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# SOVIET MILITARY OUTLAYS SINCE 1955

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MEMORANDUM

RM-3886-PR

JULY 1964

## SOVIET MILITARY OUTLAYS SINCE 1955

Abraham S. Becker

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PREFACE

This Project RAND Memorandum, part of The RAND Corporation's continuing study of the economic background of Soviet military power, attempts to survey and elaborate the information available in the open literature on Soviet military outlays since 1955. In this effort, the starting point is the explicit Soviet state budget allocation to "defense." The conclusion is reached that additional military outlays, over and above the "defense" allocation, may be presumed to exist; the rest of the Memorandum is devoted to the estimation of concealed expenditures and the evaluation of these estimates.

This study was begun as part of a larger research project on the national income of the USSR in the period of the Seven Year Plan (1959-1965). In order to gain some perspective on the events in this period, the review of military expenditures was extended back to 1955.

The intrinsic interest of the subject of this study to a wide audience needs no elaboration. On this account alone, it is perhaps wise to warn the prospective reader that the Memorandum consists of many questions and few answers. However, for exactly this reason the study will also have a direct bearing on the issues raised by the revival of discussion of "budgetary" disarmament.

The author gratefully acknowledges his debt to RAND colleagues Hans Heymann, Jr., and Richard H. Moorsteen, and to RAND consultant Abram Bergson of Harvard University, for their valuable criticisms of an earlier draft of the study. Thanks are also due to Douglas B. Diamond for helpful comments and suggestions. However, the author bears sole responsibility for the contents.

SUMMARY

This Memorandum is an outgrowth of continuing research on Soviet national income during the Seven Year Plan period. It is concerned with the growth of total Soviet military expenditures since 1955. In view of Soviet secrecy with regard to the disclosure of such data, the question arises whether a study based largely on Soviet open sources is possible and worthwhile. In an introductory consideration of possible forms of Soviet concealment, it is concluded that (a) there is no evidence of the use of means of data concealment that would make the study infeasible in principle; (b) such means also appear to be costly and internally dysfunctional; (c) concealment of military expenditures by secretion within the budget and the national income account seems the least costly and the most likely form of concealment; (d) the probability of other forms of concealment not studied in this Memorandum is small, but not zero, and the reader should bear this warning in mind.

Limitations of the data make it impossible to obtain an unambiguous, comprehensive series of estimates of Soviet military outlays. The major goal of this study is to survey and interpret the information available in the open literature. Thus this Memorandum is a critical review of what is and is not known from open sources about Soviet military outlays, the first detailed exposition of this kind. As such, the study may also contribute to the periodic discussion on budgetary disarmament.

Discussions in Soviet sources on the content and coverage of the state budget appropriation to "defense" are cryptic. A recent source indicates that budget "defense" includes pay and subsistence, procurement, and military construction for the armed forces; omitted by implication are military R&D, stockpiling, civil defense, foreign military aid, as well as space research and nuclear energy programs.

Consideration of the available descriptions of the coverage of "defense" as well as an illustrative calculation of the value of major components in 1959 suggest the hypothesis that "defense" includes military pay and subsistence, operations and maintenance, military

construction, and at least part of procurement. It is assumed that the bulk of investment in armaments production is excluded. For an estimate of total military outlays the "defense" outlay should be augmented by the value of expenditures on military R&D, stockpiling, nuclear energy activities, and space exploration.

It has been claimed that military outlays, in addition to identified "defense" expenditures, are concealed in a number of unidentified budget outlay residuals. After an extensive and detailed examination of estimates of these residuals, including a brief retrospect of the residuals in the period of World War II, it is tentatively concluded that residuals must include some nonmilitary expenditures but probably also conceal some military outlays.

On the basis of alternative assumptions as to the share of non-military expenditures in the budget residuals in the base year 1955, two time series of estimated total military outlays are developed. Compared with "defense" outlays, the estimated total expenditure series show a slower decline between 1955 and 1958; the former series is virtually unchanged in 1959 from the 1958 level, the latter increased by about one-quarter. Changes in the estimated series for 1961 and 1962 are ambiguous because data gaps require the use of a range in both years for total budget residuals. By 1962, "defense" outlays were 35 per cent higher than in 1960. Estimated total military outlays in 1961-1962 are at least roughly unchanged; possibly there was a substantial increase above even the high point of 1959. Only fragmentary data exist for 1963 and 1964.

An attempt is made to gauge the plausibility of these estimates by observing the behavior of components of machinery output. A comparison of indexes of total machinery output, production of civilian machinery, investment in machinery, and an index of residual machinery output (total output less investment in machinery and production of consumers' durables), supports a conclusion drawn by other students that after 1957, as previously in the early 1950s, the rate of growth of military output sharply outpaced that of civilian machinery output. The behavior of the estimated total military outlay series in the

period 1958-1960 seems consistent, and that of the defense series seems inconsistent, with the surmise that military procurement grew rapidly after 1957. The "defense" value in 1959 does and the estimated total outlay range in the same year does not seem too small to embrace the sum of estimated military outlay components.

There has been some speculation that the increases in the explicit "defense" budget announced in mid-1961 and carried forward in 1962 were in whole or in part illusory -- that is, that much if not all of the change represented a reclassification of military outlays formerly concealed under other budget headings. The estimates of total military outlays in this Memorandum imply a sharp increase in concealment in 1959, partly offset by a small decline in 1960. It is impossible to state a conclusion with respect to 1961-1962. Concealment may or may not have declined in either year; possibly it even increased in either year. Reexamined in the context of revisions made in the official national income reports, the issue seems to be similarly irresolvable.

It is thought likely that military outlays are to be found in several end-use categories of the official Soviet national income accounts. However, the most interesting category is that of "increments of material working capital and reserves." After subtracting the value of all other components, it is estimated that additions to state reserves increased 350 per cent in 1960, 9 per cent in 1961 and 6-30 per cent in 1962. According to Soviet sources, state reserves include a military component, but we cannot rule out the possibility that part of the sharp increase in the rate of net additions to reserves after 1959 represents stockpiling of non-armaments. On the other hand, if additions to reserves do consist in whole or in part of armaments, the evidence suggests that (a) not all procurement of arms takes place through this channel, and (b) that the armaments were of a type that were relatively unimportant in 1959 and highly significant, in terms of quantity, in 1959-1962. However, it may be that the relevant question is not, why did additions to state reserves increase so rapidly

after 1959, but why was the 1959 increment so low? Possibly the data reflect a pivotal change in 1958-1959 from one to another type of accumulation in the state reserves.

Finally, it is necessary to bear in mind the residual possibility that this study has no more than touched on the full range of methods of concealment the Soviet government can summon to its use. On the other hand, our persistent tendency before and during World War II to overestimate German military expenditures suggests that we should resist the temptation to assume perfect Soviet subtlety and see concealment where there may be none. This Memorandum has attempted to maintain a balance between extremes.

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NOTE

References in this Memorandum to the official statistical year-books in the series Narodnoe khoziaistvo SSSR, published by Gosstatizdat in Moscow, are abbreviated to N.kh. and the year indicated in the volume titles: for example, N.kh. 1962.

The sign " - " means zero or insignificant. The sign " .. " means unknown.

Unless otherwise indicated, all ruble values are expressed in "new" rubles, introduced in 1961. One "new" ruble equals 10 "old," pre-1961 rubles.

## I. INTRODUCTION

This Memorandum is an outgrowth of continuing RAND research on Soviet national income in the Seven Year Plan period. In that connection, it was important to consider the role of Soviet military expenditures in engendering the economic difficulties of recent years. The obvious prerequisite for such an evaluation was determination of the movement of military outlays since the inception of the Plan in 1958-1959. In order to provide some perspective on events in the period of the Plan, it was decided to use 1955 as the starting point, since this was the year when Khrushchev came to power, displacing Malenkov, the year when the Soviet armed forces began to be cut down from the Korean War peak levels. The present study is concerned solely with the growth of total Soviet military expenditures since 1955; consideration of the resource allocation implications is deferred to a subsequent Memorandum.

### THE PROBLEM OF SOVIET SECRECY

The U.S. federal budget is published each year in a volume a thousand pages thick. The budget volume for fiscal 1965 contains 137 pages devoted to detailed accounting of Department of Defense expenditures. Add the published hearings of Congressional committees and speeches and articles by administration officials, and the flow of official information on American military expenditures can only be described as copious. In stark contrast, the published Soviet state budget is pamphlet size; with regard to military outlays, nothing more than a single number, the total of so-called "defense" expenditures, is released; there is never any substantive public discussion of the military budget in the Supreme Soviet or in the press.

In the face of such secrecy what can we hope to learn about Soviet military outlays from open sources? Indeed, suppose the Soviet government is concealing the truth about the single number it does reveal. Under these conditions is not such a study impossible in principle? It must be acknowledged that this question cannot be

answered unequivocally, as will unfortunately prove true of most of the questions raised in this Memorandum. The possibility that the Soviet government could have so concealed significant parts of its military budget as to blind us completely to the true level and growth of these outlays seems unlikely, as will be argued below, but cannot be ruled out absolutely.

Defense of the feasibility of this study must begin with a distinction that has been crucial to the study of the Soviet economy -- between falsification in the sense of double bookkeeping, on one hand, and other forms of concealment and distortion, on the other.<sup>1</sup> If one believes that the Soviet authorities keep two sets of books, one for propaganda and one for operational use, research using Soviet statistics becomes impossible. The alternative assumption, that there is but one set of books, does not guarantee the accuracy of any estimates we attempt but at least enables us to try.

The hypothesis of a double bookkeeping system has been rejected by all students of the Soviet economy for two reasons. First, the operation of such a system would require an extremely high cost of administration; unnecessarily high, since withholding and statistical manipulation of information seem an equally effective and far cheaper way to accomplish the same purpose. Second, by a variety of tests, much Soviet data can be shown to be internally consistent, to a degree that seems unattainable with falsification under double bookkeeping.

Acceptance of the hypothesis of a single set of books does not yet dispose of the question of whether a study of Soviet military outlays is feasible in principle. Effective concealment by a variety of means could still be possible. Three such means of concealment -- secreting, distortional screening, and masking -- might be distinguished. An activity secreted is buried in a hiding place whose location may not be ascertainable from surface evidence. Distortional

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<sup>1</sup>Perhaps the classic discussion of the issue is in Abram Bergson, Soviet National Income and Product in 1937, New York, Columbia University Press, 1953, pp. 6-9. This study is hereafter cited as SNIP 1937.

screening exposes the object to view but interposes an obstacle distorting the object in order to mislead the viewer as to its form or substance. Masking enables the activity to be completely revealed to view under a false identity. Of course, the distinctions shade off into each other, but they appear useful as a means of outlining the problem.

Paradoxically, concealment by masking would be the most difficult to cope with but the easiest to detect. If Soviet military outlays are masked, we can have no confidence that announced grants in aid to mothers of large families are not in fact disguised outlays on missile factories. On the other hand, if aid to mothers exists, either its presence or its absence elsewhere cannot help but be revealed and draw attention to the disguised activity. Since Soviet statistics have an internal operational use, this system would be dysfunctional as well as cumbersome.

Distortional screening and secreting are the traditional methods of concealment used in the USSR, and, as this Memorandum makes clear, they apply to military as well as to civilian activities. Three main concealments by means of these methods may be visualized. As an extreme form of secreting, it is conceivable, for example, that a considerable portion of military outlays remains outside the budget, financed by revenues diverted from the budgetary channels or by means of operations of the banking system. However, the likelihood of this approach seems small. First, the accounting literature at all levels of administration reveals no evidence of the existence of sizable revenue sources not reported in the budget.<sup>1</sup> Second, the banking

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<sup>1</sup>Soviet sources do indicate the existence of extrabudget sources of finance for government institutions as apparently distinguished from khozraschet organizations (see below, p. 4, note 3), but the examples provided seem of minor importance: revenues from building rentals (to be used for maintenance and repair of such buildings); revenues from transport (used for maintenance and repair of transport); revenues from "subsidiary and educational-auxiliary activities; laboratories, offices, scientific research and experimental organizations and institutions" (used for maintaining and equipping these

system depends on the budget (grants to investment banks from budget expenditures and the budget surplus for Gosbank's lending activities) and on interest charged on short and medium term loans for expansion of its resources. Given the available data on growth of loan balances and on investment, neither of these sources seems large enough for sustained secretive financing of sizable military outlays.<sup>1</sup>

A pure case of distortional screening would be price discrimination in favor of the military. The only direct evidence bearing on this matter dates from before World War II, but it does not confirm the hypothesis.<sup>2</sup> More important, since Soviet industry operates on principles of khozraschet,<sup>3</sup> requiring the enterprise to finance current outlays out of current revenues, discriminatory pricing in favor of the military implies the requirement for subsidies and thus merely transforms the problem into one of finding secreted budget expenditures.

In this study consideration of concealment of Soviet military expenditures will be restricted almost entirely to the third main type of concealment, the secretion of military expenditures within the major identified national accounts, the state budget and the national income account. Because it seems less costly, concealment by secretion also

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institutions); entrance fees for museums and expositions (used for museum and exposition expenditures). (A. M. Aleksandrov, ed., Gosudarstvennyi biudzheth SSSR, Moscow, Gosfinizdat, 1961, pp. 418-419).

<sup>1</sup>The concern here is not the regular financing of part or even all of the working capital needs of military industry but the feasibility of sustained subsidization by the banking system. This has never been a function of Soviet banking but only of the state budget.

<sup>2</sup>See Abram Bergson and Hans Heymann, Jr., Soviet National Income and Product 1940 through 1948, The RAND Corporation, R-253, June 1953; also New York, Columbia University Press, 1954 (hereafter cited as SNIP 1940-1948), pp. 62-63; also Richard Moorsteen, Prices and Production of Machinery in the Soviet Union, 1928-1958, The RAND Corporation, R-370-PR, June 1962; also Cambridge, Massachusetts, Harvard University Press, 1962, p. 28.

<sup>3</sup>A basic distinction in Soviet finance is between the financing of khozraschet and of other organizations. Khozraschet organizations generally meet current needs from current revenues; by and large, they receive funds from the budget only for capital requirements. Other agencies, called budget organizations, are financed entirely through the budget.

seems a more likely procedure than the other forms listed and thereby merits more intensive examination. Nevertheless, the contingencies deemed less likely cannot simply be dismissed. The probability that the Soviet military effect is intrinsically unknowable is small but still non-zero. Nothing to be said below is intended to obscure this basic caution.

The seeming feasibility of engaging in a study of Soviet military outlays based on Soviet statistics does not, unhappily, remove all the obstacles to deriving an unambiguous, comprehensive set of estimates. Though the flow of statistics is far freer now than in the not too distant past, such a goal is in fact beyond our reach. As indicated, the Soviet government provides no more than a single number annually, alleged to be the total of its "defense" expenditures. At every step we encounter ambiguity and uncertainty in dealing with what related Soviet data we can muster, starting with the very definition of the subject under investigation. Indeed, it will prove impossible in the end to determine precisely what is being measured.

If, nevertheless, it seems worth while to persist, it is for reasons so eloquently expressed by Professor Gerschenkron: "...the counsels of pedantic purity are not necessarily the most helpful ones. At least, the present writer cannot decide to follow them at the price of foregoing acquisition of such little and uncertain knowledge as may result from preoccupation with the admittedly poor and inaccurate Soviet materials."<sup>1</sup> The views expressed in this Memorandum may or may not be accepted by the reader, but he will be in a position at all times to form his own judgment. Certainly, an effort has been made throughout to emphasize the limitations of the results to be presented.

#### GOALS OF THE STUDY

The major goal of this study is simply to marshal and interpret the available Soviet data bearing on military outlays in the budget

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<sup>1</sup>Alexander Gerschenkron, A Dollar Index of Soviet Machinery Output, 1927-28 to 1937, The RAND Corporation, R-197, April 6, 1951, p. 24.

and the national income accounts. The study makes few pretensions to innovation in either methods or results. However, there is no detailed exposition of the state of our knowledge, and this is the basic justification of the present work. The few substantive conclusions on the course of Soviet military expenditures that do emerge may help clarify our perspective on one of the fundamental questions of Soviet economic policy, the allocation of resources to military power.

