period relative to 1949 and 1950. It shall be assumed that the 26 billion ruble figure for investment in the food industry during the 1946-52 period and the 8.5 billion ruble figure for investment in the food industry in 1951 and 1952 are stated in current prices.

The estimates for investment in the light and food industries during 1946-50 in current prices total 27 billion rubles. Subtracting the 17.5 billion rubles for investment in the food industry (which is

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assumed to be in current prices) leaves 9.5 billion rubles for investment in light industry during the period 1946-50.

In the original Fourth Five Year Plan, about 8 billion rubles in 1945 prices was to be invested in light industry. <sup>192/</sup> The plan was increased to 10.2 billion rubles in 1945 prices in <sup>1947.</sup> <sup>193/</sup> If the 10.2 billion ruble figure in 1945 prices were adjusted to reflect the price levels that prevailed during the Fourth Five Year Plan period, it would amount to about 13 billion rubles. The comparison of this figure with the 9.5 billion ruble estimate derived in the preceding paragraph indicates that the revised plan for investment in light industry during the Fourth Five Year Plan was only about 75 percent fulfilled. After adjusting for price level changes, the 9.5 billion ruble estimate would indicate the approximate fulfillment of the originally planned investment of 8 billion rubles in 1945 prices.

Information is not available concerning the fulfillment of the investment plan for light industry during the Fourth Five Year Plan. However, the plan for housing construction to be undertaken by light industry is known to have been grossly underfulfilled. The Ministry of the Textile Industry announced planned investment in housing of 1.6 billion rubles in 1945 prices during the Fourth Five Year Plan. <sup>194/</sup> In 1953, in reference to the Ministry of the Manufactured Consumer Goods Industry, which combined the former Ministries of Textiles and Light Industry, it was stated that only about 1 billion rubles were invested in housing during the Fourth Five Year Plan.

This would indicate that investments in housing construction constituted about 11 percent of the total estimated investment in light industry during 1946-50. This percentage does not appear to be unreasonable. In 1951-53 housing accounted for approximately 15 percent of the total investment in light industry. In 1953 it accounted for about 18 percent. In the 1954 Plan, housing is to account for about 17 percent of investment in light industry. It would seem logical to expect that in the years of the Fourth Five Year Plan, when the Soviet authorities were not concerned about shifting labor into the consumer goods industries and when much less emphasis was placed on housing construction in general, a considerably smaller proportion of total investment in those industries would take the form of housing for workers.

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The assumption of plan fulfillment in 1947 and the assumption of a 17-percent increase of investment in 1949 used in producing the estimates for the years 1946-50 would, in the absence of additional information, appear to be on the high side. The initial assumptions used, a 10-percent underfulfillment in 1947 and a 13-percent increase in 1949, produced a total investment estimate for the light and food industries during 1946-50 of 23.8 billion rubles in current prices. Subtracting the 17.5 billion rubles for the food industry left 6.3 billion rubles for light industry. This figure seemed unreasonably low, and therefore the more liberal assumptions were substituted.

The use of the more liberal assumption for 1947 is also supported by the change in the treatment of "extra-limit" investments. In 1950 and possibly in 1949, "extra-limit" investments were included in the State investment plan. Before that time, although they were planned in the aggregate, they were not included in the published investment data. This element of incomparability in the series would have the effect of understating investment in 1948 and earlier years relative to investment in later years. For example, although the centralized investment plan in 1947 may have been underfulfilled by the light and food industries, the underfulfillment may have been offset by "extra-limit" investments undertaken in that year. Since the investment estimates for 1948-50 are derived from the 1947 estimate, they would thus be understated relative to the 1951-53 estimates, which include "extra-limit" investments.\* For the industrial sector of the Soviet economy as a whole, "extra-limit" investments have been of negligible proportions. For example, in the 1937 Plan "extra-limit" investments constituted 2.2 percent of centralized investment in industry; in the 1939 Plan the corresponding percentage was 5.1 percent. <sup>195/</sup> However, the following statement, from Narodnoye khozyaystvo, 1947, indicates that they probably constituted a significant fraction of investment in the light and food industries in the early postwar years:

In addition to centralized investments, large noncentralized capital investments will take place,

\* It would be more accurate to say that the category "extra-limit" investments was eliminated in 1950 or 1949. For present purposes the important difference is that they are now included in published investment figures, whereas formerly they were not.

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directed first of all toward housing and cultural construction, agriculture, and also to the consumer goods industry. 196/

Some information has been published on investment in the light and food industries in the Fifth Five Year Plan. It was reported that investments in the food industry in the Fifth Five Year Plan were to be 1.6 times the amount invested during the Fourth Five Year Plan period. 197/ Applying this to the 17.5 billion ruble estimated investment in 1946-50 results in a Fifth Five Year Plan figure of 28 billion rubles.

