

~~SECRET~~

NIE 11-4-56

III
Econ

III. DEVELOPMENTS IN THE SOVIET ECONOMY

SOVIET ECONOMIC POLICY

26. Soviet economic policy continues to be directed toward the most rapid possible growth of the economy. The aim, stated at the 20th Party Congress, of overtaking the US in production, underscores this policy and projects it well beyond the period of this estimate. The USSR conceives of this competition primarily in terms of heavy industrial output. Thus other sectors of the economy tend to be developed only to the extent that they support or at least do not hamper the growth of heavy industry.

27. Post-Stalin Policies. While in this most basic respect the present leaders have not altered Stalin's policy, they have apparently decided that several aspects of this policy were producing diminishing returns or even becoming self-defeating. First, agricultural stagnation in the face of general population growth, and an even faster urban increase focused attention upon the future adequacy of the food supply, upon the wasteful use of human and other resources in agriculture, and upon the need for a better diet. Secondly, the decline which the Soviet leaders probably anticipated in numbers of new industrial workers called for strenuous efforts to increase individual

~~SECRET~~

DECLASSIFIED	
Authority	<i>RAC review</i>
By	<i>LHP</i>
NLE Date	<i>5/14/02</i>

~~SECRET~~

productivity if planned economic growth was to be achieved. Policy innovations since 1953 have concentrated upon resolving these problems in order to insure further advances in heavy industry.

28. The Sixth Five-Year Plan. Soviet economic policy for most of the period of this estimate is outlined in the Sixth Five-Year Plan (1956-1960), which was announced in January 1956 and approved by the 20th Party Congress in February. This plan, like its predecessors, stresses industrial growth, calling for a 65 percent increase in industrial output. A high rate of investment is to be maintained, still directed primarily into heavy industry. This overriding claim upon Soviet resources, plus the requirements of the defense program, means that the growth in consumption, although it will probably be considerable, will continue to lag behind the growth in total output.

29. However, since future growth also depends upon agricultural progress, the manifold attack on the agricultural problem will continue, involving the New Lands and corn schemes, better farming practices, higher investment priority, improved income incentives for collective ~~farmers~~ ^{farmers}, and farmers, and stronger political controls. The increases in food and fiber output likely to be achieved should assist industry by raising worker morale.

- 2 -

~~SECRET~~

~~SECRET~~

However, increases in consumption on the scale currently promised will not occur until ^{the USSR achieves} much more substantial increases in agricultural output than we now estimate ^{to be likely} are achieved. Productivity gains will be sought primarily through further professional and worker training, new methods of organization and management, and introduction of the latest foreign and domestic technology, including re-equipment in some industries.

30. The policy of expanding trade with underdeveloped countries, facilitated by offers of credit on easy terms, was accelerated sharply in 1955, and the USSR clearly intends to press this policy vigorously. The present level of industrial output and that which we estimate for the next five years will permit considerable increases in the currently small Soviet exports of capital equipment to countries outside the Bloc without appreciably affecting domestic programs.* This factor, coupled with the availability of obsolescent material as a result of the Soviet re-equipment program, would permit substantial increases in Soviet exports of military end-items. By exporting capital goods and military end-items, the USSR could obtain foodstuffs and raw materials in short supply or costly to produce at

* ~~The representative for the Deputy Director for Intelligence, The Joint Staff, believes that the phrase "will permit considerable increases" should be replaced by "will probably permit some increases."~~

~~SECRET~~

~~SECRET~~

home and expect economic gains as well as political advantages.*

SOVIET ECONOMIC GROWTH

31. The gross national product of the USSR grew by an estimated ⁴¹~~42~~ percent during the five-year period 1951-1955, an average annual increase of ^{about 7}~~7.3~~ percent.** We estimate that during the six-year period 1956-1961 Soviet GNP will grow at nearly the same annual rate and in 1961 will be almost 50 percent higher than in 1955. This growth will come chiefly from a further

* ~~The representative of the Deputy Director for Intelligence, The Joint Staff believes that the following sentences should be added to this paragraph: "Any large-scale program of Soviet capital goods exports, however, would compete directly with the parallel demands of forced industrialization in the Bloc, and especially in Communist China. Soviet capabilities to carry out such a program, therefore, may indirectly depend on the availability to the Bloc, and especially to Communist China, of non-Bloc sources of capital goods during the period."~~

** The task of estimating Soviet GNP is complicated not only by incomplete data but by conceptual difficulties as well. The present estimates have benefitted from the increased statistical data made available in recent Soviet announcements, although important gaps remain, particularly in the military sector, as Appendix B indicates. Of the conceptual problems, the most important relates to the composition of GNP by end use and arises from the absence of rental payments and capital charges in Soviet agriculture. This has been resolved by imputing a value from analogous relationships in the US economy. Since this rough procedure accounts for about 26 percent of our base-year estimate of Soviet consumption, the results can make no claim to complete accuracy. Despite this and other difficulties, however, we regard these estimates as a reasonably correct statement of the size, composition, and growth of the Soviet economy.

- 4 -

~~SECRET~~

~~SECRET~~

rise in the already high rate of capital investment, rapid gains in productivity, and substantial although slightly diminishing additions to the labor force. The rate of growth of industrial production will slack off somewhat, but agricultural output will probably grow about twice as fast as in the 1951-1955 period.

32. The growth rate estimated above is higher than that projected in NIE 11-3-55. (19 May 55) Whereas the previous estimate foresaw an increase of GNP of 42 percent in 1960 over 1954, with the growth rate falling to slightly less than 5 percent in the final year, it now appears that the GNP in 1960 will be about 50 percent above 1954, and that even in 1961 the growth rate will still exceed 6 percent. This revision is based upon the considerable amount of new data which has become available in recent months and which has led us to revise upward our previous estimates of the growth of consumption and therefore of GNP for the Fifth Five-Year Plan; upon the strong growth trends observed during 1955; and, most importantly, upon an analysis of the Sixth Five-Year Plan which persuades us that most of the major industrial targets will be fulfilled. The planned reduction in the armed forces, if largely carried out, will alleviate the most serious hindrance -- a possible shortage of labor -- to achievement of these goals.

- 5 -

~~SECRET~~

~~SECRET~~

33. The growth rate of Soviet GNP is nearly twice that experienced by the US economy during the past five years and anticipated in the coming period. As a result, the relative size of the Soviet economy increased from about one third of the US economy in 1950 to about 37 percent in 1955 and will probably reach about 45 percent in 1961. However, the absolute gap between the two economies will continue to widen over this period. Roughly similar relationships obtain between the total outputs of the US and the NATO countries on the one hand and the Sino-Soviet Bloc on the other. (See Figure 1.) Based solely on a projection of present trends, the absolute gap between the Soviet and US GNPs would reach its widest point in the second half of the 1960's and would then begin to narrow.

Distribution of GNP

34. In utilizing its growing output, the USSR will continue to increase the share devoted to investment. We estimate that investment allocations will rise from about 26 percent of GNP in 1955 to about 31 percent in 1961. (See Figure 2.) Because of the growth in GNP over this period, investment will be about 78 percent larger in the later year. Consumption will probably grow by about 40 percent, in part because of continued urbanization, though its relative share of GNP will fall from about ~~58~~⁵⁷ to about ~~55~~⁵⁴ percent. (For prospective increases in per capita consumption, see paragraph 54.) In

- 6 -

~~SECRET~~

SECRET

contrast, the US in 1955 devoted about 66 percent of its GNP to consumption and 20 percent to investment.

35. In US prices, Soviet investment in 1955 was about \$38 billion, or about 54 percent of US investment, while consumption was about \$63 billion, or 24 percent of US consumption and about one fifth on a per capita basis. The dollar value of total defense expenditures in 1955 was about \$37 billion, or virtually 100 percent of US defense expenditures.