Because this Memorandum is a critical review of what is and is not known about Soviet military outlays, with great emphasis on the unknown, it may also be useful as a contribution to the discussion on budgetary disarmament. Interest in this subject periodically waxes and wanes; partly, it is to be feared, because of unjustified confidence in the state of our knowledge of the Soviet budget.

Section II of the study deals with the financing of military outlays. An attempt at estimating concealed military expenditures is made in Section III. Then, in Section IV, the place of military outlays in the national income accounts is considered. Section V contains the conclusions.



## II. FINANCING MILITARY OUTLAYS

### THE SCOPE OF "DEFENSE"

Expenditures of the consolidated<sup>1</sup> state budget of the USSR (Table 1) are grouped in five main classes: "national economy," "social-cultural measures," "defense," "administration," and a miscellaneous category known to include, among others, outlays on the internal security forces, grants to the investment banks, and appropriations for servicing the internal state debt. Expenditures in the first four classes as well as on debt service are reported regularly, but the last available official figure on grants to investment banks is for 1958 plan; the appropriation to the internal security forces, planned or realized, has not been made public since 1949.

Although there is no shortage of Soviet monographs on the Soviet state budget<sup>+</sup>, it is hardly surprising that none of these works dwells at length on the financing of military outlays. According to one of the rare references to this subject, the expenditure category "defense" in the state budget<sup>2</sup> covers "the monetary and material allowances for armed forces personnel, payment for supplies and repair of combat equipment, maintenance of military institutions and schools, military construction, and other expenditures included in the estimate<sup>3</sup> of the Ministry of Defense of the USSR."<sup>4</sup>

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<sup>1</sup>That is, encompassing the budgets of all state administrative units, from the village council to the central government. The state budget is composed of the all-Union budget and of the budgets of the Union-Republics, the latter embracing the budgets of all lower administrative units.

<sup>2</sup>Budget outlays in this category are hereafter identified as "defense" outlays to avoid confusion with total military outlays, as defined below.

<sup>3</sup>See note 2, p. 10.

<sup>4</sup>I. A. Dymshits, and others, Finansy i kredit SSSR, Moscow, 1956, p. 237, cited in CIA, The 1960 Soviet Budget, November 1960, p. 35.

Table 1  
EXPENDITURES OF THE USSR STATE BUDGET, 1955-1962  
(billion rubles)

	1955	1956	1957	1958	1959	1960	1961	1962
1. National economy	23.31	24.52	26.70	29.03	32.37	34.12	32.6	36.2
2. Social-cultural measures	14.72	16.44	20.05	21.42	23.12	24.94	27.2	28.9
3. Administration	1.25	1.21	1.20	1.20	1.12	1.09	1.1	1.1
4. Defense	10.74	9.73	9.12	9.36	9.37	9.30	11.6	12.7
5. Loan service	1.43	1.63	.77	.37	.69	.70	.8	.8
6. Other outlays								
A. Grants to investment banks	.35	.37	.46	.30	.35	.40	.45	.50
B. Internal security	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
C. Unidentified	.65	.95	.93	1.10	1.88	1.08	1.0	.5
D. Total	2.50	2.82	2.89	2.90	3.73	2.98	3.0	2.5
7. Total expenditures	53.95	56.35	60.73	64.28	70.40	73.13	76.3	82.2

Sources:

1. National economy
2. Social-cultural measures
3. Administration
4. Defense
7. Total expenditures

1955-1960: Ministerstvo finansov SSSR, biudzhethnoe upravlenie, Gosudarstvennyi biudzheth SSSR i biudzhety soiuznykh respublik, Moscow, Gosfinizdat, 1962 (hereafter abbreviated to Gos. biudzheth), pp. 18-19.  
1961-1962: N.kh. 1962, p. 635.

5. Loan service

1955-1956 and 1958-1960: N.kh. 1958, p. 900, N.kh. 1959, p. 801, and N.kh. 1960, p. 844. 1957: Nancy Nimitz, Soviet National Income and Product, 1956-1958, The RAND Corporation, RM-3112-PR, June 1962 (hereafter abbreviated to SNIP 1956-1958), p. 127. 1961-1962: N.kh. 1962, p. 635.

6. Other

A. Grants to investment banks. 1955-1958: SNIP 1956-1958, p. 127. 1959-1962: estimates based on 1955-1958 data.

B. Internal security. All years: an estimate assuming continuation of the rate of expenditure on the MVD and KGB of the middle 1950s

Sources to Table 1 (continued)

(see SNIP 1956-1958, p. 118, and CIA, The 1960 Soviet Budget, November 1960, p. 43). It may be noted that in January 1960 the Ministry of Internal Affairs (MVD) was abolished at the Union level and replaced by republican Ministries for the Preservation of Public Order (MOOP); in that year residual outlays of the budgets of the Union-Republics increased by 651 million rubles over the previous year's level, compared with previous annual increases of 9, 47, 107, and 73 million rubles in the years 1956-1959 (Gos. biudzheta, p. 72). This suggests a 1960 value of outlays on the MOOP of about half a billion rubles. The implied estimate of one billion rubles on the Committee on State Security (KGB) does not appear out of consideration:

(a) Nikolai Galay, an emigré specialist, estimates KGB manpower in 1962 as 350,000-400,000 (cited in Oscar Gass, "Russia: Khrushchev and After," Commentary, November 1963, p. 357). The average annual wage is assumed to be 1200 rubles, compared with the average for the entire state labor force of 1033 rubles (my forthcoming Soviet National Income and Product, 1959-1962); therefore, direct personnel costs would amount to 420-480 million rubles, leaving roughly a half billion rubles for operation and maintenance, procurement, investment, and other outlays.

(b) According to the columnist, Victor Riesel, "a high official of the KGB (Soviet Committee of State Security) who defected not too long ago, revealed to FBI Director J. Edgar Hoover that the Russians' external intelligence apparatus has an annual budget of \$1.5 billion." (Los Angeles Times, May 18, 1964.)

The reliability of these sources is not known.

A recent financial text provides somewhat more detail in an organizational as well as functional definition. The passage is cited below in full:<sup>1</sup>

The Soviet state annually appropriates funds from the USSR State Budget according to the program (po smete<sup>2</sup>) of the USSR Ministry of Defense. These funds maintain the rocket and land troops, military-air forces, navy, anti-air defense, rear echelons and supply organizations of all branches of the Armed Forces and of all types of forces (organy tyla i snabzheniia vseh vidov Vooruzhennykh Sil i rodov voisk.)

Expenditures made according to the program of the USSR Ministry of Defense are: procurement -- for the army, aviation, and navy -- of arms (vooruzhenie), ammunition and equipment (tekhnika), fuels and lubricants, as well as food, supplies (veshchevoe imushchestvo) and other goods (material'nye tsennosti) necessary for the military readiness of troops; financing capital investment and industrial enterprises of the USSR Ministry of Defense; other needs of military, political preparation and of economic-housekeeping organizations of military units; money allowances for members of the Soviet Army.<sup>3</sup>

The cited passage obscures about as much as it illuminates. Although military pay and subsistence, operation and maintenance, and procurement clearly appear as objects of "defense" appropriation, no mention is made of RDT&E (research, development, testing, and evaluation), or of military stockpiling, civil defense, and foreign military aid, to say nothing of space research and nuclear energy activities.<sup>4</sup>

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<sup>1</sup>D. A. Allakhverdian, and others, Finansy SSSR, Moscow, Gosfinizdat, 1962, p. 310.

<sup>2</sup>The Russian term for the arrangements under which budget organizations are financed is v smetnom poriadke: literally, it means "by the estimate system," the estimate referring to an agency's program, detailing its estimated requirements for financing (ibid., p. 261). For lack of a better term, the word "smet," in the sense indicated, is here translated as "program."

<sup>3</sup>Is the omission of pay for members of other branches of the armed forces deliberate? It seems difficult to believe that if military pay for the navy were actually financed outside the explicit "defense" category, its concealment would be signalled so obtrusively. "Soviet Army" is frequently used as a synonym for the "armed forces" in general usage, and this may be the case here, too.

<sup>4</sup>Nuclear energy programs seem to be administered outside the Ministry of Defense. See below, p. 22.

Whether military construction and investment in the armaments industry are included is also unclear. It has been generally agreed that investment financed by the "defense" appropriation excluded investment in plant and equipment for the production of armaments.<sup>2</sup> The passage cited speaks of "financing capital investment and industrial enterprises of the USSR Ministry of Defense." Of course, this phrase is open to a variety of interpretations: "industrial enterprises" may refer to a sizable portion of armaments production or to a few arsenals and repair plants. It is likely that the financing includes both operating and capital grants, for the same source declares that "a significant number of production and construction organizations of the Armed Forces are on khozraschet,"<sup>3</sup> implying that some of the organizations are not. Judging from the magnitude of investment in the 1955-1956 "defense" allocations,<sup>4</sup> little beyond ordinary military construction (airfields, barracks, etc.) was included then. Coverage may have changed in recent years. Unfortunately, data on military investment since 1956 are not available.<sup>5</sup> This is but one of the loose ends that must remain untied.

Outlays on the internal security forces are financed from a separate budget category, but there is some uncertainty as to whether

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<sup>1</sup>With the exception of space research, the listed items, beginning with pay and subsistence, make up the category of "national defense" in the U.S. federal budget.

<sup>2</sup>Abram Bergson, The Real National Income of Soviet Russia Since 1928, The RAND Corporation, R-367-PR, October 1961; also Cambridge, Massachusetts, Harvard University Press, 1961, p. 23. (Hereafter this study is cited as Real SNIP.)

<sup>3</sup>Allakhverdian, p. 311.

<sup>4</sup>Investment grants from the budget for activities other than "national economy," "social-cultural measures," and "administration," came to 506.3 million rubles in 1955 and 408.8 millions in 1956. Finansy i sotsialisticheskoe stroitel'stvo, Moscow, Gosfinizdat 1957, p. 349. Excluding outlays on loan service and grants to investment banks, which are assumed to include no investment component, the only expenditure categories applicable to the investment allocations cited are "defense," internal security, and an unspecified residual.

<sup>5</sup>See Appendix A.

grants to these forces for construction originate there or from the category "national economy."<sup>1</sup>

Thus, the Soviet source's description of the composition of "defense" indicates the omission of important elements of military expenditures. Juxtaposition of announced "defense" outlays and estimates of several major outlay components confirms that general conclusion and suggests additional omissions. For 1959/1960 we may estimate outlays on military pay and subsistence as an average 3.8 billion rubles and those on operation and maintenance as 1.9-3.8 billions;<sup>2</sup> military construction, based on the estimates for 1955-1956, is assumed to have been in the range 0.5-1.5 billion rubles. Subtraction of the sum of these component estimates, 6.2-9.1 billion rubles, from total "defense" expenditures of 9.3 billions leaves a residual of 0.2-3.1 billion rubles, which should cover procurement. However, a crude estimate of the gross output of armaments in 1959 suggests a level of munitions procurement in 1959/1960 of roughly 5 billion rubles.<sup>3</sup> Is procurement only partly financed by the "defense" appropriation?

To sum up, not all military outlays are encompassed by "defense" expenditures, but precisely what is included and what is excluded seems in doubt. As a working hypothesis it is assumed that "defense" consists of military pay and subsistence, operations and maintenance, military construction and at least part of procurement, and excludes the bulk of investment in the armaments industry.<sup>4</sup> In addition, an

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<sup>1</sup>SNIP 1940-1948, p. 199, and Real SNIP, p. 361.

<sup>2</sup>For pay and subsistence, see Appendix Table D-1. Expenditures on operation and maintenance are assumed to be between 50 and 100 per cent as large as outlays on pay and subsistence (the corresponding relation in the U.S. federal budget is about 90 per cent in recent years, as indicated in the Appendixes to the annual budget messages).

<sup>3</sup>See below, pp. 45-47, 49. A lag of six months is assumed between production and procurement.

<sup>4</sup>Presumably financed by investment grants in the budget allocation to "industry and construction" under the "national economy."

Nonmilitary expenditures included in defense are ignored in this study, but it should be noted that the armed forces have been used

estimate of total military outlays should include military R&D, stockpiling, nuclear energy development, and civil defense.<sup>1</sup> Given the close ties between Soviet military rocketry and space exploration, the latter might also be included in military expenditures.

EXPENDITURE RESIDUALS: CONCEALED MILITARY OUTLAYS?

There are grounds for believing that military R&D is in large part financed through the appropriation to "science," perhaps also through the allocation to "institutions of higher education,"<sup>2</sup> both of which are subclasses of the major budget heading "social-cultural measures." We shall return to this subject in Section III.

To some observers,<sup>3</sup> the persistence and growth of large and unexplained residuals of budget expenditures have suggested possible additional concealment of military outlays. The residuals that have drawn attention are the budgetary expenditure residual, the residual obtained by subtracting all known outlays from total budget outlays; the national economy residual, unidentified outlays in the expenditure category "national economy;" and the industry and construction residual, obtained by deducting all known components from the allocation to "industry and construction."

Estimates of these residuals, hereafter designated as the BE, NE, and IC residuals, appear in Table 1 (item 6.C), Table 2 (item 8.B), and Table 3 (item 4). Entries are shown only through 1962, since

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in civilian employments. See Roman Kolkowicz, The Use of Soviet Military Labor in the Civilian Economy, The RAND Corporation, RM-3360-PR, November 1962.

<sup>1</sup>To the extent that foreign military aid represents a drawing down of stocks of "mothballed" or obsolescent equipment, it is of little interest in a national income context.

<sup>2</sup>Nancy Nimitz, Soviet Expenditures on Scientific Research Since 1928, The RAND Corporation, RM-3384-PR, January 1963, pp. 12-14.

<sup>3</sup>CIA, The Soviet Budget for 1961, June 1961, Appendix B; and The Soviet Budget for 1962, November 1962, Appendix A; J. G. Godaire, "The Claim of the Soviet Military Establishment," U.S. Congress, Joint Economic Committee, Dimensions of Soviet Economic Power, Washington, D.C., 1962, pp. 36-38.

Table 2

USSR STATE BUDGET OUTLAYS ON THE NATIONAL  
ECONOMY, BY BRANCH, 1955-1962  
(billion rubles)

	1955	1956	1957	1958	1959	1960	Plan	
							1961	1962
1. Industry and construction	10.95	12.75	13.08	13.67	14.88	15.59	16.1	14.8
2. Agriculture	1.77	1.65	2.36	2.59	3.41	4.35	4.2	5.1
3. MTS-RTS	3.32	3.27	2.83	1.41	.11	.07		
4. Foreign and domestic trade <sup>a</sup>	1.07	1.22	1.73	2.03	3.21	3.59		
5. Transportation and communication	1.94	2.16	2.26	2.41	2.69	2.81	2.7	2.5
6. Housing and communal economy	.90	1.13	1.52	1.90	2.75	3.21	3.6	3.8
7. Agricultural procurement	.76	.64	.60	.60	.60	.60	.6	.6
8. Other outlays								
A. Accounting subsidies to procurement	1.00	.90	1.10	3.40	2.00	1.50	1.0	1.0
B. Unidentified	1.60	.80	1.22	1.02	2.72	2.40	4.1	3.5
C. Total	2.60	1.70	2.32	4.42	4.72	3.90	5.1	4.5
9. Total, national economy	23.31	24.52	26.70	29.03	32.37	34.12	33.9	32.5

Note:

<sup>a</sup>Figures through 1960 include subsidy for accounting losses on exports.

Sources:

All entries for 1955-1960, except items 7 and 8, are taken from Gos. biudzheta, p. 18. Sources for the other figures are:

1. Industry and construction
2. Agriculture
3. MTS-RTS
5. Transportation-communication
6. Housing and communal economy
9. Total national economy

1961 plan (except transportation-communication): V. Garbuzov, "Finansevaia sistema pered novymi zadachami," Finansy SSSR, 1961, No. 1,



Sources to Table 2 (continued)

p. 14. Transportation-communication, 1961 plan: estimated by interpolation between 1960 and 1962 plan. 1962 plan: V. Lavrov, "Gosudarstvennyi biudzhët -- vazhnoe orudie planovogo rukovodstva," Planovoe khoziaistvo, 1962, No. 2, p. 46.