It was also reported that investments in the Ministry of Manufactured Consumer Goods were to be 2.5 times as much as investment in the Fourth Five Year Plan. 198/ Applying this to the planned investment of 10.2 billion rubles during the Fourth Five Year Plan results in an estimate of 25.5 billion rubles for the Fifth Five Year Plan. This figure looks reasonable in view of the following statement made by the Minister of the Manufactured Consumer Goods Industry on 15 November 1953: 199/

The Ministry of Manufactured Consumer Goods Industry, USSR, must prepare for a sharp increase in capital construction and in the next 2 or 3 years put greater industrial capacity into use. At present, the USSR Ministry of Manufactured Consumer Goods Industry is building, at an estimated cost of more than 20 billion rubles, 400 super-limit projects [projects costing above a certain amount to construct, which must be approved by the Council of Ministers, USSR]. Already work in the amount of 9 billion rubles has been completed on these projects. All of these enterprises must go completely or partially into operation in the next 2 years. In addition, reconstruction and expansion of 800 enterprises is going on. These fall into the category of sub-limit [approved by ministry] construction.

It would be difficult to estimate the investment in 1955 that will be required to fulfill the Fifth Five Year Plan for the light and food industries, because the price level reflected in the Fifth Five Year Plan estimates has not been established. It is quite possible that the statements with respect to the Fifth Five Year Plan figures

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reflect 1950 planning prices rather than current prices.

E. Reliability of the Estimates.

The 1951-52 estimates, which were derived from the announced 1953 investment figure, should have a negligible range of error. The 1946-50 estimates, however, are not so well founded. The estimated range for the 1946-50 estimates is plus 30 percent and minus 15 percent. The narrower downward part of the range is based on the conviction that, at most, investment in the light and food industries in 1951 was no greater than investment in 1950.

VII. Investment in the Machine-Building and Construction Materials Industries.

A. Coverage of the Estimates.

No ruble investment figures, planned or actual, are available for the machine-building industry or the construction materials industry in the postwar years. For this reason only indexes of investment can be developed for these industries at this time.

The investment indexes in Table 30\* refer to the machine-building and construction materials branches of industry. The machine-building branch of industry covers most of the enterprises in the following ministries: Automobile, Tractor, and Agricultural Machine Building; Machine and Instruments Building; Machine-Tool Industry; Heavy Machine Building; Transport Machine Building; Construction and Road Machine Building, and Electrical Industry. In addition, the machine-building branch of industry also includes the machine-building enterprises of other industrial ministries -- such as the enterprises of the Ministries of the Coal and Petroleum Industries, which produce coal mining and oil field equipment.

It is believed that the aircraft, shipbuilding, and defense industries are not included within the machine-building industry in Soviet investment accounting. This is based on three pieces of evidence. First, in the classification of branches of industry known to have been in use in the postwar years, the machine-building industry

\* Table 30 follows on p. 79.

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is defined as including all enterprises primarily engaged in the production of producer goods. 200/ Secondly, in the Gosbank classification of accounts, the Ministries of Aviation, Shipbuilding, and Defense are not included in the same category as the various machine-building ministries. 201/ Thirdly, in the prewar breakdown of productive fixed capital assets in Soviet industry there is a large miscellaneous residual in the fixed assets of the metalworking industry. This residual, which is completely separate from the machine-building industry and is labelled "general repair plants and shops," constitutes such a large proportion of the total that it seems reasonably certain that it includes defense industry enterprises. 202/

Table 30

Indexes of Investment in the Machine-Building and Construction Materials Industries in the USSR Compared with Indexes of Total Investment and Total Investment in Industry a/

1948 = 100

<u>Year</u>	<u>Machine Building</u>	<u>Construction Materials</u>	<u>Total Investment b/</u>	<u>Investment in Industry b/</u>
1947	87	N.A.	82	N.A.
1948	100	100	100	100
1949	110	112	120	N.A.
1950	120	130	146	N.A.
1951	132	175	165	N.A.
1952	148	191	178	N.A.
1953	160	203	192	161

a. Based on constant 1945 prices.

b. Based on the estimates in Table 4, p. 14, above, converted to a constant 1945 price base.

The construction materials branch of industry includes, in addition to the enterprises of the Ministry of the Construction Materials Industry, construction materials enterprises subordinate to the various construction ministries, to other industrial ministries, and to republic ministries of local and fuel industry. No information is currently available with regard to the proportion of total

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investment in the industry which is accounted for by the Ministry of the Construction Materials Industry.

B. Investment Trends.

Since 1948, investments in the machine-building industry have been increasing at a slower rate than total investments and at about the same rate as investments in the industrial sector of the economy as a whole. (See Table 3Q) The lack of emphasis on investment in the machine-building industry would seem to indicate that the machine-building base of the economy of the USSR is relatively well developed as compared with other sectors of the economy, particularly the fuel and energy base. A contributing factor to the lack of emphasis on investment in the machine-building industry, which is related to the relative maturity of that industry in the Soviet economy, is that the capital-output ratio appears to be declining in the machine-building industry; that is, output appears to be increasing at a faster rate than the increase of the stock of capital assets. This situation is the opposite of that prevailing in the coal, petroleum, and electric power industries of the USSR, but it is in accord with the findings of a recent study of US manufacturing industries. 203/ This study indicates that capital-output ratios in manufacturing tend to increase until an industry reaches a relatively mature state, after which capital-output ratios tend to decline. For manufacturing industries in general, capital-output ratios in the US steadily increased from 1880 to 1919, after which they showed a steady decline.