36. An estimate of the ruble costs of past and projected military programs indicates that total defense expenditures will probably rise by about ³⁷~~35~~ percent between 1955 and 1961.* Since GNP will probably grow at an even higher rate (about 50 percent), the relative military burden on the economy should decline slightly over this period. The detailed study of defense expenditures indicates that in 1955 not only was the dollar value of total

III
Para
36

* This estimate is based upon an inter-agency study,** details of which appear in Appendix B. As explained there, a reduction of 1.2 million men in the armed forces would lower defense expenditures in 1961 by some 13-18 billion rubles; correspondingly, the increase in defense expenditures between 1955 and 1961 would fall to about ²²⁻³⁰~~27~~ percent. On the other hand, expenditures for the guided missile program ^{have} almost certainly been understated in the study. The combined result of these two factors cannot be predicted, but it is clear that they will offset each other to some extent.

** The representatives of ACSI and the Director of Naval Intelligence ^{does} do not consider the costs derived in the inter-agency study to be a valid appraisal of the overall costs of the Soviet military effort and do not concur in the findings of the study (See footnote to Appendix B, paragraph 1).

See also the footnote by the DNI attached to Appendix B.

- 7 -
SECRET

~~SECRET~~

Soviet defense expenditures approximately equal to US expenditures, but also that the dollar value of Soviet hard goods procurement was about equal to that of similar goods procured by the US.**

37. That the Soviet Union by expending 14 percent of its GNP in rubles can obtain defense goods and services equal in dollar value to those of the US, which is expending for the same activities 10.6 percent of a GNP two and one half times as large, is explained by two important economic conditions. First, the average level of real pay and subsistence provided to Soviet servicemen, like the general standard of living, is very much lower than in the US. Secondly, the Soviet armament industry is one of the USSR's most efficient industries. The dollar and ruble comparisons above do not mean that the Soviet armament industry is more efficient than the US armament industry. On the contrary, it is likely that productivity (production per man) in the Soviet armament industry is lower than productivity in the corresponding US industry. However, the Soviet armament industry is very much more efficient than Soviet agriculture and the consumer goods industries.

** ~~The representatives of ACSI and the Director of Naval Intelligence do not consider the costs derived in the inter-agency study to be a valid appraisal of the overall costs of the Soviet military effort and do not concur in the findings of the study (See footnote to Appendix B, paragraph 1).~~

~~SECRET~~

~~SECRET~~

While productivity in Soviet armament industry approaches that of the US, Soviet productivity in consumer goods is much lower and agriculture is only about one-seventh that in the US. Consequently a ruble will buy only about seven cents worth of goods and services when spent for consumption goods and services but will purchase from 20 to 25 cents worth when spent for defense purposes. Thus, for example, if each country transfers a worker from agriculture to defense industry, the Soviet worker will produce nearly as much armaments as the American worker, but the loss of his production in agriculture is far less than the corresponding loss in the US, and ~~the~~ the sacrifice involved is less.*

* ~~The representative of ACSI reserves his position on this paragraph.~~

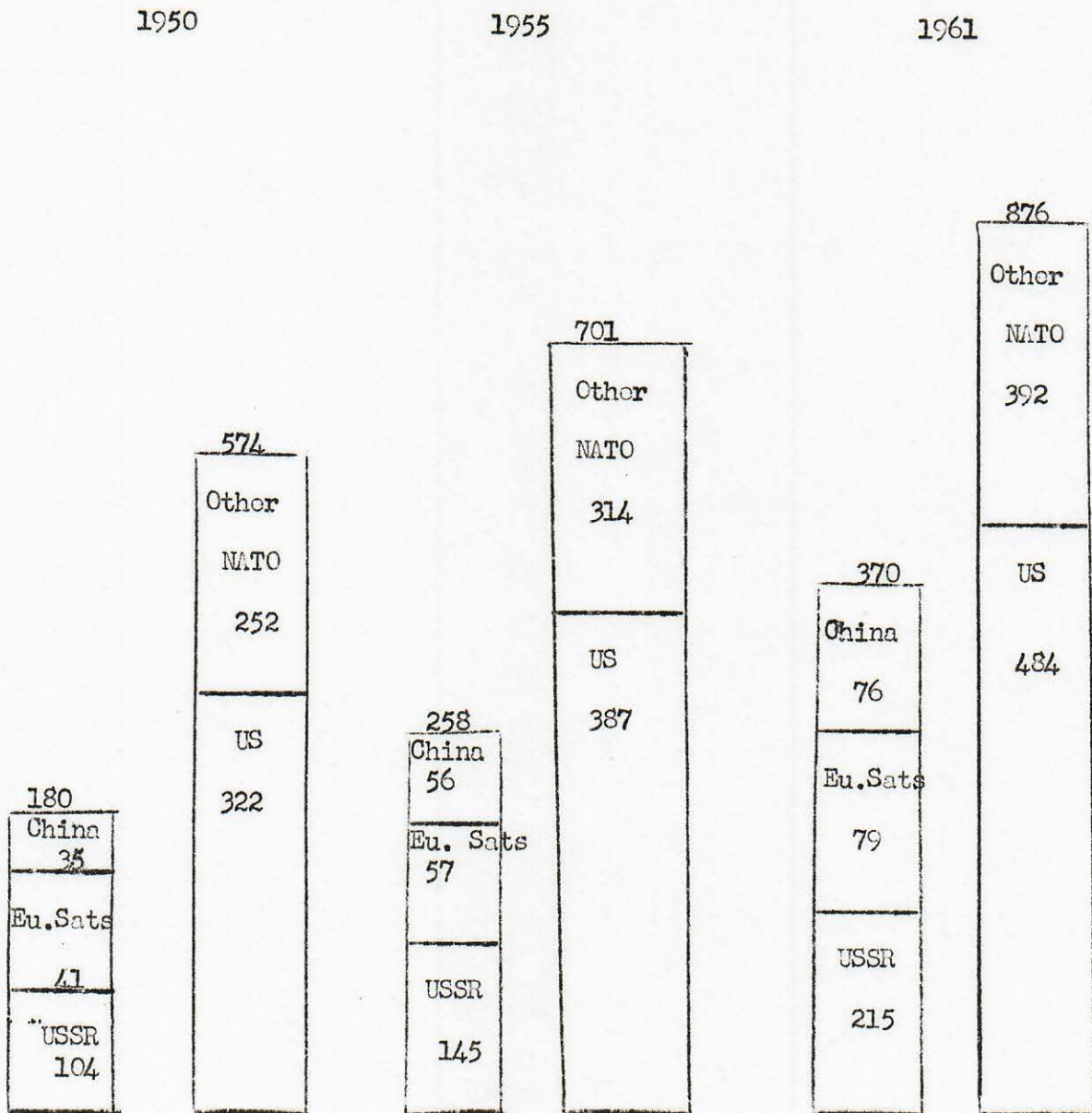
~~SECRET~~

~~SECRET~~

FIGURE I

COMPARISON OF GROSS NATIONAL PRODUCTS

(in Billion 1955 Dollars at Market Prices)