4. Foreign and domestic trade

Data for 1955-1960 in Gos. biudzhët are identified only as "trade." However, a comparison of the 1955-1956 figures from this source with data for the same years from other sources (see SNIP 1956-1958, p. 113) shows that the cited "trade" figures for 1955-1960 include foreign trade. The magnitude of the foreign trade portion of the combined outlay in 1955-1956 also shows that the allocation must include the subsidy on exports necessitated by the difference between internal prices at which export commodities were acquired and the foreign trade prices at which they were sold. The devaluation of the ruble in 1961 presumably eliminated the need for this accounting subsidy.

1962 plan allocations to trade and procurement were 1.7 billion rubles (Lavrov, p. 46) and the procurement appropriation in 1962 plan is estimated as .5 billion rubles (see below); 1961 plan is estimated by deducting 1.95 billion rubles from the 1960 realized trade figure of 3.59 billion rubles. The figure of 1.95 billion rubles represents the estimated size of the accounting subsidy to foreign trade organizations which was presumably eliminated by the 1961 currency reform (CIA, The Soviet Budget for 1961, June 1961, pp. 3, 21).

7. Agricultural procurement

1955-1956: Finansy i sotsialisticheskoe stroitel'stvo, p. 349. 1957-1962: assumed constant at .6 billion rubles, given 1956 value and a 1963 plan estimate of .6 billion rubles. The latter is obtained as follows: 1963 planned expenditures from all sources on state agriculture and procurement were stated to be 9.7 billion rubles; the state agricultural component of this sum was 17.8 per cent greater than the 1962 plan level. Since the 1962 plan figure for state agricultural expenditures from all sources was 7.6 billion rubles (Lavrov, p. 46), the comparable 1963 plan figure is 9.0 billion rubles. Therefore, 1963 plan expenditures on procurement from all sources is .7 billion, of which .6 billion is estimated as budget-financed.

8. Other outlays

A. Accounting subsidies to procurement. 1955: estimated from discussion in SNIP 1956-1958, pp. 90-91. 1956-1958: ibid., p. 90. 1959-1962 plan: my forthcoming, Soviet National Income and Product 1959-1962.

Table 3

USSR STATE BUDGET OUTFLOWS ON INDUSTRY AND CONSTRUCTION,  
BY TYPE OF OUTLAY, 1955-1962  
(billion rubles)

	1955	1956	1957	1958	1959	1960	1961	1962
1. Fixed capital investment	7.28	8.00	8.52	9.18	9.67	10.40	10.6	11.0
2. Increase of working capital	.39	.18	.32	.31	.17	.40	.4	.4
3. Current outlays of project design organizations	.45	.48	.50	.51	.56	.10	.1	.1
4. Other	2.83	4.09	3.74	3.67	4.48	4.69	5.0	3.3
5. Total, industry and construction	10.95	12.75	13.08	13.67	14.88	15.59	16.1	14.8

Sources:

1. Fixed capital investment

1955-1960: CIA, The Soviet Budget for 1962, November 1962, p. 24. 1961-1962: estimated from reported state-cooperative investment in industry and construction at estimate prices (N.kh. 1961, pp. 542-543, and N.kh. 1962, p. 435). (That construction is included in the cited estimate-price data is clear from comparison of pp. 542-543 with 544-545 in N.kh. 1961.) These data may be compared with the budget allocations as follows (billion rubles):

	<u>Budget Allocation</u>	<u>Estimate-price Data</u>
1956	8.00	9.43
1957	8.52	9.92
1958	9.18	11.21
1959	9.67	12.91
1960	10.40	14.29
1961	..	14.90
1962	..	15.72

The two sets of values differ on account of investment by cooperatives, state investment from other than budget funds, and differences between current and estimate prices. In every interval but that from 1956-1957, the estimate price data grow much more rapidly than do the budget data. It is assumed that the direction of the difference is the same in 1961-1962. The size of the estimated margin is, of course, arbitrary.

Sources to Table 3 (continued)

2. Increase of working capital

1955-1960: CIA, The Soviet Budget for 1962, p. 24. 1961-1962: assumed constant at the 1960 level.

3. Current outlays of project design organizations

1955-1960: TsSU, Kapital'noe stroitel'stvo v SSSR, Moscow, Gosstatizdat, 1961, p. 270. After 1959 these organizations went on a khozaschet basis and financed the bulk of their operations from fees paid by construction organizations. The source of these fees would be investment funds. A. F. Milykh and F. N. Nazarov, Planirovanie proektno-izyskatel'skikh rabot v stroitel'stve, Moscow, Gosplanizdat, 1961, p. 16. The magnitude of current outlays of these organizations still subsidized by the budget is unknown but must be small. A figure of .1 billion rubles is set as a notional allowance in 1960-1962.

4. Total, industry and construction

1955-1962: Table 2. 1961-1962 realized figures are assumed equal to planned values.

information relating to budget expenditures in 1963-1964 is still meager.<sup>1</sup> The estimates of the residuals shown in Tables 1 and 2 are subject to a margin of error, since in each case the item immediately preceding is also an estimate rather than an official datum.<sup>2</sup> The estimates of accounting subsidies to procurement may be particularly shaky, as are all the 1961-1962 component values in Table 3.

The values of the budget residuals in the period 1955-1962 are shown separately in Table 4 along with the sum of the residuals in absolute values and index form. A range of values is provided for 1961 and 1962 entries in the NE, IC, and sum-of-residuals columns, in recognition of the fact that the indicated residuals are entirely or largely based on plan, rather than realized data. A comparison of planned and actual remainders in the "national economy" breakdown in the period 1956-1960, shown in Table 5, does not seem promising as a basis for estimating realized values in 1961-1962.

The sharp increase between plan and fulfillment in the 1958 figures in column (3) of Table 5 must be due largely to the unforeseen price increases for agricultural products decreed in the middle of 1958, which resulted in the need for substantial subsidies to procurement organizations. However, even with this development taken into account, it is difficult to see any tendency for the planned remainders (values in column 3) to move in the same direction as the realized remainders: their movements are in opposite directions between 1956 and 1957 and again between 1959 and 1960. If the realized value of procurement subsidies in 1958 is added to the planned remainder, the conclusion would hold true for 1958-1959 as well. A factor possibly contributing to this confusing situation is that the planned budget includes a contingency fund, the "Reserve Fund of the Council of Ministers," constituting a line item separate from the "national economy," which in the

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<sup>1</sup>See below, pp. 52-54.

<sup>2</sup>In Table 2 this is true also of "agricultural procurement" in 1957-1960, but the margin of error on these entries is probably negligible.

Table 4

THE USSR BUDGET RESIDUALS, 1955-1962

	Billion Rubles			Sum of Three Residuals	
	BE	NE	IC	Billion Rubles	Index, 1958=100
1955	.65	1.60	2.83	5.08	87.7
1956	.95	.80	4.09	5.84	100.9
1957	.93	1.22	3.74	5.89	101.7
1958	1.10	1.02	3.67	5.79	100.0
1959	1.88	2.72	4.48	9.08	156.8
1960	1.08	2.40	4.69	8.17	141.1
1961	1.0	2.1-6.2	2.5-7.5	5.6-14.7	96.6-253.4
1962	.5	1.8-5.3	1.7-5.0	4.0-10.8	69.0-186.2

Sources:

Excepting 1961-1962 values of NE and IC residuals, individual residual figures are taken directly from Table 1, item 6.C, Table 2, item 8.B, Table 3, item 4. The ranges shown for the NE and IC residuals in 1961-1962 represent allowances for errors of plus or minus 50 per cent in the figures shown for these years in Tables 2 and 3. For justification of this procedure, see text, pp. 18, 21.

Table 5  
 "OTHER OUTLAYS" ON THE NATIONAL ECONOMY,  
 PLANNED AND REALIZED, 1956-1962  
 (billion rubles)

		<u>Subsidies to</u> <u>Procurement</u> (1)	<u>NE</u> <u>Residual</u> (2)	<u>Sum of (1) + (2)</u> (3)
1956	Plan	..	..	2.70
	Realized	.90	.80	1.70
1957	Plan	..	..	1.69
	Realized	1.10	1.22	2.32
1958	Plan	..	..	1.11
	Realized	3.40	1.02	4.42
1959	Plan	..	..	4.27
	Realized	2.00	2.72	4.72
1960	Plan	..	..	4.84
	Realized	1.50	2.40	3.90
1961	Plan	..	..	5.1
1962	Plan	..	..	4.5

Sources:

1956-1960 realized and 1961 plan-1962 plan figures are from Table 2. Other entries were computed on the basis of (a) officially reported total "national economy" outlays, (b) component values for industry-construction, agriculture, transportation-communication (cited in CIA, The Soviet Budget for 1961, June 1961, p. 18), and (c) plan values for trade, procurement (net of subsidies), and housing-communal expenditures, assumed equal to the realized values shown in Table 2.

course of the budget year is usually expended on elements of the "national economy" category.

Total realized expenditures on the "national economy" were 1.3 billion rubles less than plan in 1961 and 3.7 billion rubles more than plan in 1962.<sup>1</sup> For these reasons, it seems necessary to express the NE and IC residuals in 1961 and 1962 as ranges rather than as single numbers. The ranges shown in Table 4 reflect an assumed margin of error on the original figures in Tables 2 and 3 of plus or minus 50 per cent.

Up through 1960, the sum of the three residuals in Table 4 varies in the range 5-9 billion rubles; growth is relatively slow until 1959, when the residual sum increases by more than half, falling back in 1960, but to a level still sharply higher than in 1958. It is, of course, difficult to describe the 1961-1962 changes. A drop in 1962 compared with 1961 is indicated by both the lower and upper figures of the ranges, but they are equally compatible with an increase in 1962.

The pattern of the BE residual is marked by three departures from general stability. Between 1956 and 1961 the BE residual averaged one billion rubles, with the exception of a sharp jump in 1959. In 1962 the residual dropped 50 per cent from the billion ruble level, below even the 1955 mark. Of course, the pattern described depends on the assumption of constancy in the level of internal security outlays.

In contrast, the NE residual fluctuates more sharply. In both residuals there is a spurt upward in 1959 followed by a decline in 1960. However, the 1961-1962 plan level of the NE residual is considerably greater than the 1959-1960 figures; the contrary is true of the BE residual. The NE residual has drawn considerable interest on the assumption that additions to the state reserves are financed here. The state reserves may have a significant military component.<sup>2</sup>

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<sup>1</sup>Cf. Table 2 and N.kh. 1962, p. 635.

<sup>2</sup>On the state reserves, see below, pp. 55 ff.

If the IC residual conceals military outlays, it probably conceals a number of items that have little or nothing to do with military outlays -- some minor R&D expenditure, costs of starting up new enterprises and of "mastering" new types of output, and subsidies to enterprises on current account.<sup>1</sup>

One or more of the three budget residuals may be the means of financing part or all of nuclear energy activities. Both the military and nonmilitary nuclear energy programs are administered outside of the "defense" establishment and probably are separately financed as well. Nuclear energy activities of a military nature are thought to be the true function of the State Committee (formerly Ministry) for Medium Machinebuilding, whereas the rest of the program would be assigned to the State Committee for Utilization of Atomic Energy.<sup>2</sup> Both of these organs are now subordinate to the Supreme Council of the National Economy.<sup>3</sup> However, it is not inconceivable that the R&D portion of the nuclear energy budget is channeled through the appropriation to "science," and procurement of nuclear weapons may be financed separately from the general expenditures of the agencies mentioned.

After "national economy," and what has been labelled the "budget expenditure residual," the other possible repository in the budget of secreted military expenditures is "social-cultural measures." However, apart from outlays on "science" and "institutions of higher

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<sup>1</sup>The size of these budget subsidies is difficult to estimate because of uncertainty on the "grossness" or "netness" of reported profits of state enterprises. Compare the position of SNIP 1956-1958, pp. 73-81, 90-91, with that of CIA, The 1960 Soviet Budget, pp. 27, 49-53; and The Soviet Budget for 1961, pp. 24-25.

<sup>2</sup>Arnold Kramish, Atomic Energy in the Soviet Union, Stanford, Stanford University Press, 1959, pp. 176-179.

<sup>3</sup>Ekonomicheskaja gazeta, January 4, 1964, p. 34. According to this source, it is interesting to note that the chairman of the State Committee for Medium Machinebuilding has the rank of Minister of the USSR, but the chairman of the State Committee for Utilization of Atomic Energy does not.



education," the category of social-cultural measures has not been regarded as a likely hiding place, probably because the available statistical breakdowns are detailed and relatively exhaustive. Thus, total outlays on "social-cultural measures" are fully distributed among "education," "health protection," "physical culture," "social assistance," "social insurance," and "state aid to mothers." In "education," exhaustive first order distributions by program are available for three of the six subclasses (all of which are identified) -- "general education...", "cultural-educational operations," and "preparation of cadres." The fourth subclass, "science," is discussed in Section III. No breakdown of the fifth subclass, "press," is available, but it accounts for less than 100 million rubles annually. The sixth category, "art and broadcasting," is not much larger, and roughly half the outlays are accounted for by expenditures on "theatres." Similarly, outlays on "physical culture" are insignificant, and the distributions of "social assistance" and "social insurance" are reasonably detailed.<sup>1</sup>

However, one of the components of "social-cultural measures," "health protection," does have a sizable volume of unidentified expenditures in several years.<sup>2</sup> From 1950 through 1953, the unidentified program expenditures varied between 150 and 180 million rubles and 7-9 per cent of all outlays on "health protection." In 1954, the volume of unidentified expenditures suddenly increased to 522 million rubles and 18.4 per cent of the total. The numbers in 1955-1957 were:

	<u>Million Rubles</u>	<u>Per Cent of All "Health Protection"</u>
1955	517	16.9
1956	555	15.9
1957	566	15.0

<sup>1</sup>Ministerstvo finansov SSSR, biudzhethnoe upravlenie, Raskhody na sotsial'no-kul'turnye meropriiatiia po gosudarstvennomu biudzhetu SSSR, Moscow, Gosfinizdat, 1958 (hereafter abbreviated to Raskhody na sots.kul't.), pp. 5-6, 10, 13-14, 17, 19, 43-44; Gos.biudzheth, pp. 18-19, 21-23; N.kh. 1962, pp. 637-639.

<sup>2</sup>Raskhody na sots.kul't., p. 61.

It is of some interest that the unidentified programs are overwhelmingly financed by the Union budget rather than the budgets of the republics (unidentified program outlays in the Union budget in 1954-1957 were over 400 million rubles). Financing by the Union budget indicates that the programs are of more central significance than financing by republican budgets. Conceivably, the sharp increase in the unidentified "health" residual in the Union budget reflects a transfer of military medical outlays from "defense" to "health." Up until 1940 at least, military medical outlays were not part of "health" but presumably included in "defense."<sup>1</sup> Whether there were any changes in this situation between 1940 and 1953 is not known. At any rate the decline in the absolute size of the Union budget residual, from 444 million rubles in 1954 to 412 million in 1957, is consistent with the hypothesis that military outlays are concealed here, considering the substantial reduction in the size of the armed forces that took place in this period.

Unfortunately, distributions of "health" expenditures are not available for years beyond 1957. No attempt will be made to estimate the breakdown for later years, but in the estimates of total military outlays set out in Section III, allowance will be made for the possible concealment of military medical expenditures in the "health" budget.