The Soviet authorities actually planned a decline in capital-output ratios in the economy generally in the Fourth Five Year Plan, as compared with prewar relationships. In the Fourth Five Year Plan 20 percent to 30 percent more output was to be produced per ruble of fixed capital assets than in the prewar five year plans. 204/

The experience of the US would indicate that the greatest reductions in capital-output ratios should come from the more mature industries. Evidence of such a reduction in the machine-building industry of the USSR is found in a statement by the Minister of the Construction and Road Machine Building Industry. He stated, with reference to his Ministry, that "in 1950 for each ruble added to the fixed capital, 2.5 times more production was obtained than in 1946." 205/ Although the 2.5 times figure is undoubtedly inflated by the fact that 1946, the first postwar year, does not constitute

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a normal year for comparative purposes, nevertheless, after giving due weight to this factor, it would seem probable that capital-output ratios have been declining in the machine-building industries. The statement is the more significant because the Ministry of Construction and Road Machine Building is one of the least mature branches of the Soviet machine-building industry.

Investment in the construction materials industry has been increasing since 1948 at a faster rate than total investment and at a substantially faster rate than investment in industry generally. (See Table 3Q\*) The construction materials bottleneck, which has hampered construction plans all through the postwar years, has forced the Soviet authorities to increase sharply the volume of investment funds allocated to the relatively backward construction materials industry. An extremely ambitious investment program is envisaged in the Fifth Five Year Plan. Capital investments in the construction materials industry are planned to be 3 times the volume of investments made during the Fourth Five Year Plan. <sup>206/</sup> The achievement of this goal will require a considerable effort in 1954 and 1955, because the level of investment in the first 3 years of the Fifth Five Year Plan appears to have been only about double the level of investment during the first 3 years of the Fourth Five Year Plan period.

The efforts being made to develop the construction materials industry are reflected in the pattern of investment in the machine-building industry. It was reported that in the Ministry of Construction and Road Machine Building, which produces much of the equipment used by the construction materials industry, <sup>207/</sup> 18.5 percent more fixed capital was placed into operation in 1950 than in 1949. In addition, it was reported that in 1950 the stock of fixed capital of the Ministry of Construction and Road Machine Building was 2.4 times the 1946 stock. This indicates a substantially greater rate of investment in the Ministry of Construction and Road Machine Building than the rate of investment reported for the machine-building industry as a whole.

C. Investment Program, 1954.

The 6-month plan fulfillment report for 1954 stated that the volume of investment was 16 percent greater in the machine-building industry and 10 percent greater in the construction materials industry

\* P. 79, above.

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than in the corresponding period of 1953. 208/ The 16-percent increase reported for the machine-building industry is the largest increase reported for this industry in any comparable period during the postwar years. Presumably this increase reflects investments in new or expanded plants and equipment to produce machinery and equipment for the implementation of the new economic program.

The relatively small increase of 10 percent in investment in the construction materials industry is somewhat surprising. This is only slightly higher than the 8-percent increase reported for the first 6 months of 1953, although the rate of increase of total centralized investment is more than 3 times the rate of increase of the first 6 months of 1953. On the basis of this performance it seems clear that the Fifth Five Year Plan for investment in the construction materials industry will not be fulfilled.

D. Derivation of the Estimates.

No information is available concerning investment in the machine-building and construction materials industry in 1947 except the report that the investment plan for the Ministry of the Construction Materials Industry was fulfilled by only 60.3 percent and the plan for entry of new plants into operation was fulfilled by only 23.1 percent. 209/

In 1948 it was announced that investment in the machine-building industry was 15 percent greater than in 1947. 210/ No information was published concerning investment in the construction materials industry.

In 1949 it was reported that investment in the machine-building industry had increased by 10 percent and investment in the construction materials industry by 12 percent over 1948. 211/ The 1949 investment plan for the Ministry of the Construction Materials Industry was fulfilled by only 90.8 percent and the plan for the construction of housing by only 89.5 percent. 212/

The 1950 plan fulfillment report stated that investment in the machine-building industry had increased by 9 percent and investment in the construction materials industry had increased by 16 percent over 1949. 213/



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A very large increase in investment in the construction materials industry was planned in 1951, an increase of more than 80 percent over the 1950 volume of investment. The plan for construction and installation work was only 73.6 percent fulfilled, but despite this, investment in the construction materials industry was 35 percent greater than in 1950. 214/ Only slightly more than 50 percent of the new plants provided for the Ministry of the Construction Materials Industry in the investment plan were completed and placed into operation in 1951. 215/ The 1951 plan fulfillment report stated that investment in the machine-building industry exceeded 1950 investment by 10 percent. 216/

The 1952 plan fulfillment report stated that investment in the machine-building industry increased by 12 percent and that investment in the building materials industry increased by 9 percent over 1951. 217/

The 1953 plan fulfillment report stated that capital investments in the machine-building and building materials industries were greater than in 1952, but no percentage increases were given. 218/ It also stated that the plan for completing industrial installations was considerably underfulfilled by the Ministry of the Construction Materials Industry. The plan was probably also underfulfilled in the machine-building industry. In August 1953, the Minister of Machine Building, S.A. Akopov, spoke of the need for eliminating the lag in the construction of large machine tool plants. 219/

The plan fulfillment report for the first 6 months of 1953 stated that investment in both the machine-building and construction materials industries was 8 percent above the corresponding 6-month period of 1952. 220/ In preparing the indexes in Table 30, it was assumed that the 8-percent increases reported for the first 6 months were applicable to the entire year. For the rationale supporting this assumption the reader should refer to Part IV, Investment in the Coal and Petroleum Industries.