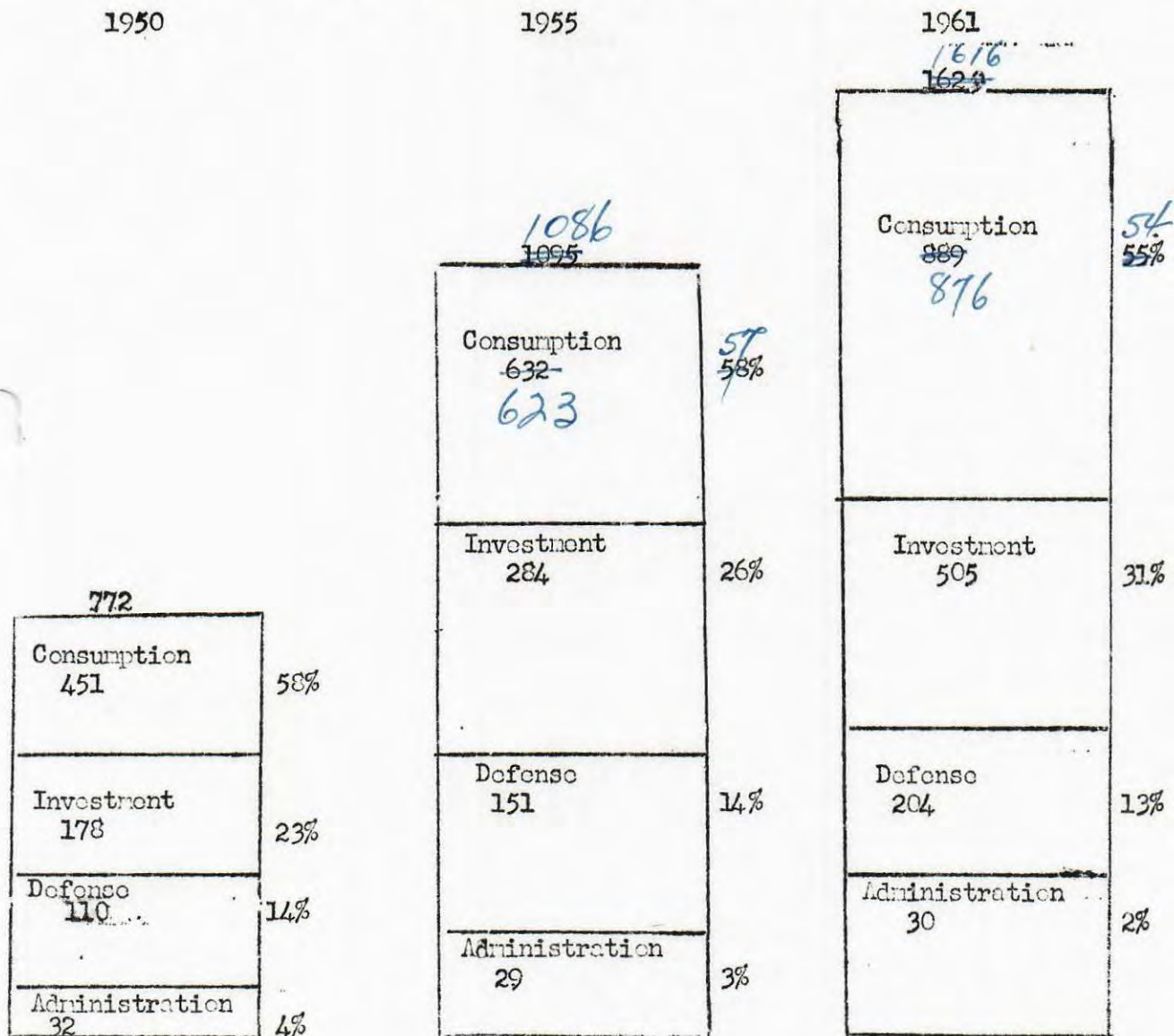


~~SECRET~~

FIGURE 2

GROSS NATIONAL PRODUCT OF THE USSR

(By End Use in Billion 1953 Rubles at Factor Cost)



NOTE: Details do not add to total because of rounding.

(Slight modifications will be made later of the ruble amounts for consumption and total GNP in all years.)

~~SECRET~~

~~SECRET~~

DEVELOPMENTS IN SOVIET INDUSTRY

38. Despite the present size of Soviet industrial output, only a moderate decline in its high growth rate is estimated in the coming five years. The major factors sustaining a continued high rate of growth, estimated at over 10 percent per year during the period of this estimate, will be continuing heavy capital investment, increases in the number and productivity of workers, and improvements in managerial and technical efficiency. We estimate that total industrial output will probably increase by 65 percent or more in the Sixth Plan as compared with 77 percent in the Fifth. Output in 1961 will probably be 83 percent or more above the 1955 level. (See Table I for the estimated output of selected industrial commodities.)

39. Of particular interest is the trend in the output of heavy industry, which is basic to future growth, military strength, and capability to export capital goods. In this sector, the increase during the Sixth Plan period will probably amount to 70 percent or more as against 84 percent during the Fifth. The rate of growth of heavy industry nevertheless remains strikingly larger than that of the US and will provide the USSR in 1960 with an output equivalent to about 45 percent of US heavy industrial production.

- 12 -

~~SECRET~~

~~SECRET~~

40. We estimate that most announced Soviet targets for commodity output in 1960 will be fulfilled, particularly in producer goods, and that there will be a number of overfulfillments of production goals for major products. The most doubtful elements in heavy industry are the target for installing new generating capacity, which will probably not be met, and the goals for production of non-ferrous metals, which will be fulfilled only with considerable difficulty. Fulfillment of the plan for large increases in the production of machinery and equipment may require more than the additional capital expenditures planned for this industry. Failure to reach overambitious agricultural goals will result in underfulfillments in light industry.

41. Investment. Of the total investment during the period 1955-1961, two-thirds will be devoted to industry, the same share which this sector received during the Fourth and Fifth Five-Year Plans. The division of this investment between heavy and light industry will continue at a 10:1 ratio. Heavy capital requirements for increasing output of electric power, petroleum, chemicals, metals, especially non-ferrous, and construction materials, will necessitate a reduction in the investment priority previously accorded to the machine building and metal-working sector, where increases in output outstripped all others during the 1951-1955 period. The proportion of total investment devoted to transportation will be approximately the same as under the Fifth Five-Year Plan. Due to the emphasis on investment ^{to provide} in more efficient

- 13 -

~~SECRET~~

~~SECRET~~

functioning of all forms of transport, we believe that the transport requirements of the Soviet economy will be met.

42. Labor Force. Because the effect of lowered wartime birth rates will soon begin to be felt in fewer entrants to the labor force, the USSR can expect population growth to provide fewer new workers, perhaps three million less, during the Sixth Plan than during the Fifth. Armed forces reductions of the size announced, however, would help to eliminate this difference. The increase in the industrial labor force, which grew by 23 percent during the Fifth Plan, will fall to perhaps 20 percent in the Sixth.*

43. Productivity. Despite probable increases in the labor force resulting from a reduction in the strength of the armed forces, productivity per worker will have to rise faster in the new plan than in the old if output targets are to be met and shorter working hours granted. Although the USSR

* The Sixth Five-Year Plan provides for an increase of only 10 percent in the industrial labor force. Planned increases in the industrial labor force appear to be customarily kept low in anticipation of gains in productivity to be made. When these gains do not materialize, labor shortages are then relieved by above-plan allocations of labor. Thus, though the Fifth Plan also called for only a 10 percent increase, in fact some 1.5 million above-plan workers were assigned to industry during the course of the plan. These were drawn largely from the collective farms. Agriculture's higher priority probably will not permit similar transfers during the Sixth Plan, but armed force reductions would serve as another source of industrial labor.

~~SECRET~~

~~SECRET~~

recognizes that worker incentives influence productivity, immediate hopes are placed upon supplying the labor force with a larger volume of modern equipment. This policy is reflected in the investment program, which calls for greater increases in expenditures for new capital equipment than in expenditures for the construction of new plants, though the latter will still absorb the major share of investment funds. A considerable share of this capital equipment will be used to replace obsolescent machinery in existing plants at a much more rapid rate than heretofore.