Except for outlays connected with the operations of foreign trade organizations, no account has yet been taken of budget expenditures on foreign economic relations. Do they account for a substantial portion of the residuals? These outlays are not identified in our budget distributions simply because of the almost complete absence of accurate information. The USSR does not release balance of payments data except for statistics on merchandise trade, valued in foreign trade rubles. Marcello Caiola of the International Monetary Fund has made the most extensive attempt at an independent calculation

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<sup>1</sup>K. N. Plotnikov, Ocherki istorii biudzheta sovetskogo gosudarstva, Moscow, Gosfinizdat, 1959, p. 266.

in the West; and it is, by his own ready admission, both incomplete and flawed by probable double counting.<sup>1</sup>

Excluding debits in the balance that may be reasonably assumed to be either self-financed or covered by outlays on foreign trade corporations (already identified in Table 2), entries in Caiola's accounts that seem relevant to our breakdown of budget expenditures are as follows (million U.S. dollars):<sup>2</sup>

	<u>1955</u>	<u>1956</u>	<u>1957</u>	<u>1958</u>	<u>1959</u>	<u>1960</u>
Military aid	-	313	16	-	120	11
Expenditures on international fairs	11	11	11	61	?	?
Maintenance of Soviet Army in East Germany <sup>3</sup>	-	-	360	439	?	?
Interest paid on loans received	?	?	?	?	9	8
Contributions to UN	11	13	14	15	18	15
Economic and technical assistance loans and grants	285	563	727	553	307	337
Repayments of principal on loans received	?	?	?	?	13	20
Payments to Austria	<u>?</u>	<u>?</u>	<u>?</u>	<u>?</u>	<u>9</u>	<u>10</u>
Total	307	900	1128	1068	476	401

In a paper prepared for the Joint Economic Committee of the U.S. Congress, two observers estimate the level of drawings against

<sup>1</sup>Marcello Caiola, "Balance of Payments of the U.S.S.R., 1955-1958," International Monetary Fund Staff Papers, Vol. IX, No. 1, March 1962, pp. 1-36, and "Balance of Payments of the U.S.S.R., 1959-1960," ibid., Vol. X, No. 2, July 1963, pp. 321-344.

<sup>2</sup>A dash indicates explicit zero estimate; a question mark, no reference in the source.

<sup>3</sup>Until 1957 East Germany bore the cost of maintaining Soviet troops on its territory. The cost was shared in 1957-1958 and was supposed to borne entirely by the USSR thereafter.

long-term Soviet loans to non-bloc underdeveloped countries as "probably exceeding" \$200 million in 1961.<sup>1</sup> Recent CIA estimates<sup>2</sup> indicate that (a) Soviet payments of principal and interest on past borrowing "left only a small net balance in 1963" after taking account of about \$300 million in new medium term credits obtained from the West annually in 1962-1963; (b) drawings against Soviet credits to less-developed nations "have continued to increase, approaching \$400 million in 1963 (exclusive of drawings against military credits)."

The interpretation of these data in the present context is hazardous, not only because of the unavoidable crudity of some of the estimates cited, but also because of the assumptions required to be made here. In particular, it is assumed that payments made and received by the USSR are reflected in gross in budget expenditures and revenues, respectively, rather than as offsets on one or the other side of the budget ledger.<sup>3</sup> Second, for simplification, it is assumed that each dollar of payments is equivalent in terms of ruble expenditure by the budget. This is unlikely, because of the arbitrariness of Soviet exchange rates and because payments obligations are incurred in both ruble and non-ruble terms. Hopefully, the biases introduced on the last assumption are not all in one direction.

One additional CIA estimate is important for the present exercise. The CIA press release estimates "recent" annual gold production in the USSR as about \$150-\$175 million and declares that this production "is very high cost even by Soviet standards." Since Gosbank controls all

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<sup>1</sup>Mark J. Garrison and Morris H. Crawford, "Soviet Trade with the Free World in 1961," U.S. Congress, Joint Economic Committee, Dimensions of Soviet Economic Power, Washington, D.C., 1962, p. 454.

<sup>2</sup>Press release dated January 9, 1964 (hereafter referred to as "CIA press release").

<sup>3</sup>"Payments made" is shorthand and intended to include exports not covered by normal trade returns -- specifically, military aid. It is intended to exclude gold exports, assumed to appear directly or indirectly as a revenue in the Soviet budget. Although crude, the assumption introduces a bias in the desired direction -- that is, increasing the value of outlays to be subtracted from the budget residuals, hence to limit the estimated domestic military component of the residuals.

gold and foreign exchange dealings, it seems likely that it is the agency procuring domestically produced gold. Presumably, any excess of domestic cost over sale price (valued at the official exchange rate) would be borne by the budget.

To complete the calculation of budgetary outlays connected with the balance of payments, the following assumptions are made: (a) The average cost of production of gold in the USSR is equivalent to \$100 an ounce, compared with the world price of \$35. Then annual production of \$150-\$175 million would require budget subsidies of about 100 million rubles, based on the official exchange rate of 90 kopeks to the dollar. (b) The CIA means to imply by "small net balance" \$100 million or less. Then repayments on foreign debt in 1963 would have amounted to at least \$200 million, or 180 million rubles at the current rate. Given Caiola's estimates for 1959-1960, foreign debt service in 1961 and 1962 is estimated as 50 million and 100 million rubles, respectively. (c) Drawings against Soviet nonmilitary credits were \$375 million in 1963. Whether effected by purchases of Soviet goods, or by exchange transfers, drawings against loans are assumed to require budget outlays over and above those on foreign trade corporations. Given Caiola's estimates for 1959-1960 and Garrison and Crawford's estimate for 1961 (underdeveloped countries only), drawings of 250 million rubles are assumed for 1961 and 300 million rubles are assumed for 1962. (d) Budget outlays on support of Soviet armed forces in East Germany are assumed constant in 1959-1962 at a level of 500 million rubles.<sup>1</sup>

Caiola's dollar estimates are converted to a ruble basis at the current rate of exchange, and the sum of these and the additional estimates developed above is as follows (million rubles):

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<sup>1</sup>It seems not unlikely that even before 1957 outlays on Soviet forces in East Germany were part of the "defense" appropriation, with East German contributions appearing on the revenue side of the budget. If that is the case, it is more likely that the accounting of these outlays remained unchanged after 1957. Thus, allowance here for these outlays may well involve double counting. Again, the bias is in the "right" direction.

	<u>1955</u>	<u>1956</u>	<u>1957</u>	<u>1958</u>	<u>1959</u>	<u>1960</u>	<u>1961</u>	<u>1962</u>
Caiola data	276	810	1015	961	428	361		
Maintenance of Soviet troops in East Germany, 1959-1962					500	500	500	500
Subsidies on account of domestic gold procurement	100	100	100	100	100	100	100	100
Servicing Soviet debt, 1961-1962							50	100
Drawings against Soviet credits, 1961-1962							<u>250</u>	<u>300</u>
Total	376	910	1115	1061	1028	961	900	1000

These are admittedly impressionistic calculations. If at all reasonable -- and considering the known overstatements, it seems difficult to believe that the numbers are serious underestimates -- they suggest that little more than a billion rubles of the residuals can be ascribed to expenditures on foreign account.

#### RESIDUALS DURING WORLD WAR II

So far the discussion of residuals and concealment has been concerned exclusively with the period since 1955. For precedents to aid in the interpretation of the post-1955 data we may turn to the period of World War II, from prelude to aftermath. Table 6 shows the budget residuals in absolute values and as a per cent of both "defense" and total budget expenditures in 1937, 1940, 1944, and 1948. For comparison, data for 1955 and 1959 are also included.

It is necessary to bear in mind that for 1937-1948 (a) the BE residual includes grants to investment banks; (b) the NE residual may include some subsidies (other than for industry, agriculture, transportation and communication, trade, communal economy and housing); (c) the IC residual excludes subsidies. The effect of (c), of course, is to counterbalance the overstatement of the residuals occasioned by (a) and (b). Also, because subsidies to industry were relatively less

Table 6

THE USSR BUDGET RESIDUALS, 1937-1959,  
SELECTED YEARS

	Absolute Values, Billion Rubles			Total, Three Residuals, as Per Cent of		
	BE	NE	IC	Total, Three Residuals	"Defense"	Total Budget Expenditures
1937	.35	.31	.18	.84	48.0	7.9
1940	.17	.57	.74	1.48	26.1	8.5
1944	.40	.43	.60	1.43	10.4	5.4
1948	.70	.92	1.18	2.80	42.2	7.5
1955	.65	1.60	2.83	5.08	47.3	9.4
1959	1.88	2.72	4.48	9.08	96.9	12.9

Sources:

1937-1948: Appendix B.

1955, 1959: Tables 1 and 4.

important after 1955 than in 1937-1948, the exclusion of subsidies from the IC residual in the earlier period makes for greater comparability over the entire two decades.

Between 1937 and 1940, the sum of the residuals increased 86 per cent. Apparently, little or no change occurred during the war, although after the succeeding four years the sum was 90 per cent larger than in 1940. Of course, these values are expressed at current prices, and a considerable price inflation did take place between 1937 and 1948, especially after 1940. The extensive increase in the sum of the residuals between 1948 and 1955 and again in 1959 occurred, according to official claims, at relatively the same level of producers' goods prices.<sup>1</sup> Then, the "real" growth in the sum of residuals between 1937 and 1948 is considerably less than indicated in Table 6. By the same token, the rapidity of the increase in the following decade is understated relative to the change in the earlier period.

Comparing the growth of the residuals with that of "defense" outlays we see that the former increased less rapidly than did the latter between 1937 and 1944, but that the trend was reversed in the period after 1944.<sup>2</sup> The sum of the residuals accounts for roughly the same share of total budget expenditures, 8-9 per cent, in all years except 1944 and 1959; the trough was reached in 1944 and the peak in 1959.<sup>3</sup>

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<sup>1</sup>It has been officially claimed that wholesale prices of producers' goods were raised but 58 per cent on 1 January 1949, and that substantial reductions in 1950 and again in 1952 left the producers' goods price level only 7 per cent higher than in 1948. A further reduction took place in 1955. (N.kh. 1962, pp. 145-146.) However, the careful calculations of Bergson, Bernaut, and Turgeon indicate that basic industrial goods prices more than doubled in 1949 and that prices of these goods in 1952 were still 84 per cent higher than in 1952. Moorsteen's index of civilian machinery prices also shows a doubling in 1949 over the previous year's level, and the 1952 index number is 27 per cent greater than in 1948. (Real SNIP, pp. 367-368.)

<sup>2</sup>The ratio of the residual sum to "defense" increased each year in 1955-1957, declined slightly in 1958 and again in 1960 from the 1959 peak.

<sup>3</sup>The residual climbed to 10.4 per cent of total expenditures in 1956, declined to 9.0 by 1958 and after the peak in 1959 dropped in 1960 to 11.2 per cent.



If the Soviet government were attempting to conceal military outlays in order to demonstrate a pacific stance, one would expect to find the pattern emerging in Table 6 -- the residuals declining as a per cent of "defense" expenditures when war broke out and increasing after the war's end. On the other hand, the observed pattern may simply reflect the declining importance of innocuous civilian expenditures in a period of mobilization and war and the resumption of their priority claim during demobilization and "peace." A recent authoritative source supplies two additional figures with the aid of which we may explore these hypotheses. It has been revealed that the value of gross output of military industry in 1940 was 2.4 billion and in 1944, 7.40 billion (new) rubles at "1926/27 prices."<sup>1</sup> According to the 1941 plan, the value at current prices of the projected volume of "marketed"<sup>2</sup> output of the four commissariats of military industry was to be 26 per cent larger than the corresponding gross output value at 1926/27 prices.<sup>3</sup> If the relation held true in 1940 and 1944, the "marketed" output of military industry at current prices would have been 3.0 billion rubles in 1940 and 9.3 billion rubles in 1944. We may consider these figures to be approximations to military procurement,<sup>4</sup> and we now subtract them as well as estimates

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<sup>1</sup>Institut Marksizma-Leninizma pri TsK KPSS, otdel istorii velikoi otechestvennoi voiny, Istoriia velikoi otechestvennoi voiny Sovetskogo Soiuzia 1941-1945, Tom piaty, Moscow, Voennoe izdatel'stvo Ministerstva oborony Soiuzia SSR, 1963, p. 427.

<sup>2</sup>"Marketed output" seems a particularly bad rendering for tovarnaia produktsia when applied to military output. The term refers roughly to the part of gross output that is earmarked for extra-enterprise distribution or that has already been shipped out. TsSU, Slovar'-spravochnik po sotsial'no-ekonomicheskoi statistike, Moscow, Gosplanizdat, 1944, p. 64.

<sup>3</sup>Gosudarstvennyi plan razvitiia narodnogo khoziaistva SSSR na 1941 god (Prilozheniia k Postanovleniiu SNK SSSR i TsK VKP(b) No. 127 ot 17 ianvaria 1941 g.), American Council of Learned Societies Reprints, No. 30, n.p., Universal Press, n.d., pp. 9, 11.

<sup>4</sup>Procurement of armaments was probably smaller in both years, allowing for any lag between production and procurement, nonarmaments produced by military industry, and (for 1944) cost reduction in arms factories. On the other hand, the military undoubtedly procured supplies and equipment originating in nonmilitary industrial enterprises.

of pay and subsistence<sup>1</sup> from total "defense" expenditures (billion rubles):

	<u>1940</u>	<u>1944</u>
Total "defense"	5.68	13.78
Less: pay and subsistence	1.07	3.99
Less: military procurement	3.0	9.3
Equals: other "defense"	1.6	.5

If the estimated figures are not too far off the mark,<sup>2</sup> the calculation does not lend strong support to the hypothesis that (a) the budget residuals in 1940 and 1944 concealed military outlays and (b) the change in these residuals relative to the change in total "defense" between 1940 and 1944 is explained by the logic of concealment for propaganda purposes. The difficulty is that the budget residuals hardly changed in that interval. Consider the following alternative interpretations of the change in "other 'defense'":

1. The scope of "defense" changed in that "other 'defense'" was included in 1940 but excluded in 1944. Unless "other 'defense'" behaved in a radically different manner than did outlays in manpower and procurement, the implication is that to account for all military

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<sup>1</sup>Real SNIP, p. 364.

<sup>2</sup>A very rough check on the estimated levels of procurement may be derived from data provided by N. Voznesenskii, Voennaia ekonomika SSSR v period otechestvennoi voyny, Moscow, OGIz, 1948, pp. 65-67. Voznesenskii declared that national income increased 13 per cent in 1943 over the previous year's mark whereas the corresponding increase in gross social product, which consists of national income plus "productive consumption," was 3.2 billion rubles. Since the relative share of productive consumption remained the same in 1943 as in 1942, implying an absolute increase, it is clear that national income increased by less than 3.2 billion rubles, hence that 1942 national income was less than 24 billion rubles. Assume that the true value was 20 billion. Voznesenskii also indicated that "military expenditures not including personal consumption of the troops" accounted for 29 per cent of national income in 1942 and 31 per cent in 1943. Ignoring price changes, the implied values of "military expenditures not including personal consumption of the troops" are 6 billion rubles in 1942 and 7 billion in 1943. Most likely, these figures represent largely procurement plus military construction. The Marxist nature of the national income account requires omission of payment for services.

outlays we have a much greater "need" for the residuals as concealments in 1944 than in 1940. But the sum of the residuals did not increase between these dates.

2. "Other 'defense'" is included in "defense" in both years. Then a part of military procurement in 1944 was financed outside of "defense." Whether one assumes that military procurement was wholly or only partly financed through the "defense" appropriation in 1940, a substantial increase in the sum of the residuals would seem to be required to assure an increase in "other 'defense'" consistent with a tripling of military procurement and an almost quadrupling of pay and subsistence allowances. In sum, the data of the 1930s and 1940s are ambiguous with respect to evidence of concealment of military outlays in the residuals.

#### CONCLUSIONS

There would seem to be three conclusions to be drawn from the evidence assembled on budget residuals: (a) There is little in the pattern of change of the individual residuals to suggest any basis for resolution of whether or not the residuals conceal military outlays. (b) The residuals include an unknown but clearly positive volume of nonmilitary expenditures. (c) From 1955 on, and especially in 1959-1960, the sum of the residuals is very large (10-15 per cent) relative to identified budget outlays. In view of the persistent reticence of Soviet sources concerning the composition of these expenditures, it can be assumed that at least some of the activities in question are of a sensitive nature. Outlays on international account fall short of exhausting the sum of the budget residuals. The other most likely category of expenditures that is both large and sensitive is military outlays. Tentatively, it is concluded that a significant share of the residuals represents concealed military outlays.