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VIII. Investment in the Residual Industries.

A. Definition of the Residual Industries.

The term "residual" industries refers to all branches of the industrial sector whose investments are financed through the residual or unallocated sector of the industrial investment budget. This includes all industries except those for which ruble investment estimates have been made in this report, that is, all industries except the coal, petroleum, electric power, metallurgical, and light and food industries.

The residual industries are composed of the following: machine-building, chemicals, construction materials, lumber and paper, defense (conventional weapons), and construction.

B. Investment Trends.

Estimates of investment in the residual industries can be made only for 1948 and 1953, the only postwar years for which official figures for total actual investment in industry are available. Deducting the 1948 estimates for investment in the coal, petroleum, electric power, metallurgical, and light and food industries from the total 1948 investment in industry of 46.4 billion rubles leaves 20.2 billion rubles for the residual industries, or about 44 percent of the total investment in industry. The corresponding figure for 1953 is 30.5 billion rubles, or about 35 percent of the total.

The investment allocation to the residual industries in 1953 constitutes a smaller proportion of total investment in industry than the proportion allocated to these industries in the prewar years. Between 1930 and 1939 the investment allocations to the residual industries ranged from 42 percent to 52 percent of total investment in industry, increasing to 58 percent of the total in the 1941 Plan. 221/ The increase in allocations to the residual industries in the 1941 Plan reflected a diversion of investment funds to the defense industries.

As noted above, the share of the residual industries in total investment in industry is estimated to have declined from about 44 percent of the total in 1948 to about 35 percent of the total in 1953. At the same time, it is known that investment in the machine-building industry increased between 1948 and 1953 at about the same rate as

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total investment in industry and that investment in the construction materials industry during the same period increased at a considerably faster rate than total investment in industry (see Table 30\*). This means that all of the reduction in the share of total investment in industry going to the residual industries was confined to the industries other than machine-building and construction materials. Of the remaining industries, only the chemical industry and the defense industry (conventional weapons) are of any substantial size. These relationships would seem to indicate that there could not have been any substantial increases, and there probably was a decline, in the share of investment in industry going to the defense industry (conventional weapons) between 1948 and 1953.

C. Allocation of Investment among the Residual Industries.

An examination of the prewar allocation of investment among the residual industries throws some light on the postwar allocation of investment among these industries. Scattered information on actual investment in 1934, 1938, 1939, and 1940 and in the 1933-37 Plan and complete information on planned investment in 1934, 1935, and 1936 provided the basis for calculating the ranges for investment among the residual industries as percentages of total investment in industry shown in Table 31. 222/

Table 31

Investment in the Residual Industries in the USSR  
as Percentages of Total Investment in Industry  
Various Prewar Years

<u>Industry</u>	<u>Percent</u>
Machine Building	12 to 19
Chemicals	7 to 11
Construction Materials	1 to 3
Paper	1 to 3
Defense Industry, Timber Industry, Construction Industry, and All Other	14 to 16
<u>Total</u>	<u>35 to 52</u>

\* P. 79, above.

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The investment allocations in the 1941 Plan were deliberately excluded in computing the ranges in Table 31. This was done because the 1941 Plan was clearly a war preparedness plan, and the pattern of investment allocations in the 1941 Plan differed very radically from the pattern of the earlier prewar years. In the 1941 Plan the residual industries accounted for 58 percent of total investment in industry, which is a considerably higher proportion of the total than in any earlier prewar year or in any postwar year for which information is available. Even more significant, however, is the fact that the allocations to the defense industry accounted for about 75 percent of the total investment in the residual industries. The allocation of investment among the residual industries in the 1941 Plan is shown in Table 32.

Table 32

Investment in the Residual Industries in the USSR  
as Percentages of Total Investment in Industry 223/  
1941 Plan

<u>Industry</u>	<u>Percent</u>
Machine Building	8
Chemicals	4
Construction Materials	1
Paper	1
Defense Industry, Timber Industry, Construction Industry, and All Other	44
Total Residual Industries	<u>58</u>

In the later postwar years the proportion of total investment in industry allocated to the chemicals and construction materials industry probably would be near the upper limit of their peacetime prewar ranges of 11 percent and 3 percent, respectively, and the proportion of total investment in industry allocated to the machine-building industry probably would be near the lower limit of its prewar peacetime range of 12 percent (see Table 31). Some postwar information is available on the level of investment in the timber industry. In the Fourth Five Year Plan the volume of capital

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investment in the USSR Ministry of the Timber Industry was to be 4 billion rubles. 224/ This is about 2.5 percent of the planned 157 billion rubles of centralized investment in industry during the Fourth Five Year Plan. No information is available with regard to investments by the construction industry, but this industry undoubtedly accounts for a very small percentage of total investment in industry.