44. Just as Soviet priorities have produced an economic structure which appears lopsided in contrast with consumer-oriented economies, so they have produced a pattern of technological progress which has been quite uneven in comparison to that of Western nations. Military production has received the most intensive development, and defense and defense-related industries have reached relatively advanced technological levels. In the making of ordinary steels, the best Soviet plants are fully comparable to US plants, although the industry as a whole is not. In metalcutting processes, the USSR is on a par ^{with} or not far behind the US in machinery design and process mechanization, but it has only just begun the application of automated control systems. Production processes are less advanced in metalforming machinery, electric power generation, coal mining, and the chemicals industry; and they

- 15 -

~~SECRET~~

~~SECRET~~

lag badly in the low-priority consumer industries. On an over-all basis, the USSR's smaller quantity of modern equipment and lower level of technology are probably the major factors accounting for a labor productivity in heavy industry which is less than half that of the US.

45. This lag is also a rough measure of the USSR's potential for increasing industrial productivity. The Sixth Five Year Plan calls for a 50 percent increase in productivity. However the government has since promised a reduction in working hours which would require a 71 percent increase in productivity per man-hour if this goal is to be reached. This we doubt can be achieved, but we estimate that productivity will increase during the Sixth Five-Year Plan more than the 44 percent which we estimate was achieved during the Fifth. Productivity gains will result chiefly from modernization of plants and from introduction of advanced domestic and foreign technology. The intensive efforts to improve planning, restore order to the wage system, and raise efficiency through greater plant specialization and better inter-plant cooperation -- problems which have received little attention in the past-- are intended to accomplish a comprehensive reform of Soviet industry and to make an important contribution to productivity. Enlargement of the area of managerial initiative may also contribute to this result. On the other hand, a more active party role in the operation of industry may limit the importance of this factor.

- 16 -

~~SECRET~~

~~SECRET~~

46. In summary, we believe that the USSR will meet its announced 1960 targets for total industrial output and for most important heavy industrial commodities. Sufficient above-plan workers will probably be available to compensate for any failures to meet productivity goals, and the transition to a 41-hour work week could be slowed down if necessary. Major shortfalls are expected only in some branches of light industry, where plan fulfillment will be prevented by insufficient supplies of agricultural raw materials.

47. Regional Distribution of Industry. Soviet industry will probably undergo a regional shift of considerable importance during the Sixth Five-Year Plan, although the bulk will still be located in European Russia and the Urals. About half of the new capital investment in 1956-1960 is scheduled to occur in the Urals and eastward, and by 1961 this area is to produce more iron and steel than did the entire USSR in 1950 and more electric power and cement than did the whole country in 1954. (see Figure 3) A large share of the new plants built in the next five years are to be located in this region, leaving industry in European USSR to rely heavily on re-equipment of existing plants and other improvements in achieving planned increases in production. The construction of new rail lines will also be concentrated east of the Urals.

- 17 -

~~SECRET~~

~~SECRET~~

48. The development of this region is based upon the harnessing of the Siberian rivers with hydroelectric stations at Irkutsk, Novosibirsk, and Bratsk, the exploitation of large iron and coal reserves, and development of the large but mainly low-grade deposits of non-ferrous metals in Kazakhstan. Movement to the interior may be in part intended to reduce the strategic vulnerability of Soviet industry, but considerations of future economic growth are probably of greater importance, since the little-developed resources of this area offer greater long-run potential than further development of the maturer regions of the European USSR.*

* ~~The representative for the Director of Intelligence, USAF, reserves his position on this sentence.~~

~~SECRET~~

TABLE I

ESTIMATED OUTPUT OF SELECTED INDUSTRIAL PRODUCTS

	USSR 1950, 1955 and 1961:		US 1955	
	1950	1955	1955	1961*
	<u>USSR</u>	<u>USSR</u>	<u>US</u>	<u>USSR</u>
Electric Power (billion kwh)	90	170	655	363
Crude Petroleum (million tons)	38	71	335	150
Coal (million tons)	261	391	450	633
Crude Steel (million tons)	27	45	106	68
Refined Copper (thousand tons)	302	462	1,052	746
Aluminum (thousand tons)	210	538	1,497	1,240
Cement (million tons)	10	22	51	63
Machine Tools (thousand units) ****	79	105	80**	200
Freight Cars (thousand 2-axle equivalent units)	85	69	71	100
Trucks (thousand units)	294	329	1,190	447
Synthetic Ammonia (thousand tons)***	520	753	2,859	1,596
Cotton Fabrics (million meters)	3,900	5,904	8,950	7,500
Washing Machines (thousand units)	0.3	87	4,237	616
Meat (thousand tons, slaughter wgt.)	3,075	4,000	12,241	5,200

* The 1961 estimates, except in the case of meat, are a one-year projection from the official 1960 targets, which we estimate will be substantially achieved.

** US production of machine tools, which are generally more complex types than those of the USSR, fluctuates considerably from year to year. The recent high was 110,000 units in 1952 and the peak output was 307,000 units in 1942. *Moreover, the proportion of heavy, complex and special purpose tools is higher in the U.S.*

*** Used mostly for nitrogenous fertilizer.

**** ~~The representative for the Deputy Director for Intelligence, The Joint Staff, reserves his position on the inclusion of this item in the table.~~

~~SECRET~~

Econ
Tble

~~SECRET~~

DEVELOPMENTS IN SOVIET AGRICULTURE

49. Soviet agriculture in 1955 showed the first significant response to the multiple programs for expanding output which were launched in the preceding two years. Good yields were obtained in the Ukraine, and gains resulting from a large expansion of acreage in the New Lands area were only partially offset by drought. These circumstances, in conjunction with the corn program, raised grain and fodder production by about 15 percent over 1954. Potato output declined, however, and technical crops showed a mixed pattern, sugar beets and flax expanding rapidly but cotton production falling. Livestock numbers increased only slowly and meat production grew scarcely at all, but improved fodder supplies contributed to an increase of about 10 percent in milk production.

50. Further growth in agricultural output will almost certainly result from the higher priority accorded to agriculture since 1953 and projected forward in the Sixth Five-Year Plan. State investment in this sector during 1956-1960 is planned at twice the amount invested in 1951-1955 and will require 12 percent of total state investments as against only eight percent in 1952. Further adjustments in prices paid to collective farms and farmers appear to be in prospect in the continuing effort to provide the incentives which previous policies had neglected. In contrast to the period 1928-1952, when agriculture was called upon

- 20 -

~~SECRET~~

~~SECRET~~

to provide a continual flow of workers to industry, agriculture will receive labor from the urban areas or at least hold its own. Most important of all, solution of agricultural problems has been defined as the major task of the party membership.

51. Through local recruiting and transfers from urban areas, the party has built up its rural strength from 1.7 million members in 1947 to over three million in 1956. This reinforcement has greatly increased the leadership's ability to execute its programs and may permit greater flexibility in adapting these programs to local conditions, a notably weak point in earlier agricultural campaigns. It has also made more feasible a resumption of the drive against private farming, evidenced in higher requirements for participation in communal labor and a decree "recommending" that collectives "voluntarily" reduce the private plots and livestock holdings of their members. In contrast to Stalin's crude attacks, the present campaign is lubricated by higher incentives for communal work and is based on thorough political preparations. If it remains gradual, state controls over agriculture will probably become more effective, but any sudden acceleration runs the danger of provoking peasant resistance and a decline in output. The key question in this program is whether the new incentive measures will elicit sufficient confidence among the peasants to induce them to regard the collective farm rather than their private

- 21 -

~~SECRET~~

~~SECRET~~

holdings as the means to a tolerable and improving standard of living. A further pressure on the private sector is reflected in programs to increase state farm output, particularly of commodities competitive with those sold by individual peasants in the free market.