III. THE VALUE OF CONCEALED MILITARY OUTLAYS

TOTAL MILITARY OUTLAYS: AN ESTIMATED RANGE

A modification of the procedure outlined by Godaire<sup>1</sup> is used in Table 7 to attempt to derive a range of estimates of total military outlays by adding to "defense" outlays a share of expenditures on "science" and of the three budget outlay residuals. Given the assumed coverage of "defense,"<sup>2</sup> these additions are intended to cover expenditures on military R&D, stockpiling, nuclear energy,<sup>3</sup> and possibly part of procurements. Assuming that investment in armaments production is financed from the investment portion of the budget allocation to "industry and construction," it seems best to forbear from attempting to estimate this investment; it appears hopelessly difficult to break down available data for this purpose.

Nancy Nimitz has argued convincingly that (a) military research activities are included in reported outlays on "science," (b) military R&D must be largely supported by budget allocations to "science," (c) military R&D is to be found in outlays financed by the all-Union budget (as distinguished from the budget of the Union-Republics, the two summing to the total consolidated state budget).<sup>4</sup> On examination of a detailed breakdown by type of outlay of budget appropriations to "science," she discovered that although the sum of the expenditures listed (wages, investment, etc.) just about exhausted the total republican budget allocation, it failed to account for more than half of the total all-Union allocation. The unidentified all-Union outlays she inferred to be expenditures

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<sup>1</sup>Godairé, pp. 39-41.

<sup>2</sup>Above, p. 12.

<sup>3</sup>Expenditures on civil defense are omitted (except to the extent they appear in the IC residual) because they seem to be dispersed in the outlays of the numerous organizations and agencies -- farms, factories, municipalities, etc. -- that oversee these activities. Leon Gouré, Civil Defense in the Soviet Union, Berkeley and Los Angeles, University of California Press, 1962, pp. 36-37.

<sup>4</sup>Nimitz, Soviet Expenditures on Scientific Research, pp. 12-27.

of industrial research institutions, and she estimated that "outlays per scientist in all-Union industrial research increased by something on the order of 75 per cent...between 1955 and 1960." She concludes: "[The increase] is probably explained by a shift toward projects where investment and/or prototype and testing costs are extremely high. The type of evidence considered... does not permit us to estimate how much industrial research is addressed to defense problems. There can be little doubt, however, that defense research is concentrated in the industrial category, and must be largely responsible for the shift educed above."<sup>1</sup>

For the calculations in Table 7, military R&D outlays are assumed to be equal to the unidentified all-Union budget to outlays on "science." Clearly, the unidentified outlays include nonmilitary activities too. On the other hand, however, there are likely to be R&D activities of a military nature in research financed by enterprises or in budget appropriations to "higher educational institutions," which, in 1959-1960, amounted to 500-700 million rubles, or 40-50 per cent of the estimated unidentified all-Union "science" outlays.<sup>2</sup> Overstatement of military outlays involved in the use of the unidentified "science" expenditures in toto is assumed to be offset by omission of the military components of other R&D outlays.

Two series are developed for the military component of the budget residuals: to allow for civilian activities financed by the residuals, it is assumed that either one-quarter or three-quarters of the sum of the residuals in 1955 represented purely civilian activities. Thereafter, outlays on these civilian activities are assumed to have increased at the implied average annual rate of growth of total budget expenditures. Subtracting the assumed civilian outlays from the sum of the three residuals shown in

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<sup>1</sup>Ibid., p. 26.

<sup>2</sup>Ibid., p. 11, 41, 45.

Table 7

## EXPLICIT AND ESTIMATED USSR MILIT.

	1955	1956	1957	1958
	(billion rubl)			
1. "Defense" outlays	10.74	9.73	9.12	9.36
2. Estimated military component of other outlays				
A. "Science"	.45	.59	.81	1.00
B. Budget residuals				
(1) Low	1.27	1.79	1.59	1.23
(2) High	3.81	4.49	4.46	4.27
3. Estimated total military outlays				
A. Low	12.46	12.11	11.52	11.59
B. High	15.00	14.81	14.39	14.63
			<u>Indexes, 1958 = 1</u>	
4. "Defense" outlays	114.7	104.0	97.4	100.0
5. Estimated total military outlays				
A. Low	107.5	104.5	99.4	100.0
B. High	102.5	101.2	98.4	100.0

Table 7

## EXPLICIT AND ESTIMATED USSR MILITARY OUTLAYS, 1955-1962

	1955	1956	1957	1958	1959	1960	1961	1962
(billion rubles)								
1. "Defense" outlays	10.74	9.73	9.12	9.36	9.37	9.30	11.6	12.7
2. Estimated military component of other outlays								
A. "Science"	.45	.59	.81	1.00	1.17	1.40	1.6	1.8
B. Budget residuals								
(1) Low	1.27	1.79	1.59	1.23	4.23	3.02	.1-9.2	0-5.0
(2) High	3.81	4.49	4.46	4.27	7.46	6.45	3.8-12.9	2.1-8.9
3. Estimated total military outlays								
A. Low	12.46	12.11	11.52	11.59	14.77	13.72	13.3-22.4	14.5-19.5
B. High	15.00	14.81	14.39	14.63	18.00	17.15	17.0-26.1	16.6-23.4
<u>Indexes, 1958 = 100</u>								
4. "Defense" outlays	114.7	104.0	97.4	100.0	100.1	99.4	123.4	135.1
5. Estimated total military outlays								
A. Low	107.5	104.5	99.4	100.0	127.4	118.4	114.7-193.1	125.0-168.1
B. High	102.5	101.2	98.4	100.0	123.0	117.2	116.4-178.8	113.7-160.3

Table 7 (continued)

Sources:

1. "Defense" outlays: Table 1.
2. Estimated military components of other outlays.

A. "Science." Figures for 1955-1960 are taken directly from Nimitz, Soviet Expenditures on Scientific Research, p. 45 (Table 9, row 32, "unidentified outlays"). See above, p. 34-35 for discussion of this procedure. For 1961-1962, it is assumed that 60 per cent of total budget outlays on "science" are those that were unidentified in earlier years in the distribution cited; this is the relation observed in 1957, the last year for which a complete breakdown is available. For 1958-1960, Nimitz's estimates imply annual relations of 59, 58, and 60 per cent. Total budget outlays on science in 1961-1962 are given in N.kh. 1962, p. 638.

B. Budget residuals. The military components are portions of the sum of the three residuals (Table 4). The low estimate is obtained by assuming that 25 per cent of the sum of residuals in 1955 represented military outlays, the high estimate by assuming that the military share was 75 per cent. In each case, the non-military component of the residuals in 1956-1962 is expanded at the average annual rate of growth of total budget outlays in this period, 6.2 per cent. The remainder of the sum of residuals represents the estimate of the military component.



Table 4 yields the estimated military component of the residuals in a maximum and minimum series.<sup>1</sup>

Before commenting on the series developed in Table 7, it may be of interest to compare the estimate for 1955 with one by Professor Morris Bornstein of the University of Michigan for the same year. Bornstein's estimate is 14.46 billion rubles, compared with the range shown in Table 7 of 12.5-15.0 billions. The coverage of Bornstein's figure differs slightly from that shown in Table 7, for his estimate includes the pay and subsistence of the internal security forces (.77 billion rubles) and excludes military R&D (item 2.A, Table 7) as well as military pensions paid from the "defense" budget<sup>2</sup> (.20 billion rubles).<sup>3</sup> Adjusting his estimate for these differences in coverage lowers the figure to 14.43 billion rubles, towards the upper end of the range estimated in Table 7.

The correspondence of these estimates is perhaps more apparent than real. Bornstein's calculations were completed before the appearance of the authoritative Soviet statistical handbook on the budget.<sup>4</sup> This probably explains the large difference between the value of the NE residual shown in Table 4, 1.60 billion rubles, and his estimate of 3.24 billion rubles for "government current purchases for defense programs," obtained as a residual in an estimated distribution of budget expenditures on the national economy." Bornstein's estimate does not include elements of either the BE or IC residuals.

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<sup>1</sup>This also allows for concealed military medical expenditures. See above, pp. 22-24.

<sup>2</sup>On these military pensions, see Appendix Table C-3.

<sup>3</sup>Morris Bornstein and others, Soviet National Accounts for 1955, Center for Russian Studies, the University of Michigan, 1951, pp. 48, 50-52, 68. For a summary of these accounts, see Morris Bornstein, "Soviet National Income Accounts for 1955," Review of Economics and Statistics, Vol. XLIV, No. 4, November 1962, pp. 446-457.

<sup>4</sup>Gos. buidzhet (see sources to Table 1).

One more prefatory remark needs to be made: no adequate basis exists for an attempt to deflate the military expenditure series for price changes. It is known that the average wage in industry increased at a moderate pace in this period, approximately 3.3 per cent per year through 1961;<sup>1</sup> official claims have productivity rising at 7.5 per cent annually for industry as a whole and 8.8 per cent in machinebuilding;<sup>2</sup> wholesale prices of machinebuilding and metalworking generally declined after 1955, as did costs in construction.<sup>3</sup> However, these data do not necessarily imply cost reduction in military industry. In a period of far-reaching change in the technology of war, the contrary is equally if not more likely. All we can say is that if there was cost inflation in the military sector, it was not being aggravated by price and wage movements in the nonagricultural economy.

The movement of "defense" outlays is compared with those of the estimated total military expenditure series in Fig. 1.<sup>4</sup> Through 1958, the direction of change is the same in all series, down until 1957 and slightly up in 1958. The differences in the relative size of year-to-year changes do not seem large enough to merit more than a perfunctory acknowledgment. It is the period after 1958 that is clearly of greatest interest.

"Defense" outlays in the five years beginning with 1956 fluctuate within an extremely narrow range of .61 billion rubles; from 1958 through 1960, the level is virtually constant. The two total outlay series, however, increase sharply in 1959, in each case by roughly

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<sup>1</sup>CIA, Average Annual Money Earnings of Wagesworkers in Soviet Industry 1928-1961, July 1963, p. 2.

<sup>2</sup>N.kh. 1960, p. 231 and N.kh. 1962, pp. 132-133.

<sup>3</sup>N.kh. 1962, pp. 144-145, 447.

<sup>4</sup>Readers should not become alarmed on seeing the graph of the "low" series appearing above that of the high series in Fig. 1. "Low" and "high" refer to absolute values while Fig. 1 uses a relative scale.

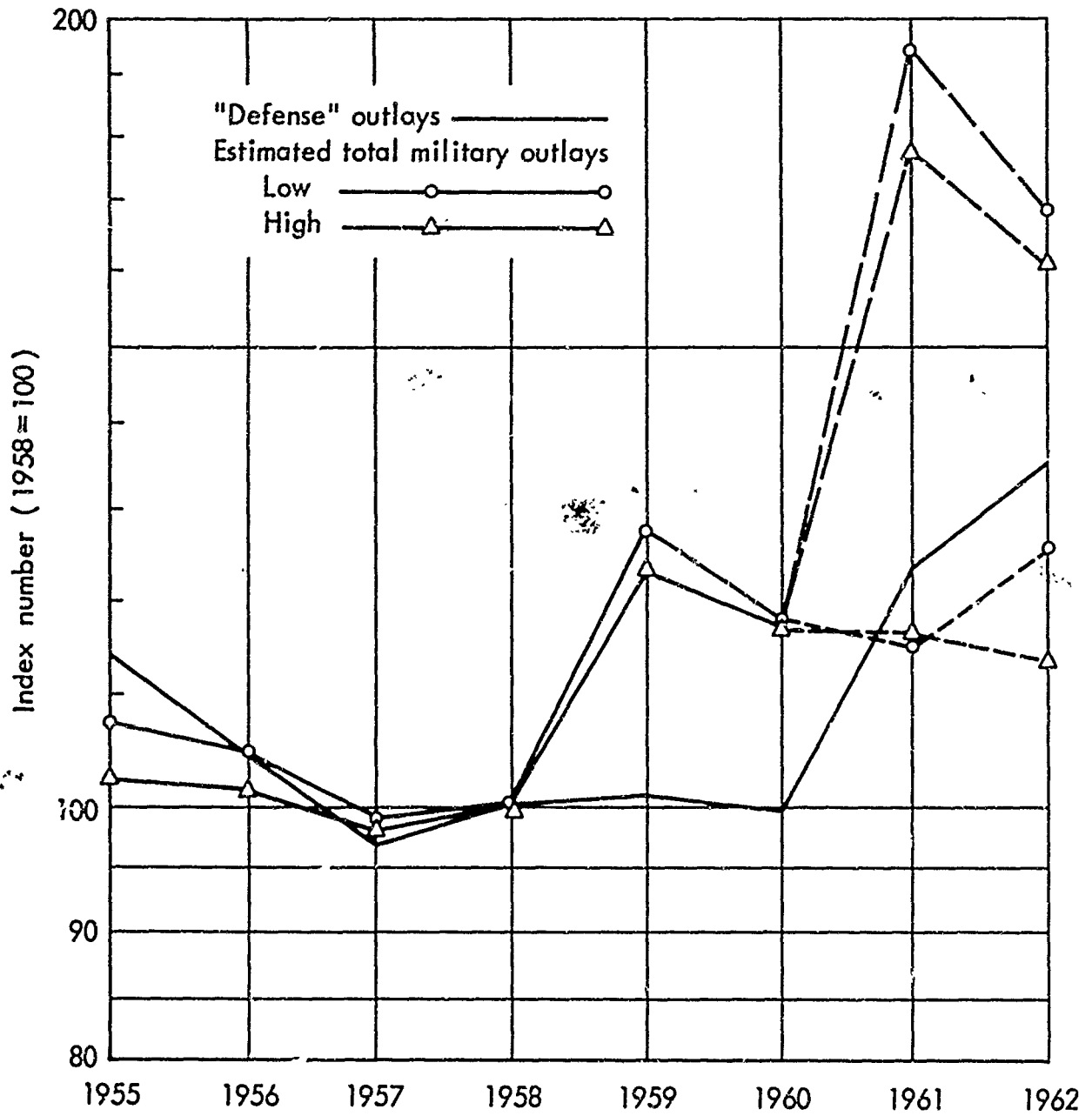


Fig. 1 — Indexes of defense and estimated total military outlays  
1955 - 1962 (1958 = 100)

Note: "Low" and "high" refer to the absolute value series of Table 7. As this figure uses a relative scale, "low" may appear above "high".

Source: Table 7

one-quarter, and the decline in 1960 still leaves the level of these expenditures 17 or 18 per cent greater than in 1958. The 1961-1962 period must be considered as a whole, because of the necessity to estimate the concealed outlays as ranges in both the high and low series. By 1962, "defense" outlays were 37 per cent higher than in 1960. Estimated total military outlays remained at least roughly unchanged; possibly, there was a substantial increase above even the high point reached in 1959.

#### A CHECK: MILITARY MACHINEBUILDING

A possible basis for confirmation or rejection of these estimates is provided by the available data on output of the Soviet machinebuilding and metalworking industry (MBMW). It is assumed that the armaments industry is for the most part a component of MBMW and that the output of this part of the armaments industry is included in the official values and indexes of MBMW production. The first assumption is supported by the official industry classification of the Seven-Year Plan.<sup>1</sup> The second assumption cannot be supported by official references but it would seem to be a logical explanation of the pattern pictured in Fig. 2.

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<sup>1</sup>Gosplan, Formy i pokazateli k sostavleniiu proekta perspektivnogo plana razvitiia narodnogo khoziaistva SSSR na 1959-1965 gody, 1959, translated in Cahiers de l'Institut de Science Economique Appliquée, No. 107, Series G, No. 10, November 1960, pp. 237-240 (hereafter abbreviated to Formy). In this classification, shipbuilding, a branch of MBMW, is said to include warships, and a separate branch of MBMW, designed "defense industry" is said to cover "machinebuilding and metalworking enterprises for the production and repair of military equipment (matériel de combat) and of munitions, including all aircraft plants but excluding naval shipyards and specialized plants for the production of instruments and electronics." Instruments and electronics are separate branches of MBMW. On the other hand, although the government's Ministry of Medium Machinebuilding has been considered in the West a cover for the atomic energy program (see above p.22), the Seven-Year Plan classification defines the chemical industry as including "enterprises...having production of military interest or intended for thermonuclear reactions and for nuclear fission reactions" (Formy, p. 240).