An examination of the residual elements in industrial investments in 1948 and 1953 leads to the following conclusions about the approximate size of investments in the defense industry (conventional weapons): (1) the proportion of total industrial investment allocated to the defense industry (conventional weapons) in 1953 probably does not exceed 15 percent, which would amount to about 12 billion rubles in current prices, and it may be substantially less than this proportion;\* (2) the proportion of total industrial investment allocated to the defense industry (conventional weapons) in 1953 is probably no more than one-third of the proportion of total industrial investment allocated to the defense industry (conventional weapons) in the 1941 Plan; and (3), as noted earlier, there could not have been any substantial increase, and there probably was a decline, in the share of industrial investment going to the defense industry (conventional weapons) between 1948 and 1953.

50X1

\* Fifteen percent is approximately the proportion of total industrial investment allocated to the defense industries in 1934-36. 225/

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IX. Postwar Industrial Investment Policy of the USSR.

A. Principal Features.

Three principal features of the postwar investment policy of the USSR should be noted. First, the postwar investment programs have been very large-scale programs. They have probably absorbed a larger fraction of the gross national product of the USSR than in most, if not all, of the prewar years.\* Second, the allocation of investment among the various sectors of the economy has been very stable during the postwar years. There have been no drastic changes in the allocation of investments such as occurred during the 1936-41 period. Third, the share of total investment going to heavy industry has been very large -- much larger than in the prewar years. Even in the 1954 Plan, which represents a not insignificant concession to the Soviet consumer, the share of total investment going to heavy industry is still considerably larger than in the thirties. If, for example, the light and food industries were to receive the same proportion of total industrial investment which they received in the 1936 Plan, the 1954 Plan would have to call for the investment of about 25 billion rubles in the light and food industries instead of the 14.4 billion rubles which have actually been allocated to those industries.

The stability of Soviet investment allocations during the postwar period would tend to indicate that Soviet expectations and policies were also relatively stable during this period. There were, however, some shifts in the emphasis of Soviet investment programs during the postwar years which, while they did not involve radical changes, may be of some significance in evaluating Soviet intentions during this period.

B. Phases of Soviet Postwar Investment Policy.

1. 1946-50.

The postwar industrial investment programs of the USSR may be divided into three phases. The first phase, which covered the years of the Fourth Five Year Plan, was dominated by a strenuous attempt to rebuild and expand heavy industry. In terms of investment allocations,

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\* Based on the gross national product estimates in 253/.

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the pace of the development of heavy industry was substantially greater during the years 1946-50 than during any period of the thirties. Heavy industry absorbed about 50 percent of total investments during this period as compared to only about 40 percent during the prewar years. The other sectors of the economy received a correspondingly smaller share of investment allocations. The sectors of the economy oriented toward the consumer were particularly hard hit by this policy. In 1937, for example, agriculture received about 22 percent of total investment, while in 1948 it received only about 15 percent.\* In 1938 the light and food industries received about 15 percent of total industrial investment, while in 1948 they received only 11 percent. As the Fourth Five Year Plan proceeded, however, and the Soviet leaders began to feel more comfortable with the restoration of heavy industry, they permitted small and very gradual increases in the proportion of investment funds allocated to the light and food industries and agriculture.

2. 1951-52.

In 1951 and 1952 the very gradual trend toward allocating a larger fraction of investment funds to the consumer-oriented industries was reversed. Investment in the light and food industries declined in 1951 and in 1952 is estimated to have remained substantially below the 1950 level. Investments in agriculture in 1952 are also estimated to have been substantially below the 1950 level. The decline in investment in the light and food industries and agriculture between 1950 and 1952 took place while total investment was increasing by more than 20 percent. The proportion of total investment allocated to the light and food industries and agriculture declined from about 25 percent in 1950 to about 21 percent in 1952. This shift in policy seems clearly to indicate an adjustment occasioned by the Korean war toward investment undertakings that would increase the short-term war capabilities of the USSR.

3. 1953-54.

The third phase of postwar Soviet investment policy began with the death of Stalin and the announcement of the new economic policy, with its increased emphasis on investment in the light and food industries, agriculture, and trade. Investments in the light and food

\* Based on 15/.

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industries and agriculture are estimated to have increased from about 21 percent of total investment in 1952 to about 28 percent in the 1954 Plan. A change of this limited magnitude does not, of course, constitute a fundamental change from the investment policy of the earlier postwar years. Its real significance lies in the fact that it represents a reversal of the trend of investment policy in 1951-52.

C. Conclusions.

The postwar years have been characterized by an extreme effort to expand heavy industry, an effort which, from the standpoint of investment policy, exceeded in intensity that of the prewar years. This economic policy parallels the military policy of the USSR during the postwar years, a policy which called for the maintenance of an advanced state of readiness for war. In the heavy industrial sector this policy was not reflected in extraordinarily large investment allocations to the defense industry (conventional weapons) but, rather, in large investments in the basic industries, with particular emphasis on the rapid development of the fuel and energy sector of the economy.