52. Prediction is particularly hazardous in Soviet agriculture, but an increase of about one-fourth in the total value of farm output appears likely over the period 1955-1961 principally because of an increase in quality products, such as meat, milk, and fibers. This rate of growth is about double that achieved during the Fifth Five-Year Plan but far below the Sixth's official target of 70 percent. Our estimate allows some success to the New Lands and corn programs, despite climatic dangers and high costs. Although some further acreage expansions can be expected, most of the gains in grain production will come from the improved yields which should result from a greater than ~~two~~-fold increase in the combine park for small grains and, in the case of corn, from the use of hybrid seeds, further machinery supplies, and an accumulation of experience. We estimate that grain output in 1961 will probably be about 116 million tons against an estimated 1955 harvest of 100 million tons and an official 1960 target of 180 million.

53. Because current Soviet agricultural policy focuses upon higher outputs of livestock products, two-thirds of this increase will be in

- 22 -

~~SECRET~~

~~SECRET~~

feeder grains, in which unripened corn harvested early in climatically inhospitable areas will play a major role. This program has already produced good results in the higher milk yields of cows wintered on this feed in 1955-1956. Increases of 25-30 percent in meat and milk production over the period 1955-1961 are expected to result primarily from higher productivity per animal rather than from larger herds, although swine numbers probably will grow significantly since they do not compete seriously with cattle for the limited meadow and pasture areas. These increases, while far below the official 1960 targets for a doubling of production, will nevertheless represent important gains.

DEVELOPMENTS IN SOVIET CONSUMPTION

54. Soviet per capita consumption rose at an average rate of about 5 percent per year during the Fifth Five-Year Plan and is expected to rise at about 4 percent per year during the Sixth, raising the living standard by over one quarter between 1955 and 1961. This is an appreciable improvement in material welfare, even though part of it is more apparent than real, reflecting merely the shift, associated with urbanization, from the consumption of goods made at home to purchase in the market. Although this living standard will still be low by Western criteria, it probably will not be a cause of serious dissatisfaction, since the Soviet citizen will almost certainly continue to experience steady ~~annual~~ improvements

- 23 -

~~SECRET~~

~~SECRET~~

in material welfare. Neither will Soviet living standards appear as a mark against the Soviet system in the eyes of most Asians, Middle Easterners, and Africans, accustomed to much lower per capita levels of consumption.

55. The estimated gains in agricultural output will be the major factor in improving the living standard since agriculture provides the basis for about three-quarters of Soviet consumption. Per capita supplies of food and clothing in 1961 are expected to be 24 and 43 percent, respectively, above 1955 levels.* The expansion of durable consumer goods output will exceed these rates. However, production will fall off from the high rates of 1953-1955, total output will be modest, and these goods will remain available only to upper-income groups. Historically, consumer goods production has suffered whenever industry has run short of resources, producer goods having a higher priority. An important improvement will occur in urban housing, where the very limited per capita space will rise by roughly one-quarter.

56. In the distribution of personal income, the higher agricultural prices paid since 1953 have narrowed somewhat the gap between rural and urban incomes and will continue to do so during the coming five years.

* The rise in the value of per capita consumption of agricultural products will run ahead of the increase in total agricultural output because of increases in the value added by processing and packaging.

~~SECRET~~

~~SECRET~~

The lowest pension and wage rates are to be raised, and higher pension rates are to be cut. These measures will tend to reduce somewhat the extreme class differentiations which Stalin's economic and social policies had produced.

DEVELOPMENTS IN SOVIET FOREIGN TRADE

57. The expansion of Soviet foreign trade, which has been fairly rapid in recent years, leveled off in 1955 at about \$6.3 billion dollars, due primarily to the fact that trade with Sino-Soviet Bloc partners, which accounts for about four-fifths of the total, remained virtually unchanged. (See Table II) New increases in trade within the Bloc are expected to result from Communist China's continuing need for Soviet assistance in its industrialization program and the increasing coordination of the Soviet and East European Satellite economies.

TABLE II

INDEX OF VOLUME OF SOVIET FOREIGN TRADE

(1951 = 100)

<u>Year</u>	<u>Bloc</u>	<u>Non-Bloc</u>	<u>Total</u>
1948	38	116	59
1949	55	110	66
1950	89	81	88
1951	100	100	100
1952	117	114	117
1953	141	120	136
1954	146	166	150
1955	148	172	152

- 24 -

~~SECRET~~

~~SECRET~~

58. In its trade with the Free World in 1955, the USSR substantially increased its exports as compared with 1954 and reduced its imports, notably of foodstuffs, thus converting a deficit into a rough balance of trade. Western Europe's share of Soviet trade with the Free World rose slightly to over four-fifths. The share of manufactured goods in Soviet exports continued to increase, and while the USSR remains a large net importer of capital goods in its Free World trade, its own capital exports are rising. We estimate that Soviet trade with non Bloc countries will rise during the next five years, with developed countries continuing to account for the major share.

59. The most important development in Soviet foreign economic relations in 1955 was the rapid acceleration of the USSR's campaign to establish the claim that it can be a major source of economic assistance to underdeveloped countries, although the volume of trade with these countries does not yet loom large in total Soviet trade. The most dramatic feature of this campaign, in which Communist China and the European Satellites are also participating, is Bloc offers of capital equipment, military goods, and related technical services. These offers include deferred payment at low interest rates, frequently in local currencies or exportable surpluses which the underdeveloped countries find unsalable in other markets at satisfactory prices. Bloc offers of medium and long-term credit now exceed one billion dollars, and credit agreements totaling more than \$800 million have been reached with

- 25 -

~~SECRET~~

~~SECRET~~

12 countries, including Yugoslavia (\$299 million), India (\$158 million), Egypt (\$175 million), and Afghanistan (\$122 million).

60. During the coming five years, Soviet trade with underdeveloped countries will probably exceed the 1955 level of about \$200 million by several times, with a substantial share financed by credit. In the 1930s the USSR, seeking to industrialize rapidly, exchanged its low-cost foodstuffs and raw materials for capital equipment from Western Europe and the US. A quarter century of industrial growth, agricultural neglect, and exploitation of the most high grade and accessible raw materials has so reduced the cost of manufactured goods relative to those of food and raw materials in the Soviet Union that it is now economically profitable to export capital equipment in return for the food and raw materials of other countries now seeking to industrialize. In addition to economic considerations, this stage of development coincides with a period in which the USSR can ~~also~~ profit politically from such trade. ~~In addition to cost considerations,~~ the USSR's success in industrial development as against its poorer agricultural record and prospects provides further motivation for this kind of trade policy.

61. Soviet economic capabilities are adequate to support a considerable expansion of Soviet trade and credit programs with underdeveloped countries in the next several years.*

* ~~The representative for the Deputy Director for Intelligence, the Joint Staff, wishes to change "Considerable to "some" and to add; "despite the demands of Bloc programs of forced industrialization."~~

~~SECRET~~

Soviet shipments of capital goods and arms to all countries have more than doubled since 1950. Credit extensions by the USSR to non-Bloc countries amount at present to less than \$500 million, or about one-third of one percent of Soviet GNP. The USSR has a capability for expanding exports of capital goods which is large relative to the probable requirements of these countries, and the estimated 80 percent increase in production of machinery and equipment during the Sixth Five-Year Plan will further increase this capability. In addition, central planning and a state monopoly of trade provide the USSR with an advantage over capitalist countries in the coordination of internal and external policies, giving it great freedom in directing its foreign trade for maximum political as well as economic advantage.*

62. While past policy has severely limited foreign trade, historic Soviet fears of losing economic independence through reliance on foreign sources appear to have been reduced by the strength of the Soviet economy and by the creation of the Bloc market. The Soviet leaders apparently realize that a marginal degree of reliance upon non-Bloc sources of supply, especially products of advanced technology for certain foods, and for some raw materials, is preferable to a more rigid policy of atarky , since it offers the promise of more rapid rates of economic growth. In addition,

* ~~The representative for the Deputy Director for Intelligence, The Joint Staff, reserves his opinion on this sentence.~~

~~SECRET~~

they see opportunities in such trade programs for promoting neutralism in the underdeveloped countries and encouraging political attitudes favorable to the USSR and its economic achievements under Communism. The future size of the trade and credit program with underdeveloped countries is likely to depend as much on conditions in and the policies of these countries as on Soviet willingness and ability to expand these exchanges. (For more detailed assessment, see NIE 100-3-56, especially paragraphs 23-35.)