A contemporary classification in L. M. Volodarskii, Statistika promyshlennosti i voprosy planirovaniia, Moscow, Gosstatizdat, 1958, pp. 269-272, omits all references to military production contained in Formy, but the two are otherwise identical.

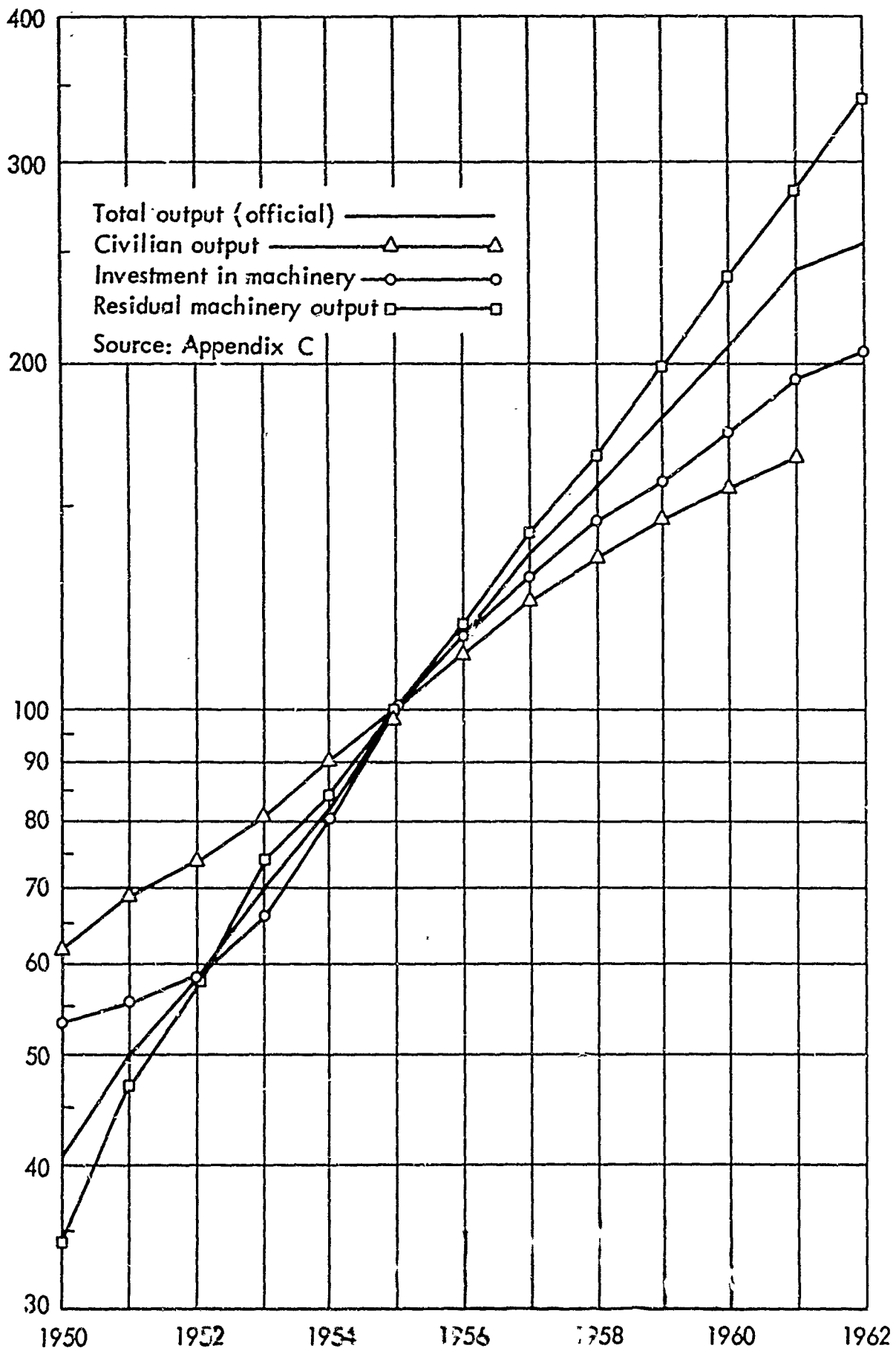


Fig. 2 — Indexes of total machinery output (official), civilian machinery output, investment in machinery and residual machinery output 1950 - 1962 (1955 = 100)

Fig. 2 shows the trend of four indexes in the period 1950-1962. Three of these indexes are straightforward -- the official Soviet index of machinebuilding output, an index of investment in machinery (a modification of one compiled by CIA from official data), and an index of civilian machinery output independently calculated by CIA. The fourth index (hereafter designated the machinery residual index) is computed from a series of residuals, each obtained by deducting investment in machinery, lagged half a year behind total output, and production of consumers' durables (including electronics) from the gross value of machinebuilding derived from an official index.<sup>1</sup>

The generation of the machinery residual index is of uncertain legitimacy and the issue must be examined carefully:

1. One deficiency of the procedure is the conglomeration of price weights. The CIA indexes use July 1, 1955 price weights. The official machinebuilding index does too, but only beginning with 1956: through 1949 the index is based on 1926/27 "constant" prices, from 1950 through 1955, prices of January 1, 1952, net of turnover tax.<sup>2</sup> To develop a 1950 datum at 1955 prices from a linked index based on two sets of prices is something of an act of faith.

2. The official machinebuilding index and the CIA index of consumers' durables output are computed from values at producers' prices, so-called "enterprise prices." The CIA index of investment in machinery is based on values that are gross of distribution (including transport) charges. Moreover, there is some evidence that

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<sup>1</sup>Details of the calculations are shown in Appendix C.

<sup>2</sup>The statistical handbooks indicate that 1926/27 prices were the weights for 1950 as well (for example, N.kh. 1962, p. 665). Although this is formally true, it appears that for the purpose of index linkage, 1950 output was revalued at 1952 prices (A. I. Ezhov, Statistika promyshlennosti, 3rd ed., Moscow, Gosstatizdat, 1957, pp. 85-86). In effect then, 1949 was the last year in which 1926/27 prices were the index weights.

the markup on machinery sold to collective farms has been larger than the markup on machinery purchased by state enterprises.<sup>1</sup> To adjust for these differences, 10 per cent of annual investment in machinery by non-kolkhoz enterprises is deducted as an estimate of distribution charges;<sup>2</sup> the corresponding deduction for collective farm investment in machinery is set arbitrarily at 15 per cent for all years through 1960. In 1961, prices paid by collective farmers for a variety of spare parts and machinery were reduced. After 1960 the distribution charges are estimated as 10 per cent in all transactions.

3. Investment in machinery includes imported as well as domestically produced machinery. Production excludes imports but includes output destined for export. The available data on Soviet foreign trade are values in foreign trade rubles, which are not necessarily related to values at domestic prices. However, the magnitude of Soviet foreign trade in machinery clearly seems low enough to be ignored, especially as the net balance, rather than the value of either exports or imports, is at issue here.<sup>3</sup>

It would be presumptuous to conclude this discussion by attempting to establish a margin of error on the values of the machinery residual, particularly, since still other deficiencies remain to be noted.<sup>4</sup> Nevertheless, the data seem to be sufficient to warrant at least one inference regarding coverage. The machinery residual values should include exports, sales to intermediate processors, the value of parts and components allocated to capital repair of machinery, changes in inventories at machine building plants, and changes in ware-

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<sup>1</sup>Moorsteen, p. 29.

<sup>2</sup>Ibid., p. 110.

<sup>3</sup>In foreign trade prices, the net machinery import balance rose from 90 million rubles in 1950 to 964 millions in 1962 (N.kh. 1958, pp. 302, 804, and N.kh. 1962, pp. 545, 546).

<sup>4</sup>For example, those of the official total output index. See below, p.48, note 1.

house stocks of machinery requiring installation.<sup>1</sup> Does it also include armaments? An answer may be attempted by a sample calculation for 1959, estimating the value of the known inclusions in the residual:

1. The value of machinery exports, in the form required, can only be guessed at, because the available data give exports at foreign trade prices. At foreign trade prices, the reported value of machinery exports in 1959 was 1.05 billion rubles.<sup>2</sup> It is doubtful that the domestic price equivalent of that sum would substantially exceed half a billion rubles.<sup>3</sup>

2. The value of the bulk of intermediate shipments by the machinery industry can be estimated for 1959, on the basis of the portion of the intermediate-processing quadrant of the 1959 input-output table published in the 1960 statistical yearbook. This value

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<sup>1</sup>The last named component is not included in Soviet investment statistics. See below, pp. 94-95. The machinery residuals probably include some nonmachinery product. The total gross output of machinebuilding is based on an enterprise classification, hence includes secondary nonmachinery product and excludes machinery produced as secondary product in other branches of manufacturing industry. It would seem likely that the inclusion exceeds the exclusion, especially on account of machinery repair activities.

<sup>2</sup>N.kh. 1962, p. 545.

<sup>3</sup>At the official exchange rate in force since the beginning of 1961, the dollar equivalent of the foreign trade ruble value of machinery exports in 1959 is \$1.16 billion. A study of producers' durables ruble-dollar ratios for 1955 concluded that, in terms of the pre-1961 domestic rubles, the average ruble-dollar ratio with American weights was approximately 6.0:1 and with Soviet weights might be considerably lower. A. S. Becker, Prices of Producers' Durables in the United States and the USSR in 1955, The RAND Corporation, RM-2432, August 1959, pp. 47-48. Since the scale of all domestic prices in the USSR was decreased by a factor of ten in 1961, the 1961 ruble equivalent of the estimated 1955 ruble-dollar ratio would be 0.6:1. According to an official Soviet index, wholesale prices of MBMW declined 13 per cent between 1955 and 1958 (N.kh. 1962, p. 144). The export data also include domestic transportation costs, whereas the values required for deduction from the machinebuilding total should be at producers' prices.



comes to 5.2 billion rubles.<sup>1</sup> Allowing for the intermediate shipments of branches of machinery omitted from the published material<sup>2</sup> could hardly raise the figure above, say, 7 billion rubles.

3. Information on the distribution of capital repairs is scarce. On the basis of data in the 1941 plan, it is estimated that 40 per cent of all capital repairs, except those to private housing, represent repairs to machinery and equipment.<sup>3</sup> Soviet data show raw materials as 51.8 per cent and wage charges as 31.7 per cent of production costs in MBMW in 1959.<sup>4</sup> Since repair work is notoriously labor intensive, it is possible that labor accounts for as much as half and parts and components for as little as one-third of machinery repairs. As an extra precaution, the latter proportion is assumed to be 40 per cent. The value of capital repairs in 1959, excluding repairs to private housing, came to 7.23 billion rubles.<sup>5</sup> Hence, the value of parts and components in 1959 may be estimated as 1.15 billion rubles.

4. Inventories in all industry rose by 1.57 billion rubles in 1959.<sup>6</sup> It seems a good guess that if there was positive

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<sup>1</sup>Computed from N.kh. 1960, pp. 104-143, as

$$\sum_{j=13}^{35} \sum_{i=1}^{73} X_{ij} - \sum_{j=13}^{35} X_{71,j}$$

The machinery branches are industries 13-35 of the 73 included in the table; industry 71 is freight transport and productive communications, which is deducted here to transform purchaser values to producer values, the valuation of the official machinery index; in summing over *i*, industry 67, which is the sum of industries 68 and 69, is excluded.

<sup>2</sup>In addition to "defense industry," branches apparently omitted are medical equipment and instruments miscellaneous machinebuilding (trade, fire-fighting, safety equipment, fans, typewriters and equipment for municipal services).

<sup>3</sup>The 1941 data are cited in Moorsteen, p. 448.

<sup>4</sup>N.kh. 1959, p. 161.

<sup>5</sup>Becker, Soviet National Income and Product, (forthcoming), Table G.

<sup>6</sup>Computed from N.kh. 1960, pp. 92-93, as all current assets less monetary claims, debitory, and other current assets.

inventory investment in machinebuilding, it was not likely to have exceeded half a billion rubles.

5. In Appendix D, the increment to warehouse stocks of machinery requiring installation is estimated as .08 million rubles.

Thus, the 1959 value of known inclusions<sup>1</sup> in the residual machinery output is about nine billion rubles, possibly less. The value of the residual in 1959 is 15.3 billion rubles. It seems clear that both the residual and the total machinery series do include military output.

Can we also assume that the share of the nonmilitary components of the machinery residual remains roughly constant, hence that the graph of the residual index in Fig. 2 may be viewed as the graph of armaments output as well? If the assumption seems highly dubious on its own grounds, it makes better sense for certain periods as an inference drawn from examination of Fig. 2.

A striking pattern is manifest in Fig. 2. All four indexes move more or less in tandem between 1953-1954 and 1956-1957; before and after that period, they diverge sharply. In both periods of divergence, the residual index is the fastest growing, followed by the official machinery output index; in the early 1950s, CIA's civilian machinery index is the slowest growing, falling behind the index of investment in machinery. The degree of divergence grows rapidly and uninterruptedly from 1950 to 1953 and after 1957. No convergence seems to have taken place in 1961-1962.

The early 1950s are included in Fig. 2 in order to observe the behavior of the indexes in a period of military mobilization and subsequent retrenchment. The nature of the residual index and

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<sup>1</sup>So-called "operations of an industrial character" are also known to be included but their value is probably negligible here.

the behavior of the four indexes in the period 1950-1957 suggests that beginning in 1957 the rate of growth of military output again sharply outpaced that of civilian machinery output, as it did in 1950-1953.<sup>1</sup>

What bearing do these data have on the estimates of total military outlays in Table 7? In two instances we detect consistency between them. In consequence, however, the scope of "defense" outlays comes into question again:

1. A sharp reduction in the size of the armed forces, on the order of 2.1 million men, probably took place in the years 1955-1960. All but roughly one-seventh of this cut was accomplished by the end of 1957.<sup>2</sup> Although the decline in pay and subsistence outlays may have continued beyond 1957, the rate of decrease was undoubtedly considerably slower than in the three preceding years and could easily have been counterbalanced by increases in operation and maintenance outlays. Thus, the stability of all "defense" outlays in 1959 and 1960 (Fig. 1) implies rough stability of other military outlays, mainly procurement expenditures, as well. Our discussion of the behavior of the machinery residual index suggests, on the contrary, that military procurement must have risen conspicuously in 1958-1960. The behavior of the total military outlay series in these years is consistent with that surmise.

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<sup>1</sup>Moorsteen has compared official production index numbers for eight individual categories of civilian machinery for 1950-1955 with his own, independently computed, 1937 price-weighted indexes. The official index numbers all exceed those estimated by Moorsteen by from 46 to 122 per cent (Moorsteen, p. 122). If the official index is biased upwards in this period, so is our residual index, and the pattern observed in Table 2 for the early 1950s may be in whole or in part illusory.

The marked divergence after 1957-1958 of the official total output index from an index of civilian machinery output was first noted by Rush V. Greenslade and Phyllis Wallace in "Industrial Production in the USSR," U.S. Congress, Joint Economic Committee, Dimensions of Soviet Economic Power, Washington, D. C. 1962, pp. 121-123. See also, CIA, Index of Civilian Industrial Production in the USSR 1950-1961, September 1963, pp. 46-47.

<sup>2</sup>See SNIP 1956-1958, p. 50.

2. By deducting the value of known inclusions in the residual machinery output for 1959, a rough estimate of the value of gross output of armaments included in MBMW of 6 billion rubles is obtained. A comparable estimate of final output, allowing for semifabricates and changes in the value of unfinished production<sup>1</sup> might be, say, 5 billions. We may also estimate 1959 outlays in pay and subsistence as 3.92 billion rubles and on operation and maintenance as 2-4 billion rubles.<sup>2</sup> We now subtract the estimated values of pay and subsistence, operation and maintenance, plus a notional allowance of .3 billion rubles for pensions paid from "defense" funds,<sup>3</sup> from "defense" outlays and from the estimated total military outlays for 1959. From the latter, in addition, we subtract military R&D expenditures. The differences, which should consist of military procurement, stockpiling, and nuclear energy expenditures, are (billion rubles): "defense," 1.2-2.3; total military outlays (low) 5.4-7.4; total military outlays (high) 8.6-10.6. As an estimate of just military procurement, the calculated difference for "defense" is clearly too small. The differences in total military outlays seem to be more reasonable, especially since the differences include, in principle, something more than procurement.