The new economic policy has not resulted in a radical shift in the allocation of investments in the USSR. It did, however, have the effect of slowing down the growth of heavy industrial capacity in 1953, and it has resulted in an investment program in 1954 which is probably less well-adapted to promote short-term war capabilities than the investment program of any other postwar year, particularly the investment programs of 1951-52.



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APPENDIX A

METHODOLOGY

This appendix covers questions of methodology which are common to the estimates for all industries and which have not been thoroughly explained in the text.

1. Soviet Investment Terminology.

The Soviet term for capital investment (kapital'nyye vlozheniya) is substantially identical in meaning with the term as it is used in the US. The only major difference is in the treatment of investment in agriculture. 229/ Two other terms are also used by the Soviet authorities as synonymous with capital investment: capital work (kapital'nyye raboty) and capital construction (kapital'nyye stroitel'stva).

A Soviet statistical book published in 1952 takes exception to the use of the term "capital construction" as synonymous with "capital investment", arguing that its meaning should be restricted to construction in the narrower sense (not including equipment). 230/ Another Soviet statistical book, published in 1949, makes the same complaint. The latter book states that "in planning and in statistical practice ... the terms 'capital investment' and 'capital construction' are frequently used as synonyms." 231/ Despite the objections of the statistical theorists, the Soviet planners apparently continue to use the terms as synonymous. They have been so interpreted in this report.

Capital investment has four principal components: (1) construction work (stroitel'nyye raboty); (2) equipment (oborudovaniya); (3) work in installing equipment (raboty po montazhu oborudovaniya); and (4) expenditures not connected with an increase in fixed assets (zatraty ne svyazanniye s prirostom osnovnykh sredstv). Expenditures not connected with an increase in fixed assets include such items as geological work not connected with a specific construction project and the salaries of management personnel of enterprises under construction. Construction and installation work is counted in capital investment as the work progresses. Equipment is counted in capital investment as soon as it is received on the site, whether or not it is installed and placed in operation. 232/

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In addition to reporting investment work undertaken during a given period, reports are also made on the entry of fixed assets into operation (vvod v deystviye osnovnykh fondov) and the entry of productive capacity into operation (vvod v deystviye proizvodstvennykh). The former is the capital investment in new capacity which was placed into operation during the period; the latter measures the new capacity placed in operation during the period in terms of physical units, that is, tons, kilowatts, or square meters. A new plant is not included in the fixed assets of an industry until it is completed and has started to operate, although the investment in new plants is reported in investment by the industry as the work progresses.

2. Coverage of Soviet Industrial Investment Data.

Soviet industrial investment statistics are classified principally in two ways, by branch of industry and by ministry. All enterprises are classified into branches of industry "according to the predominant character of the production". <sup>233/</sup> For example, a machine-building plant under the jurisdiction of the Ministry of the Petroleum Industry would be classified in the machine-building industry in the branch classification. Investments in such a plant would be classified under the machine-building industry in the branch classification and under the Ministry of the Petroleum Industry in the ministry classification.

There are two reasons given for keeping dual accounts on industrial investment. First, the branch classification facilitates comparisons of investments in various periods. The comparisons are not distorted by shifts of plants from one ministry to another or by changes in the composition of the ministries themselves. <sup>234/</sup> Second, much of the capital investment program is planned on a branch basis as well as on a ministerial basis, and reporting of investment is required on a branch basis in order to have a complete check on the fulfillment of the investment plan.

The most difficult problems involved in producing the estimates in this report stemmed from this dual accounting of industrial investment in the USSR. Some of the available investment information pertains definitely to ministries, some pertains definitely to branches of industry, and the coverage of much of the rest of the data, particularly the percentage increases in investment given in the plan fulfillment reports, was uncertain.

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A speech by M.G. Pervukhin in April 1954 clarified the situation considerably. <sup>235/</sup> He stated that more than 13 billion rubles were to be invested in electric power stations and networks by all ministries in 1954. This is definitely a reference to a branch investment figure and not to investment in the Ministry of Electric Power Stations. This 1954 Plan figure is consistent with the 1954 estimate derived from the adjusted 1947 planned investment in electric power stations and percentage increases for the subsequent years. This consistency indicates that both the 1947 planned investment figures and the indexes of investment for the various segments of industry refer to branches of industry rather than to ministries.

In many cases there will be little difference between the branch figures and the ministry figures. For example, investment in the petroleum branch of industry should be approximately the same as investment in the Ministry of the Petroleum Industry. The only significant difference would be that investments in machine-building plants subordinate to the Ministry of the Petroleum Industry would not be included in investment in the petroleum branch of industry. The most substantial difference would arise in the case of electric power, since it is estimated that during the postwar years about 20 percent of the total new electric power capacity has been constructed outside of the Ministry of Electric Power Stations. Under these circumstances the close correspondence of the 1954 estimate, as derived from the 1947 Plan figure, with the 1954 Plan figure in Pervukhin's statement constitutes a strong indication that both the 1947 investment plan figures and the investment indexes relate to branches of industry and not to ministries.