- 28 -

~~SECRET~~

~~SECRET~~

3656

CENTRAL INTELLIGENCE AGENCY

27 June 1956

MEMORANDUM FOR THE INTELLIGENCE ADVISORY COMMITTEE

SUBJECT: NIE 11-4-56: SOVIET CAPABILITIES AND COURSES OF ACTION
(Part IV)

The attached part of the draft estimate has been approved by the Board of National Estimates pursuant to a consideration of it by the IAC representatives.

William P. Bundy
WILLIAM P. BUNDY
Deputy Assistant Director
National Estimates

Distribution "A"

~~SECRET~~

DECLASSIFIED	
Authority	<i>RAC review</i>
By	<i>LKS</i>
NLE Date	<i>5/14/02</i>

~~SECRET~~

NIE 11-4-56

IV. SCIENTIFIC AND TECHNICAL DEVELOPMENTS*

Scientific Resources and Policy

63. Soviet scientific and technical capabilities continue to expand rapidly. Although total Soviet scientific resources remain smaller than those of the US, and assets of the Sino-Soviet Bloc far smaller than those of the West, the USSR has been able to achieve near parity with the US in areas of critical military and industrial significance. By increasing the emphasis on science and technology and by controlling the allocation of scientific manpower and facilities, the Soviet regime has developed from a small original base augmented by past exploitation of Western science enough competence to provide expert scientific support for priority military and economic programs.

64. Trained Manpower: We estimate that the USSR as of mid-1956 has about 1,690,000 graduates of scientific and technical curricula given at the university level; about 915,000 of these are post-World War II graduates. The number of these graduates actually employed in

* NIE 11-6-56, "Capabilities and Trends in Soviet Science and Technology" is scheduled for early publication.

~~SECRET~~

DECLASSIFIED	
Authority	<i>RAC review</i>
By	<i>AS</i> 5/14/02
	NLE Date

IV
S&T

scientific and technical fields in the USSR (1,360,000) compares closely with that in the US. However, the USSR is now graduating substantially more trained scientists and engineers annually than the US. If present trends continue, by mid-1961 the USSR will have more graduates employed in scientific and technical fields than the US and about 60 percent more in physical sciences and engineering.^{1/}

65. In the postwar period the quality of Soviet scientific training has been generally good and has approached and in some cases surpassed US levels. However, the number engaged in research and teaching in the physical sciences and engineering is substantially smaller in the USSR than in the US.^{2/} Moreover, the practical and experimental aspects of engineering training have been traditionally weak, although efforts are being made to overcome this. Weaknesses in scientific training will not, however, affect Soviet ability to achieve technological objectives to which priority is attached.

^{1/} Numerical estimates of Soviet scientific personnel are believed to be correct within plus or minus 10 percent. For detailed comparison of USSR and US scientific personnel, see graphics on following page.

^{2/} See the category "Scientific Workers" in the graphics on the following page.

66. Scientific Facilities: Financial support, organizational direction, and the quality of laboratories are generally adequate for the effective utilization of scientific talent. Although complex research instruments are probably in shorter supply than in the US or UK, we believe that present Soviet research and development programs of major importance are hampered only slightly by shortages or non-availability of scientific instruments and equipment. On the other hand, programs of lower priority are probably hampered to a greater extent. We believe that by 1961 the USSR will have made further substantial progress in research and development in electronics, which is basic to instrumentation, and will have achieved near equality with the US in research instruments.

67. Basic Research: The quality of Soviet basic research in ~~most~~ *and in many fields of* fields of mathematics, physics, and chemistry is believed about equal to that of the US.* New evidence indicates striking progress over the past few years in such important fields as nuclear physics, geophysics, high-speed digital computers, high-temperature alloys, and the theory of automation. ~~Further progress is likely in these fields; for example, it appears likely that by 1961 the USSR will have achieved near equality with the United States in nuclear physics.~~

* ~~The representative of the Deputy Director for Intelligence, The Joint Staff, reserves his position on this sentence.~~

~~SECRET~~

68. Ideological obstacles to scientific research and development -- never of importance in the major industrial or war-supporting fields -- will probably diminish in consequence of the repudiation of both past doctrinal rigidity and an outwardly contemptuous attitude towards Western technology. Recognition of their retarding effects in certain phases of biological and agricultural sciences was implicit in the recent demotion of Lysenko and in Soviet purchases of US hybrid corn. Weakness in these fields (and in agricultural machinery) were probably caused, however, more by official emphasis on other areas of research and development than by ideological restraints, and will probably be partly remedied by 1961. Agricultural research is now more intelligently directed than in the past toward solving the essential problems of increasing per acre crop yields and livestock production. There is an evident intention to profit from US experience in such fields of current Soviet emphasis as mineral fertilizers, chemicals to control crop and livestock pests, and crop breeding.

69. The Satellite scientific contribution to Soviet technological development is largely in optics, electronics, communication equipment, synthetic fibers, and pharmaceuticals. Its relative importance will probably diminish during the next five years because of increasing Soviet capabilities in these fields.

- 4 -

~~SECRET~~

~~SECRET~~

70. Nonprofessional technicians: The USSR is not as well supplied with technicians, mechanics, and maintenance men as are the Western industrial countries, where broader sections of the population have acquired mechanical skills over a longer period. Standards of maintenance are also generally lower than in these countries. However, Soviet engineers have partly compensated for these deficiencies by building machines and equipment which are simple in design and easy to maintain and repair. Considerable progress has been made during the last decade in increasing the supply of nonprofessional technical personnel, and the present emphasis on specialized training after lower school should significantly increase the number available by 1961. The 10-year lower school program of the USSR, which is gradually replacing the former seven-year curriculum, also includes a high proportion of scientific and technical subjects of use in training nonprofessional technicians.

- 5 -

~~SECRET~~

~~SECRET~~

SCIENTIFIC AND TECHNICAL DEVELOPMENTS
OF ECONOMIC AND SOCIAL SIGNIFICANCE

71. Soviet technology in heavy industry has demonstrated a familiarity with the most advanced skills and a capability for adapting and introducing modern techniques, whether self-developed or borrowed, into their rapidly expanding industrial base. However, Soviet practices were initially backward, and the introduction of new techniques has often been slowed by reluctance to replace obsolete but still workable equipment. Thus, while the best Soviet practices in many industries can be generally considered equivalent to those of the West, the average level of Soviet practices still lags considerably behind that of the West.

72. The USSR plans to increase greatly the emphasis on automation in industrial technology during the current five year plan although progress in this sphere will probably be less than in simple mechanization and re-equipment. In the technology of chemical production the USSR generally lags well behind US practice, but the USSR is now making a major effort to develop new techniques in petrochemistry.

- 6 -

~~SECRET~~

~~SECRET~~

In the metals industry, advances in rolling and finishing technology have lagged badly behind advances in most other divisions, although further progress is likely during the period of this estimate. Soviet ability to design metal-cutting machinery is believed to be comparable to that of the US, and with respect to ceramic tools for high-speed cutting the USSR is superior to the US.