Thus, there is reason to doubt that the identified "defense" outlays cover all of pay and subsistence, operation and maintenance, military construction, and procurement. At the same time, we note some evidence of consistency between the estimates of total military outlays in the years 1957-1960 and the information derived from data on machinery output. In Section IV we will discuss the relation

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<sup>1</sup>Changes in unfinished production are included in gross output of machinebuilding and metalworking where the production cycle is longer than two months. N.kh. 1961, p. 789.

<sup>2</sup>For pay and subsistence, see Appendix Table D-1. As in a previous section (above, p.12), expenditures on operation and maintenance are assumed to be between 50 and 100 per cent as large as outlays on pay and subsistence.

<sup>3</sup>See Appendix Table D-1.

between stockpiling, military procurement and military production, but first we turn to consider the changes in military outlays in 1961-1962. Unfortunately, the consistency tests just presented do not help resolve our uncertainty concerning the movement of military expenditures in these two years.

#### CHANGES IN DEGREE OF CONCEALMENT

In the middle of 1961, Khrushchev announced the government's intention to increase "defense" outlays for the year as a whole to 12.4 billion rubles, as compared with the original planned level of 9.3 billion.<sup>1</sup> Table 1 shows that realized expenditures in 1961 were in fact 25 per cent larger than actual outlays in 1960. The planned budget for 1962 called for a further increase of 16 per cent, to 13.4 billion rubles.<sup>2</sup> A suspicion has been expressed that much, if not all, of this 45 per cent increase in the level of "defense" expenditure, comparing 1962 plan with the original 1961 plan, represents reclassification of military outlays formerly concealed in the residuals discussed above.<sup>3</sup>

Thus, the planned NE residual is estimated to have declined by 0.6 billion rubles between 1961 plan and 1962 plan (Table 2). Considering that the planned appropriation to "industry and construction" declined 1.3 billion rubles in the same interval and that the sum of expenditures other than "national economy," "social-cultural measures," "administration," and "defense" declined by 1.5 billion rubles, it is possible that all three outlay residuals were reduced.<sup>4</sup>

<sup>1</sup>Pravda, July 9, 1961.

<sup>2</sup>Pravda, December 9, 1961.

<sup>3</sup>CIA, The Soviet Budget for 1962, pp. 12-13. The motivation for such a reclassification was, presumably, political -- a response to the increase in the U.S. military budget.

It should be noted that realized "defense" outlays were 0.7 billion rubles lower than planned in 1962, hence the increase between the original 1961 plan and realized 1962 is 37 per cent.

<sup>4</sup>Izvestiia, December 21 and 23, 1960; Garbuzov, "Finansovaia sistema...", p. 14; Pravda, December 7 and 9, 1961, Lavrov, "Gosudarstvennyi biudzheth...", p. 46. For additional discussion, see CIA, The Soviet Budget for 1962, pp. 12-13, 23-24.

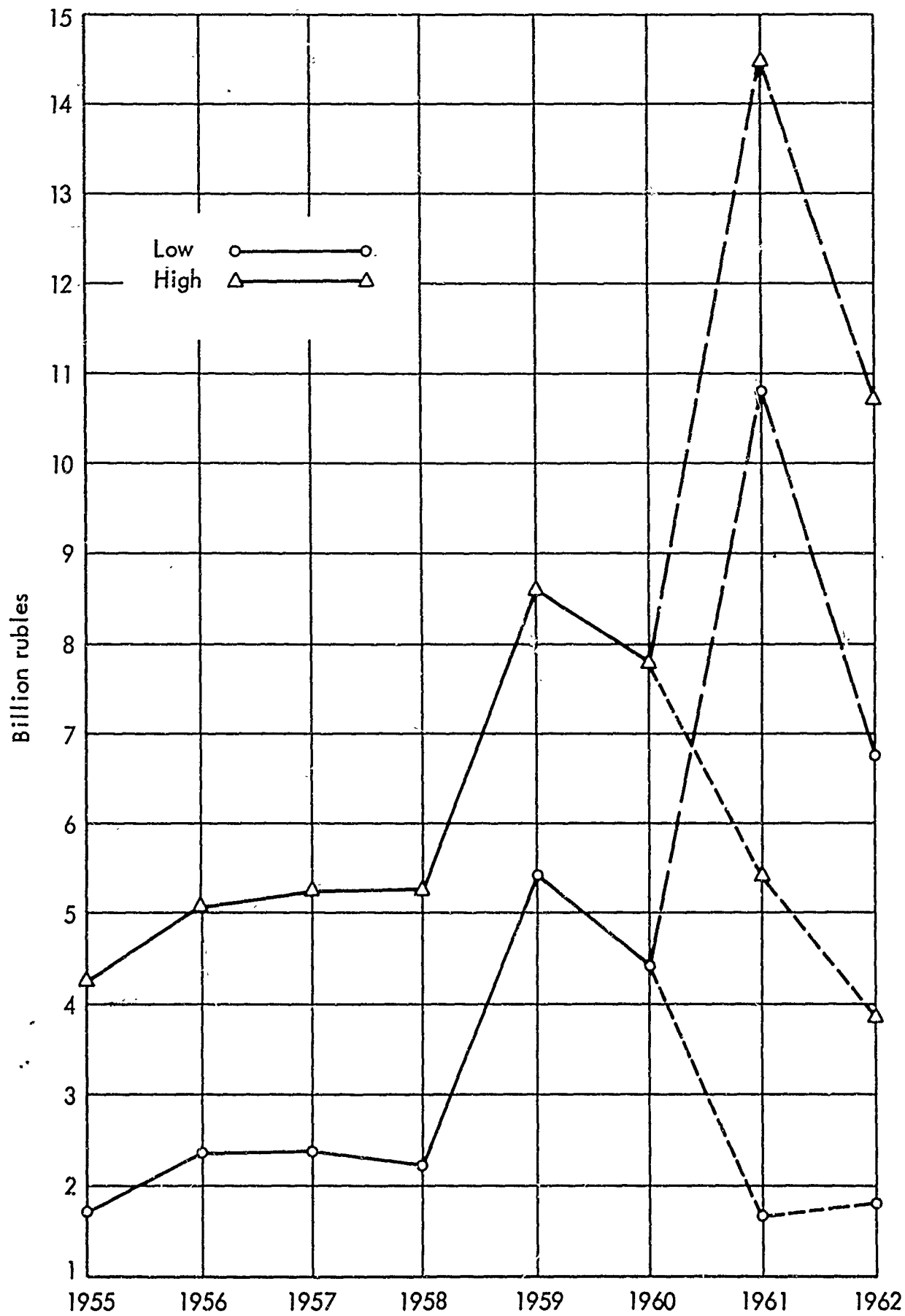


Fig. 3— Concealed military outlays 1955 - 1962

Note: For explanation of the 1961 and 1962 ranges, see Table 7 and pp. 39-41.  
Source: Table 7

Comparing planned and realized magnitudes for 1961 alone, we cannot be sure of the change in residuals because we have no data for realized values of components of either "national economy" or its subclass "industry and construction." As was indicated earlier, it seems impossible to gauge the realized value of the components from a comparison of previous planned and realized magnitudes.

Fig. 3 charts the change in the amount of concealed military expenditures shown in Table 7. Between 1955 and 1960 the amount of concealed expenditures varies in the low estimate between 1.7 and 5.4 billion rubles and in the high estimate between 4.3 and 8.6 billions. In both series, the point of maximum concealment is reached in 1959, in a very sharp increase over 1958, with a slight drop occurring in 1960. As to 1961-1962, it is impossible to draw a firm conclusion. Concealment may or may not have declined in either 1961 or 1962; possibly it even increased in either year. The average values of the 1961 and 1962 ranges for both series show an increase in 1961 to a level exceeding the respective 1959 values and a decline in 1962 to levels slightly below those of 1960.

The information available from Soviet sources on 1963 and 1964 planned budget expenditures (Table 8) is meager, particularly for 1964.<sup>1</sup> Only a partial breakdown of planned expenditures on the national economy in 1964 can be put together; the breakdown of outlays on industry and construction is not known for either year. Compared with 1962 plan, "defense" expenditures were scheduled to increase half a billion rubles in 1963, or by 3.7 per cent, whereas the 1964 plan calls for a 600 million ruble decline from the 1963 plan level to just under the 1962 plan value. Since realized expenditures were 700 million rubles below plan in 1962 and there has been no indication given of the size of realized "defense"

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<sup>1</sup>The budget for 1965 was also announced at the time of release of the 1964 budget. However, for 1965 only the planned total expenditure and three components were given -- social-cultural outlays, administration, and the Reserve Fund of the Council of Ministers.

Table 8

USSR STATE BUDGET EXPENDITURES, 1962 PLAN-1964 PLAN  
(billion rubles)

	1962 Plan	1963 Plan	1964 Plan
1. National economy	32.5	34.5	38.7
2. Social-cultural measures	28.7	31.0	32.7
3. Administration	1.1	1.1	1.1
4. Defense	13.4	13.9	13.3
5. Loan service	0.8	0.9	0.9
6. Reserve Fund of Council of Ministers	3.9	2.6	2.3
7. Other outlays		<u>2.2</u>	<u>2.3</u>
8. Total expenditures	80.4	86.2	91.3

Sources:

Entries for item 5 are estimates based on data for recent years shown in Table 1. Other figures are taken from Lavrov, "Gosudarstvennyi biudzheth..." p. 46 (1962 plan); V. Garbuzov, "Resheniia noiabr'skogo Plenuma TsK KPSS i zadachi finansovykh organov," Finansy SSSR, 1963, No. 1, p. 11; and Izvestiia, 11 December 1962 (1963 plan); Pravda, 17 December 1963 (1964 plan).



outlays in 1963, it is as yet impossible to interpret these figures. Expenditures on the national economy were to increase by six per cent in 1963 and an additional 12 per cent in 1964. Excluding outlays on the national economy, social-cultural measures, "defense," and administration, the remainder of budget outlays (Reserve Fund of the Council of Ministers, internal debt service, internal security, and the BE residual) was planned to increase 21 per cent in 1963 and to decline four per cent in 1964. Obviously, little can be done with these data alone.

These estimates do not support the hypothesis of "surfacing" in 1961; neither do they refute the hypothesis. The issue is re-examined in the next section in the context of the official national income reports.

IV. MILITARY OUTLAYS IN THE OFFICIAL  
NATIONAL INCOME ACCOUNTS

In the statistical yearbook for 1960, the Central Statistical Administration for the first time in twenty-five years presented an absolute distribution of national income (Marxist concept) by use. Subsequent yearbooks have continued the practice but the series has not been carried back before 1959. The data released in the 1962 yearbook are shown in full in Table 9.

Soviet sources indicate that military outlays ought to be found in both consumption and investment in the breakdowns of Table 9. Military subsistence would be in part of item 1.A, "personal consumption";<sup>1</sup> the non-wage costs of operation of the military establishment and of R&D would be found in the rest of the consumption fund.<sup>2</sup> Possibly, the consumption fund would include even military construction, although the latter would appear to belong more naturally to item 2.A, "increment of fixed capital."<sup>3</sup>

INCREMENTS OF STATE RESERVES

The most interesting category, for present purposes, is item 2.B, "increment of material working capital and reserves." "Reserves" refers primarily to "state material reserves" and a number of Soviet sources have indicated that one of the components of state reserves

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<sup>1</sup>V. A. Sobol', Ocherki po voprosam balansa narodnogo khoziaistva, Moscow, Gosstatizdat, 1960, p. 160.

<sup>2</sup>V. U. Kuleshov, Sotsialisticheskoe vosproizvodstvo, Moscow, "Vysshiaia shkola," 1961, p. 45, declares that the "fund of social consumption" -- which, together with the "fund of personal consumption," makes up the whole "consumption fund" -- includes material outlays on defense less the personal consumption of members of the armed forces. A. I. Petrov (ed.) Kurs ekonomicheskoi statistiki, Moscow, Gosstatizdat, 1961, implies the same thing on pp. 389, 414. See also V. F. Maier and P. N. Krylov, Planirovanie narodnogo potrebleniia v SSSR, Moscow, Izdatel'stvo "Ekonomika," 1964, p. 15.

<sup>3</sup>For a discussion of the problem of identifying military construction in the official investment statistics, see Appendix A.

Table 9

SOVIET NATIONAL INCOME (MARXIST CONCEPT)  
BY END USE, 1959-1962  
(billion rubles)

	1959	1960	1961	1962
<b>1. Consumption</b>				
A. Personal consumption	88.0	93.9	96.7	104.5
B. Material outlays in institutions servicing the population	7.2	8.2	8.7	9.5
C. Material outlays in science and administration	<u>2.1</u>	<u>2.4</u>	<u>2.7</u>	<u>3.0</u>
D. Total	97.3	104.5	108.1	117.0
<b>2. Accumulation and other expenditure</b>				
A. Increment of fixed capital	22.8	25.3	25.3	29.4
B. Increment of material working capital and reserves	<u>12.8</u>	<u>12.9</u>	<u>17.6</u>	<u>16.5</u>
C. Total	35.6	38.2	42.9	45.9
<b>3. National income, net of losses</b>	<b>132.9</b>	<b>142.7</b>	<b>151.0</b>	<b>162.9</b>

Source:

N.kh. 1962, pp. 483-484.

is armaments<sup>1</sup> -- in the words of one writer, "means of defense of a special nature."<sup>2</sup> Estimates of the magnitude of additions to state reserves may be made by deducting other known components from the official totals for "increment of material working capital and reserves." Such a calculation, the details of which are shown in Appendix E, yields the following estimates ( billion rubles):

	<u>1959</u>	<u>1960</u>	<u>1961</u>	<u>1962</u>
Total increment of material working capital and reserves	12.8	12.9	17.6	16.5
Less: public sector inventory investment	9.84	4.61	7.33	6.5-8.0
Less: increment of unfinished investment in the public sector	1.70	2.48	3.98	1.75
Equals: additions to state reserves	1.3	5.8	6.3	6.7-8.2

Apart from estimating errors, the indicated values of additions to state reserves are off by the value of increments in private sector agricultural inventories, which have had to be ignored for lack of data. But it is difficult to believe that private agricultural inventory investment can affect the results significantly.

As computed, additions to state reserves in 1960 were 4.5 times as high as in 1959; a further increase of 9 per cent occurred in 1961, followed by continued growth in 1962 (6-30 per cent over 1961). What happened in 1960 to account for more than a quadrupling in net additions to state reserves? Or in 1961-1962 to account for the continued rapid increases in additions to state reserves? Most of the rest of this section is devoted to consideration of these questions. Unfortunately, satisfactory answers cannot be promised. Despite its bulk -- or perhaps because of it, for if we had more

<sup>1</sup>For example, see Bol'shaia sovetskaia entsiklopediia, 2nd ed., 1955, Vol. 36, p. 265; also A. V. Bachurin (ed.), Finansy i kredit SSSR, Moscow, Gosfinizdat, 1958, p. 148, who defines state reserves as including "industrial, agricultural, transport, food, defense and other types of reserves."

<sup>2</sup>M. Z. Bor, Voprosy metodologii planovogo balansa narodnogo khoziaistva SSSR, Moscow, Izdatel'stvo Akademii nauk SSSR, 1960, p. 311.

direct information, prolixity would be unnecessary -- the discussion is inconclusive.<sup>1</sup> However, this important material has not been dealt with anywhere else and for that reason alone merits setting out in some detail.