Further evidence that the published investment indexes refer to branches of industry rather than to ministries is found (1) in the fact that the classification of industries in the investment indexes follows closely the classification of the branches of industry and (2) in the statement made in an article in Planovoye khozyaystvo in 1951 to the effect that the branch classification is more significant for planning purposes than the ministerial classification. This article states: <sup>236/</sup> "The structure of the capital work plan on the branch level proves to be of particular significance in the analysis and coordination of the capital work plan with other basic economic and political tasks."

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The only indication that the industry investment indexes might refer to ministries is the fact that the plan fulfillment report for the first 6 months of 1953, paralleling the merger of the Ministry of Electric Power Stations and the Ministry of Electrical Industry, reported investment for electric power stations and electrical industry combined. If the previous investment indexes for electric power stations had been branch figures, then the 1953 index should not have been affected by the merger of the Ministries. This indication, however, was not considered significant enough to outweigh the preponderance of evidence supporting the branch interpretation.

The investment estimates do not include capital repairs, that is, major repairs to equipment and structures. Capital repairs should properly be included in capital investment, but it is the Soviet practice to plan and finance them independently. They are not included in the State plan of capital investment. 237/ No postwar information is available on the volume of capital repairs in particular industries, but they are estimated to have amounted to about 15 percent of total investment in the economy during the postwar years. 238/

It is assumed that the investment figures published by the USSR for the various branches of industry include nonproductive investments; that is, housing, social-cultural, and municipal construction. This assumption is based on two considerations. First, a Soviet statistical book, in discussing the classification of enterprises into branches of industry states: "It is necessary to classify the enterprise as a whole, and not merely the single part of it, under one branch or another. In other words, the enterprise is the only thing we are classifying." 239/ In discussing the meaning of the term enterprise, this same Soviet source states: "Our industrial enterprises usually are complex economic units, which, in addition to their industrial-production activity, perform other economic functions (the residence economy, community economy, trade activity, etc.)." 240/ The failure to qualify the statement that the entire enterprise is classified into one branch or another implies that nonproductive investments made by an enterprise are placed in the same branch classification as productive investment by the enterprise.

A second and more conclusive consideration is that a comparison of the total volume of investments in housing construction by the industrial ministries with the residual remaining after deducting the sum

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of the industry estimates of investment from total investment in industry indicates that housing and other nonproductive investments must be included in the branch investment figures. For example, in 1953, total investment in industry, including nonproductive investments by the industrial ministries, was 87.6 billion rubles. Deducting the estimated investments of 22.4 billion rubles for the coal and petroleum industries, 7.6 billion rubles for the light and food industries, 11.0 billion rubles for the electric power industry, and 16.1 billion rubles for the metallurgical industry leaves a residual of 30.5 billion rubles. In this residual are investments in the following industries: machine-building, chemicals, construction materials, timber and paper, defense, and construction.

In 1953, 19.4 billion rubles were invested in housing construction in the USSR. 241/ Of this amount probably about 14 to 15 billion rubles were financed through the investment budgets of the industrial ministries. Since housing construction constitutes about 80 percent of all nonproductive investments in industry, 242/ total nonproductive investments in industry probably amounted to about 17 to 19 billion rubles in 1953, or 19 to 22 percent of total investments in industry.

If nonproductive investments were not included in the investment estimates for the electric power, coal, petroleum, metallurgical, and light and food industries, then the entire estimated 17 to 19 billion rubles for nonproductive investments by industry would have to come out of the residual of 30.5 billion rubles. This would leave only 11 to 13 billion rubles for investment in all of the residual industries. This is clearly too low a figure.

In the prewar years the industries for which ruble estimates are presented in this paper accounted for 55 to 60 percent of total investment in industry, with the exception of 1941, when they accounted for only little more than 40 percent of the total. 243/ The residual industries accounted for about 40 to 45 percent of the total, rising to about 60 percent of the total in the 1941 plan. If it is assumed that nonproductive investments are included in the industry investment estimates, then the entire residual of 30.5 billion rubles would be allocable to the residual industries. This would amount to about 35 percent of total investment in industry. Although this is a smaller

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fraction of the total than these industries accounted for during the prewar years, it looks reasonable in view of the greater emphasis on developing the fuel and energy sectors of the economy during the postwar years. On the other hand, if all housing and other nonproductive investments were assumed to be in the residual 30.5 billion rubles,<sup>1</sup> then only 11 to 13 billion rubles would be allocable to the residual industries, or only 12 to 19 percent of total investment in industry. Since this is obviously much too low, it was concluded that nonproductive investments are included in the industrial branch investment estimates.

Two changes in Soviet investment accounting which affect the comparability of the postwar investment estimates should be noted: the change in the treatment of "extra-limit" investments and the removal of planning and research work from the investment budget. Prior to 1949, the so-called "extra-limit" investments were not included in the State plan of capital investment. In 1950 (and possibly in 1949) this practice was changed, presumably to provide for greater centralized control over the total investment program, and the category of "extra-limit" investments was eliminated. 244/ Investments that formerly fell into this category are now included in the State plan of capital investment.