73. Soviet medical science is generally advanced, but behind that of the major Western countries in some areas of basic microbiological research. Clinical research and practices are nearly comparable to Western standards, and Soviet work in biochemistry, hematology, and physiology has been outstanding. Accomplishments in the latter field continue to be applied to mental and physical conditioning, and there has been a partial rehabilitation of the science of psychology from the rigid doctrinal bonds of the Stalin era.

SCIENTIFIC AND TECHNICAL DEVELOPMENTS OF MILITARY SIGNIFICANCE

74. The USSR almost certainly has the scientific and technological capability necessary to develop weapons and military equipment which are generally equal to, and sometimes better than, those of other nations. Though the USSR probably cannot carry out parallel programs simultaneously in all fields, its scientific resources are

~~7~~

~~SECRET~~

adequate to press vigorously programs in a variety of priority areas.

- 7 -

~~SECRET~~

SUBJECT: NUCLEAR PARAGRAPHS FOR NIE 11-4-56

⁷⁵
~~71~~ Nuclear Weapons. ^{1/} As a result of new evidence we have revised upward by a factor of about four our previous estimates of past and future Soviet production of U-235. The element of uncertainty in our current estimate of past production is very large, but the error probably does not exceed plus or minus 50 percent. ^{2/3/} Our estimate of future U-235 production is subject to further variables, such production being dependent primarily on Soviet plans and decisions and is therefore less reliable than the estimate of 1956 cumulative production.

IV
Para
75

⁷⁶
~~71a~~ A highly significant development during the past year was the airburst on 22 November 1955 of a thermonuclear weapon which yielded about 1.6 megatons. This test, together with the above revision in our

Nuclea

-
- 1/ See NIE 11-2-56, The Soviet Atomic Energy Program, 8 June 1956 (RESTRICTED DATA) for fuller details and dissents.
 - 2/ The Director of Naval Intelligence believes these estimates of U-235 production to be too high. He believes that for planning purposes a more practical magnitude would be in a range below that of the minus 50 percent lower limit of this estimate.
 - 3/ The Deputy Director for Intelligence, The Joint Staff believes that the new intelligence does not adequately support the estimate of U-235 cumulative production. A more practical figure for planning would be one in the lower range of uncertainty approaching the minus 50 percent lower limit given for 1955.

DECLASSIFIED
 Authority RAC Review
 By AW NLE Date 5/14/02

~~TOP SECRET~~

fissionable materials estimate, leads us to estimate that the USSR now has a significant multimegaton weapons capability and will have a major capability in the near future. The USSR could have begun developing an emergency capability stockpile, and have perhaps as many as 75 weapons of the 22 November 1955 type by 1 July 1956 if it did not encounter fabrication difficulties. About this time, it could be in full-scale production so that it could have converted a major portion of its U-235 stockpile by about 1 January 1957.

⁷⁷
~~71b~~ The USSR is now capable of increasing the yield of the 22 November 1955 type weapons to about 10 MT by further developmental advances. Future developments will probably lead to increasing the nuclear efficiency, yields, and deliverability of high yield weapons. We estimate that prototypes of high yield missile warheads (though with yields substantially smaller than 10 MT) will be tested by 1957-1958.

⁷⁸
~~71c~~. Soviet interest in low-yield, small dimension weapons is well established by ^{Soviet} their military doctrine and by the large proportion of low-yield weapons or devices detonated in the test series of 1953-1956. It is estimated that the USSR now has a small diameter warhead

- 2 -

~~TOP SECRET~~

~~TOP SECRET~~

using an implosion system of relatively low efficiency, with yields in the range from 10 kilotons to less than one kiloton. Improved efficiencies, which will permit ^{more} widespread use for air defense, are expected by 1959.

78a.
71d. The Soviets conducted their first underwater atomic test near Novaya Zemlya on 21 September 1955, which opens new vistas into the development of atomic weapons for a variety of naval uses, resulting in a significant increase in the over-all Soviet nuclear warfare capability.

78f
71e. Available evidence indicates that the USSR is presently stockpiling and will continue to stockpile a versatile family of nuclear weapons, ranging from very low yield warheads to high yield thermonuclear weapons. We cannot determine with any degree of certainty the probable number of nuclear weapons of each type since this will depend on strategic and other factors. However, in order to provide an appreciation of Soviet stockpile capabilities a few arbitrary illustrative stockpiles under varying strategic assumptions are given below. It is emphasized that these are purely illustrative,

- 3 -

~~TOP SECRET~~

as the Soviets can utilize their fissionable material in any number of weapons combinations.^{4/}

Arbitrary Examples of Soviet Stockpile Allocations as of Mid-1956.

(1) Assuming overriding priority to high yield weapons for attack on allied retaliatory strength and relatively less emphasis on various types of medium and low yield weapons:

High Yield (200kt to 10 MT)	475 ^{5/}
Medium Yield (5 to 70kt)	570
Low Yield (.5 to 20kt)	100

(2) Assuming roughly equal priority to high yield and to various types of medium and low yield weapons:

High Yield (200kt to 10 MT)	275 ^{5/}
Medium Yield (5 to 70kt)	510
Low Yield (.5 to 20kt)	495

4/ For analysis of these various alternatives and the reasoning behind them, as well as for methods of calculating other alternative stockpiles, see NIE 11-2-56. It should also be noted that the dissents of the Director of Naval Intelligence and the Deputy Director, Joint Staff also apply to these stockpile quantities.

5/ By this date only 75 could be weapons of the 22 November 1955 type.

Arbitrary Examples of Soviet Stockpile Allocations as of Mid-1961.

(1) Assuming close to maximum emphasis on high yield weapons; limited requirement for medium yield; considerable requirement for low yield weapons, primarily for air defense.

High Yield (500kt to 20 MT)	1,750
Medium Yield (5 to 70kt)	745
Low Yield (.5 to 4 kt)	2,900

(2) Assuming roughly equal priority to high, medium and low yield weapons, the latter primarily for air defense.

High Yield (500kt to 20 MT)	1,050
Medium Yield (5 to 70kt)	2,650
Low Yield (.5 to 4kt)	2,700

^{78c.}
~~71f.~~ Nuclear Power. The Soviets have displayed considerable progress in nuclear electric power reactor development. We estimate they are capable of meeting the ambitious goals of the Sixth Five Year Plan for 2000-2500 MW of installed capacity by the end of 1960, but this achievement will require a very high priority effort.

~~TOP SECRET~~

78d.

Fig. Nuclear Propulsion. The state of Soviet reactor technology also indicates that the USSR is capable of developing propulsion applications. We estimate it could produce a reactor suitable for submarine or surface ship application by 1956-1957. The Soviet aircraft propulsion program probably will not progress beyond the research phase prior to 1958.

- 6 -

~~TOP SECRET~~

~~SECRET~~

~~programs simultaneously in all fields, its scientific resources are adequate to press vigorously programs in a variety of priority areas.~~

~~78. Nuclear Weapons. (to be added)~~

*See tab "Nuclear"
for paras 75-78d*

79. Guided Missiles.* We believe that the strategic requirements of the USSR have dictated a major effort in the field of guided missiles. From the evidence of a large number of personalities and activities associated with missile development, recent statements of Soviet leaders observed air defense sites around Moscow, and other material, we have concluded that the USSR is engaged in an extensive guided missile program on a high priority. The USSR has an adequate economic base for a sizeable production program; and we are convinced -- from our knowledge of Soviet exploitation of German missile experience and evidence of Soviet capabilities in related fields -- that the USSR has the basic scientific and technical capability to support a comprehensive research and development program. We believe that the USSR now has surface-to-air guided missiles in at least limited operational status, and could have guided missiles in limited operational status in

* For fuller discussion of Soviet guided missiles, including estimates of the dates when various types of missiles might appear in operational use, see NIE 11-12-55, "Soviet Guided Missile Capabilities and Probable Programs," published 20 December 1955. This will be superseded by NIE 11-5-56, "Soviet Guided Missile Capabilities and Probable Program," to be published in October 1956.