"Extra-limit" investments have been estimated at about 12 percent of total investment (excluding capital repairs) in 1948. 245/ Fortunately, they were undoubtedly a much smaller fraction of total investment in the industrial sector of the economy. "Extra-limit" investments in heavy industry were probably of negligible proportions. They were probably significant only in the light and food industries. 246/

Beginning in 1951, planning and research work has been financed outside the investment budget. 247/ Planning expenditures in 1951 were to amount to 3.7 billion rubles, or about 3 percent of planned centralized investment in that year. 248/

The effect of the change in the treatment of "extra-limit" investments would be to understate investment in the years preceding 1949 relative to the later years. On the other hand, the change in the treatment of planning and research work would have the opposite effect, that is, to understate investments in the years following 1950 relative to the earlier years. To some extent these changes

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will offset each other. With the possible exception of the light and food industries, it is believed that these changes in investment and accounting do not seriously impair the comparability of the industry investment series.

3. Price Comparability of Soviet Investment Indexes.

It has been assumed that the Soviet investment indexes are stated in comparable prices. This assumption is supported by a statement in a Soviet statistical book, published in 1952, to the effect that indexes of the volume of capital investments for the USSR during the period 1946-50 were constructed on the basis of constant 1945 prices. 249/

4. Investment Price Indexes Employed.

The conversion of the estimates of total investment and total centralized investment from current prices to constant 1945 prices was made on the basis of the investment price index implicit in the estimates of total centralized investment. The Russians publish annually the real volume of State investment as a percentage of the preceding year. By comparing this real investment series to the estimates of total State investment (centralized investment) in current rubles, the price index in Table 33 was constructed.

Table 33

Soviet Investment Price Index  
1945-52

<u>1945 = 100</u>	
<u>Year</u>	<u>Index</u>
1945	100
1946	110
1947	120
1948	128
1949	142
1950	142
1951	131
1952	125
1953	125

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The conversion of estimates of investment in industry and in particular branches of industry from constant 1945 prices to current prices, and vice versa, was made on the basis of the investment price index in A. Nove, A Note on the Volume of Soviet Investment (unpublished manuscript, U). This index (Table 34) was constructed in the same manner as the index in Table 33. The major weakness of Nove's index is that it is based, in part, on planned rather than actual investment.

Table 34

Nove's Investment Price Index for the USSR  
1945-53

<u>Year</u>	<u>Index</u>
1945	100.0
1946	104.1
1947	110.7
1948	110.7
1949	146.6
1950	141.4
1951	137.2
1952	133.1
1953 <sup>a/</sup>	128.9

a. Nove's index does not give a figure for 1953. The index for that year is based on the assumption that the planned reduction in investment costs was fulfilled. 250/ This may not be an appropriate assumption in view of the complaints in the Soviet press with regard to the failure of various ministries to fulfill the planned cost reductions in their investment undertakings. 251/ In any event, the possible error in the price decline assumed for 1953 cannot be of sufficient magnitude to affect seriously the estimates.



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Both the index in Table 33 and the index in Table 34 pertain to price changes affecting total State investment. Neither index is particularly well suited to serve as a deflator for total industrial investment or for investment in particular branches of industry. The justification for using either index for these purposes is that no more suitable indexes are currently available. The principal differences between the index in Table 33 and Nove's index are found in their description of price movements between 1945 and 1949, the latter showing a more gradual increase in 1945-48 and a much sharper increase in 1949 than the index in Table 33. One problem affecting both indexes is the uncertainty about the comparability of the series for total State investment introduced by the change in the treatment of extra-limit investments in 1949.

It was decided to use Nove's index for deflating estimates of investment in industry and in particular branches of industry because the movements of Nove's index during the 1945-49 period correspond rather closely with most of the information pertaining to investment costs in the industrial ministries, including the coefficients issued to the industrial ministries by the Ministry of Finance for converting from 1945 planning prices to 1949 prices. 252/ It is clear, however, that the use of Nove's index for this purpose is an unsatisfactory expedient. It is believed that research now in progress will produce more satisfactory price indexes for the industrial sector of the economy as a whole and for the various branches of industry.

##### 5. Estimating Procedure Employed.

The basic estimating procedure used in producing most of the investment estimates in this report is as follows: (a) The starting point is the 1947 investment plan for branches of industry, stated in 1945 prices. (b) The first step is to adjust the 1947 planned investment figures to reflect the degree of fulfillment of the plan. (c) The second step is to apply percentage increases for investment in the subsequent years to the 1947 base figure to produce the estimates for the later years. In both the first and second steps information relating to ministries as well as to branches of industry was used. (d) The third step is to apply the investment price index to convert the estimates from 1945 prices to current prices.

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The validity of this estimating procedure is supported by the following considerations: (a) The estimates appear to be consistent with the following published information: (1) investment by the Ministries of the Foodstuffs and Manufactured Consumer Goods Industries in 1953 and in the 1954 Plan; (2) investment in the electric power industry in the 1954 Plan; and (3) investment by the Ministry of the Coal Industry in the 1954 Plan. (b) The various industry investment estimates, when aggregated, appear to be consistent with the published information on total investment in industry in 1948, in the 1949 Plan, in 1953, and in the 1954 Plan. (c) The estimates are also consistent with a number of other checks which were applied to them and described in the text.

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