~~SECRET~~

~~SECRET~~

the other three categories (air-to-surface, air-to-air, and surface-to-surface). Soviet missile capabilities will continue to grow during the period of this estimate. However, we have little firm information on the specific characteristics of the missile models the USSR is presently developing, or may now have in operational use.*

80. Electronics. The magnitude, diversity, and past success of the Soviet research and development program in electronics indicate the probable development of new and improved electronic devices during the period of this estimate. Soviet air defense capabilities will probably be enhanced by continuing improvements in detection, warning, interception, and data-handling equipment. Air offensive capabilities are likely to be improved by an increase in accuracy of Soviet navigational equipment and bombing radars, which will probably be comparable in performance to Western equipment. Soviet research on communication theory will probably result in improvements in communication techniques, radar, computers, automatic guidance devices, and telemetering, and could lead over the next five years to development of a communication network exceedingly difficult to intercept or jam.

* For estimates of the capabilities of Soviet forces to employ guided missiles, see Section VI.

~~SECRET~~

~~SECRET~~

a. Early Warning Radar (EW). -- The USSR has a large variety of EW radars in use, including World War II sets, native sets based on Western designs, and sets of purely native design. Most of the older sets will probably be replaced by the end of 1956. Soviet radar coverage is estimated to be fairly reliable against jet medium bombers at maximum ranges from 125 miles (up to 60,000 feet altitude) to 180 miles (up to 45,000 feet altitude). By 1958 the USSR will probably have developed one or more EW radars capable of detecting jet medium bombers at 65,000 feet up to a distance of about 200 miles, or under certain circumstances to as much as 300. The problem of low altitude coverage will still exist, but probably will be greatly lessened by the use of moving target indicators and gap-filler radars.

b. Ground-Control Intercept Radar (GCI). -- We estimate that by 1958 the USSR will have GCI radars of new types as well as the following types now in use: (1) the V-beam sets presently in use, which are probably capable of coverage on jet medium bombers at maximum reliable ranges of 75-110 nautical miles, and (2) the ^{paired}~~paired~~ combinations of long-range azimuth indicating sets (GAGE) and height indicating sets (PATY CAKE), which collectively can provide GCI data. We believe that by 1961 GCI coverage will be increased to the order of 200 miles and

- 10 -

~~SECRET~~

~~SECRET~~

perhaps beyond. Ranges of this sort would require the use of transponder beacons not now known to be installed in interceptor aircraft. ^{By 1959,} ~~Reliable~~ altitude coverage ^{will be achieved} up to a maximum of 60,000 feet, ~~will be achieved by~~ ^{at} 1959, though ^{at} less than maximum ranges.

c. Airborne Intercept Radar (AI). Airborne intercept radar is now in extensive use. The best equipment expected to be available during the next five years may have maximum ranges against medium bombers of about 30 nautical miles for search and 20 for tracking, with range accuracy of plus or minus 25 yards and angular accuracy of plus or minus one degree. The best of the equipment currently available may approximate this performance.

d. Blind Bombing and Navigational Radar. -- The USSR has operational an X-band (three centimeter) set, which will probably be improved. By the end of 1957 we estimate that the best Soviet blind bombing and navigational radar will be capable of operating at altitudes up to 60,000 feet, and will have a range of about 125 nautical miles for navigation. Bombing and navigation accuracies will be about equivalent to those of Western equipment. The use of frequencies higher than X-band is unlikely for the present, but may be achieved by mid-1960.

- 11 -

~~SECRET~~

~~SECRET~~

e. Fire Control Radar. -- The WHIFF radar, the Soviet version of the SCR-584, will continue to be used in quantity, and a new set, FIRE CAN, is coming into quantity use. Radar sets with even greater accuracies, range definitions, and reduced vulnerability to jamming might appear at any time. The X-band will probably be used for newly developed fire control radars.

f. Electromagnetic Warfare. -- The USSR presently has the capability of seriously disrupting Western long-range radio communications and electronic navigational systems. Capabilities in related electronic fields indicate that the USSR is probably capable of electronic jamming at frequencies through 12,000 megacycles, and possibly considerably higher. By 1960 the USSR may have jamming equipment in operational use in frequency ranges through 30,000 megacycles. Evidence indicates that the USSR is now training in the use of CHAFF.

g. Microwave Communications. -- Microwave communication equipment is in wide use in East Germany, and we believe that existing fixed networks in the Soviet Union and some other Bloc areas are expanding. A recent marked decrease in Soviet orders for microwave relay sets from the Satellites probably indicates that Soviet expansion of microwave communications will be accomplished largely with Soviet equipment. By 1960, the

- 12 -

~~SECRET~~

~~SECRET~~

estimated minimum channel capacity for long distance civil circuits will be 24, and the equipment will be suitable for relaying a signal many times without serious degradation. Soviet research in semiconductors indicates that by 1960 transistors will be used extensively in communication equipment, which will thus be much lighter and less power-consuming than present-day counterparts.

81. Biological Warfare. The USSR has the technical knowledge, trained personnel, and facilities necessary for conducting an extensive program in BW research and development. Accumulated evidence indicates that the USSR is almost certainly engaged in such a program, probably including antipersonnel, antilivestock, and possibly anticrop agents. The scope and magnitude of the program cannot be judged from the information available, but the organisms of at least four human diseases (anthrax, tularemia, plague, and brucellosis) and two animal diseases (foot-mouth and rinderpest) are believed to have been investigated as BW agents.

82. The USSR also has the facilities, personnel, and materials needed for the large-scale production of BW agents, although we have no evidence of such production at present. We believe that they have a current capability for clandestine BW operations against personnel, livestock, and certain crops, and a BW defensive capability generally

- 13 -

~~SECRET~~

~~SECRET~~

comparable with that of Western countries. Soviet capabilities for clandestine and possibly for overt employment of BW agents will probably continue to be expanded, and defensive capabilities improved.

83. Chemical Warfare. During World War II, the USSR produced most of the standard chemical agents and auxiliary equipment for chemical warfare. The USSR is believed to have maintained some of its wartime toxic munitions stockpiles and continued some peacetime production of toxic CW agents. While present production figures are not known, the USSR has the materials and skills available to produce some 40,000 to 60,000 tons of toxic agents per year. These agents would consist primarily of mustard gas and such nerve gases as GA (Tabun) and, in small quantity, GB (Sarin). Soviet CW armament reserves are believed sufficient to sustain large-scale operations for several months. Soviet defensive capabilities are believed comparable to those of Western countries. During the period of this estimate, the USSR will probably conduct research on new types of toxic agents, including the "V" agents and possibly certain psychogenic agents.

- 14 -

~~SECRET~~

~~TOP SECRET~~

60

#102440-g

CENTRAL INTELLIGENCE AGENCY

24 July 1956

MEMORANDUM FOR THE INTELLIGENCE ADVISORY COMMITTEE

SUBJECT: NIE 11-4-56: SOVIET CAPABILITIES AND COURSES OF ACTION
(Parts V & VI)

The attached parts of the draft estimate have been approved by the Board of National Estimates pursuant to a consideration of them by the IAC representatives.

William P. Bundy
WILLIAM P. BUNDY
Deputy Assistant Director
National Estimates

Distribution "A"

DECLASSIFIED	
Authority	<i>RAC Review</i>
By	<i>JS</i>
	<i>5/14/02</i>
	NLE Date

~~TOP SECRET~~