#### STOCKPILING NON-ARMAMENTS

It is first necessary to consider the possibility that additions to state reserves consist entirely or largely of non-armaments. At first glance, the two most obvious objects of stockpiling do not seem to furnish a likely explanation of the changes described. It seems unlikely, first, that the grain harvests of 1959-1962 were large enough to allow substantial stockpiling. Not until 1962 did state grain procurements reach the 1958 level; allowing for net exports, however, the domestically available flow of procurements never regained the 1958 level:<sup>2</sup>

<u>Million Tons of Grain</u>	<u>1958</u>	<u>1959</u>	<u>1960</u>	<u>1961</u>	<u>1962</u>
State procurements	56.6	46.6	46.7	52.1	56.6
Net exports	<u>4.3</u>	<u>6.8</u>	<u>6.6</u>	<u>6.8</u>	<u>7.8</u>
Procurements less net exports	52.3	39.8	40.1	45.3	48.8

Valued at the average prices paid to collective farms in 1958-1960 (which were higher than prices paid state farms),<sup>3</sup> it would require a surplus of roughly 16 million tons of grain to obtain an increase

<sup>1</sup>it begins inauspiciously. Additions to state reserves are supposed to be financed through budget expenditures on the "national economy" (Bachurin, p. 148). A glance at Table 4 above shows that the NE residual is far too small in 1960, 1961, or 1962 to encompass the estimated additions to reserves. Possibly the IC residual also plays a part here.

<sup>2</sup>Procurement data from N.kh. 1962, p. 239; exports and imports from the series, Ministerstvo vneshnei torgovli SSSR, Vneshniaia torgovlia Soiuza SSR za -- god, Moscow, Vneshtorgizdat: 1959, 1960, 1961, 1962 yearbooks published in 1960, 1961, 1962, 1963.

<sup>3</sup>A. G. Zverev, Natsional'nyi dokhod i finansy SSSR, Moscow, Gosfinizdat, 1961, pp. 306, 311; V. Khlebnikov, "O dal'neishem ukreplenii ekonomiki kolkhozov," Voprosy ekonomiki, 1962, No. 7, p. 53.

of one billion rubles in state reserves. Nancy Nimitz has estimated that perhaps 10 million tons of grain were available for additions to government stocks from the extraordinary harvest of 1958. It is doubtful that such an amount could be stockpiled from subsequent harvests; substantially larger increments to reserves can be confidently ruled out.<sup>1</sup>

Nor does it appear that Cuban sugar imports were of a magnitude to explain the extraordinary growth in state stockpiling. In new foreign trade rubles, Soviet imports of raw sugar (entirely from Cuba) rose from a level of .007 billion in 1959 to .270 billion in 1961 and dropped to .184 billion in 1962. Part of this growth may have been re-exported in the form of increased exports of refined sugar: although the USSR was a net importer of refined sugar in 1959-1960, it was a net exporter in 1961-1962 to the value of .012 and .013 billion rubles, respectively.<sup>2</sup>

There is a simple difficulty with these conjectures -- the prices governing transfers to or from the state reserves are unknown. In particular, whether stocks are valued at prices inclusive or exclusive of turnover taxes is not known and could make a substantial difference. This is of lesser concern in the case of grain where the full retail price of bread is only triple the procurement price of grain:<sup>3</sup> even allowing for a price inclusive of turnover tax, it would appear to take at least 8-10 million tons of grain to make up

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<sup>1</sup>The fact that the USSR felt compelled to import some 10 million tons after the disastrous harvest of 1963 suggests that reserves were inadequate and hence that the rate of net stockpiling in previous years was low. Khrushchev has said that if grain could not have been imported, the necessity to dip into reserves would also have required rationing to consumers. Pravda, October 27, 1963.

<sup>2</sup>Sources cited in note 2, p. 58. The trade statistics show no USSR exports of raw sugar.

<sup>3</sup>The price of bread in Moscow state stores was observed in 1963 as between 13 and 40 kopeks per kilogram. Also based on personal observations are the CIA's estimated 1955 prices for bread and bakery products of 140.2 (from coarse-milled flour) and 420.8 (quality flour) rubles per ton, net of retail trade margin. CIA, Index of Civilian Industrial Production in the USSR 1950-1961 (Supplement), October 1963, p. 125.

an increase of a billion rubles in reserves. The issue does make a difference for sugar: exclusive of retail trade margins, the retail price of granulated sugar is almost 8.5 times as high as the unit value (in foreign trade rubles) of refined sugar imports and better than ten and a half times as high as the unit value of raw sugar imports.<sup>1</sup> Allowing for losses in refining,<sup>2</sup> the refined equivalent of the 3,345,000 tons of raw sugar imported in 1961 could have been valued at domestic prices as high as 2.5 billion rubles. It seems unlikely that all imported sugar was stockpiled, but without additional information, it is impossible to say.

So far, the discussion of stockpiling has concerned only two commodities, grain and sugar; there is nothing to indicate that other commodities were not also the object of stockpiling -- for example, nonferrous metals. Bor, the Soviet writer previously cited, defines the state reserves as combining "state material reserves of a long-term character...." and "current reserves of the Council of Ministers, used in the course of fulfillment of the annual plan for satisfaction of current needs as they arise," in addition to the "reserves of means of defense of a special nature" already mentioned.<sup>3</sup>

The wording of this passage is sufficiently vague to accommodate a considerable range of possibilities. Do the "state material reserves of a long-term character" include gold and foreign exchange

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<sup>1</sup>Net of retail trade markup, the 1955 prices estimated by CIA (ibid.) were 849.6 rubles per ton of granulated sugar and 1038.4 rubles per ton of lump sugar. The retail price of sugar has not changed since 1955, according to official price indexes (N.kh. 1960, p. 716 and N.kh. 1962, p. 532). The unit values of raw and refined sugar imports in the peak year 1961 were 81 and 108 rubles per ton, respectively.

<sup>2</sup>Raw cane sugar has a sucrose content of 96-97 per cent and moisture content of .5-1 per cent. Soviet standards require 99.75 and 99.85 per cent pure sucrose and a maximum of .05 and .14 per cent moisture for refined sugar of highest grade and first grade, respectively. (Eksportno-importnyi slovar', Moscow, Vneshtorgizdat, 1953, II, cols. 1308-1309; I. A. Pugachev (ed.), Tovarnyi slovar', Moscow, Gostorgizdat, 1959, cols. 1046-1047).

<sup>3</sup>Bor, Voprosy metodologii..., p. 311.

reserves? If so, it would appear that annual increments have been small.<sup>1</sup> Is it possible that additions to and withdrawals from the "current reserves of the Council of Ministers" are frequent during the year but produce small net annual changes? What of the relationship between Soviet military doctrine and stockpiling? The recent authoritative work edited by Marshall Sokolovskii seems to hedge on the nature of possible future wars and stresses the need for reserves of both military hardware and "strategic commodities."<sup>2</sup>

On the foregoing information alone we cannot rule out the possibility that some part of the sharp increase in the rate of stockpiling after 1959 represents stockpiling of commodities other than armaments.

#### PROCUREMENT OR STOCKPILING OF ARMAMENTS

The evidence for an alternative hypothesis, that sharp increases in additions to state reserves in 1960-1962 reflect rapid growth of military procurement and/or stockpiling is considered below.

1. Earlier, a value of about five billion rubles was estimated for the final output of armaments included in machinebuilding in 1959.<sup>3</sup> Assume no more than a six-month lag between production and inscription onto the books of the state reserves. If net increments to state reserves were increasing at a constant rate in the period under concern, then in the last half of 1959 and first half of 1960 additions to state reserves could have accounted for about 70 per cent of the final output of munitions, less if armaments are also produced under cover of the chemical industry,<sup>4</sup> and still less, if in addition, stockpiling of non-armaments took place at the same time.

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<sup>1</sup>See above, pp. 25-27.

<sup>2</sup>V. D. Sokolovskii, Voennaia strategii, Moscow, Voennoe izdatel'stvo Ministerstva oborony SSSR, 1962, pp. 363-364, 369, 373-374, 381-391.

<sup>3</sup>Above, p. 49.

<sup>4</sup>See above, p. 41, note 1.



2. It would be difficult to conclude that the pattern of output increases in the calculated machinery residuals, our closest approximation to a military production series, bears any relation to the changes in additions to state reserves for the four years 1959-1962. This is so even if the machinery residuals are "led" half a year.<sup>1</sup> Compared with increases in additions to reserves of 346, 9 and 6-30 per cent for 1960-1962, the "led" residuals show increases of 20, 19 and 20 per cent.<sup>2</sup>

3. In Appendix Table D-1, deduction of pensions, pay, and subsistence from total outlays in the three variants yields three series of estimates of outlays on procurement and other military needs. A comparison of the 1959-1962 remainders from that table with the estimated additions to state reserves in those years yields the following relations (per cent):

	<u>1959</u>	<u>1960</u>	<u>1961</u>	<u>1962</u>
Additions to state reserves as per cent of outlays on procurement and other military needs, based on:				
1. "Defense"	25	107	79	76-93
2. Estimated total: low	12	59	34-65	43-77
3. Estimated total: high	9	44	28-47	34-65

If additions to state reserves consist very largely of armaments and have been accurately estimated, then in both absolute amounts and in terms of the share of military outlays excluding pensions, pay, and subsistence, an extremely sharp increase occurred in 1960. Changes in the indicated share after 1960 appear to have been less extensive.

In summary, it appears that (a) there is no clear relation between changes in additions to reserves and changes in the residual machinery output values, (b) additions to state reserves in 1959/1960

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<sup>1</sup>That is, the average of two consecutive annual values is assigned to the later year of the pair.

<sup>2</sup>Computed from Appendix Table C-2.

are substantially smaller than a crude estimate of the value of final armaments output in 1959, (c) the ratio of reserve increments to military outlays excluding pensions, pay, and subsistence jumps drastically in 1960 and remains on a high level in 1961-1962. What explanation will fit these findings?

If additions to reserves consist in whole or in greater part of armaments, it would be fair to infer: from (a) and (b), that not all military procurement takes place through this channel -- that the reference cited earlier to "means of defense of a special nature" is intended to distinguish between categories of armaments, only part of which are procured through state reserve channels; from (c), that the armaments entering into state reserves were relatively unimportant in 1959 and highly significant in 1959-1962. As to the identity of the armaments meeting this description, the evidence unfortunately will lead us no further.

It is possible that one of the basic questions posed in this section -- why did additions to state reserves increase so sharply in 1960 -- should be instead, why was the 1959 increment so low? According to a 1959 article by Bor, "as national income statistics show, we channel 5-6 per cent of national income, or 1/5-1/4 of the total accumulation fund, into state reserves."<sup>1</sup> By Bor's rule, additions to state reserves in 1959 would have been as high as 7-8 billion rubles. Perhaps 1958-1959 are pivotal years in which traditional Soviet stockpiling of "strategic commodities" was terminating, prior to the initiation of accumulation of an entirely new class of military goods. Clearly, this is sheer conjecture.<sup>2</sup>

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<sup>1</sup>M. Z. Bor, "O nekotorykh faktorakh, opredelivaiushchikh tempy i proporsii sotsialisticheskogo vosproizvodstva," Voprosy ekonomiki, 1959, No. 7, p. 52.

<sup>2</sup>It is intriguing in this connection to compare the national income distributions for 1959-1962 with the skeleton breakdowns for 1940 and 1942-1943, which specifically include military outlays, provided by Voznesenskii (pp. 65, 67). Voznesenskii's data are as follows (per cent of total national income):

REVISIONS OF THE 1959-1961 OFFICIAL DATA

One other possibility merits exploration. Suppose armaments are in fact the major, if not the sole, factor in the growth of state reserves. Were there possibly changes in classification of armaments procurement in 1958-1960 that alone would help explain the sharp increase in additions to state reserves in 1960?

There are, indeed, some puzzling differences between the national income distributions for the same years appearing in the different yearbooks that might be attributable to reclassifications. These differences may be observed in Table 10. If the 1959-1960 values of the 1960 yearbook are compared with those of the 1961 yearbook, it can be seen that personal consumption for 1959 is unchanged; for 1960 it is increased by only 0.2 billion rubles or 0.2 per cent. However, item 1.B, "material outlays in institutions servicing the population," is increased by 0.4 billion rubles in 1959 and 0.8 billion in 1960, or by 5.9 and 10.8 per cent respectively. Item 1.C, "material outlays in science and administration," is decreased by 0.3 billion rubles in 1959 and 0.4 billions in 1960, or by 12.5 and 14.3 per cent, respectively. For comparison, the revisions of the 1961 consumption values involve zero change in item 1.C and decreases of two per cent each in items 1.A and 1.B.

	<u>1940</u>	<u>1942</u>	<u>1943</u>
Consumption	74	67	61
Accumulation	19	4	7
War expenditures, excluding personal consumption of the armed forces	<u>7</u>	<u>29</u>	<u>32</u>
	100	100	100

Based on the 1962 yearbook values, the structure of the recent national income distributions is (per cent):

	<u>1959</u>	<u>1960</u>	<u>1961</u>	<u>1962</u>
Consumption	73.2	73.2	71.6	71.8
Increase of fixed capital, working capital, and unfinished construction	25.8	22.7	24.2	23.2-24.1
Additions to state reserves	<u>1.0</u>	<u>4.1</u>	<u>4.2</u>	<u>4.1- 5.0</u>
	100.0	100.0	100.0	100.0

Table 10  
 SOVIET NATIONAL INCOME BY END USE, 1959-1961, ACCORDING  
 TO THE 1960, 1961, AND 1962 YEARBOOKS

	1959 <sup>a</sup>		1960 <sup>a</sup>		1961	
	1960 Yearbook	1961 Yearbook	1960 Yearbook	1961 Yearbook	1961 Yearbook	1962 Yearbook
1. Consumption						
A. Personal consumption	88.0	88.0	93.7	93.9	96.9	96.7
B. Material outlays in institutions servicing the population	6.8	7.2	7.4	8.2	8.9	8.7
C. Material outlays in science and administration	<u>2.4</u>	<u>2.1</u>	<u>2.8</u>	<u>2.4</u>	<u>2.7</u>	<u>2.7</u>
D. Total	97.2	97.3	103.9	104.5	108.5	108.1
2. Accumulation and other expenditure						
A. Increment of fixed capital	22.5	22.8	26.3	25.3	25.4	25.3
B. Increment of material working capital and reserves	<u>13.6</u>	<u>12.8</u>	<u>13.5</u>	<u>12.9</u>	<u>17.3</u>	<u>17.6</u>
C. Total	36.1	35.6	39.8	38.2	42.7	42.9
3. National income, net of losses	133.3	132.9	143.7	142.7	151.2	151.0

Note:

<sup>a</sup>The 1962 yearbook provides the same data for 1959-1960 as the 1961 yearbook.

Sources:

N.kh. 1960, p. 154, N.kh. 1961, p. 599, N.kh. 1962, pp. 483-484.

Table 10

SOVIET NATIONAL INCOME BY END USE, 1959-1961, ACCORDING  
TO THE 1960, 1961, AND 1962 YEARBOOKS

	1959 <sup>a</sup>		1960 <sup>a</sup>		1961	
	1960 Yearbook	1961 Yearbook	1960 Yearbook	1961 Yearbook	1961 Yearbook	1962 Yearbook
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B. Material outlays in institutions servicing the population	6.8	7.2	7.4	8.2	8.9	8.7
C. Material outlays in science and administration	<u>2.4</u>	<u>2.1</u>	<u>2.8</u>	<u>2.4</u>	<u>2.7</u>	<u>2.7</u>
D. Total	97.2	97.3	103.9	104.5	108.5	108.1
2. Accumulation and other expenditure						
A. Increment of fixed capital	22.5	22.8	26.3	25.3	25.4	25.3
B. Increment of material working capital and reserves	<u>13.6</u>	<u>12.8</u>	<u>13.5</u>	<u>12.9</u>	<u>17.3</u>	<u>17.6</u>
C. Total	36.1	35.6	39.8	38.2	42.7	42.9
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Note:

<sup>a</sup>The 1962 yearbook provides the same data for 1959-1960 as the 1961 yearbook.

Sources:

N.kh. 1960, p. 154, N.kh. 1961, p. 599, N.kh. 1962, pp. 483-484.

Changes of the magnitude of 10-15 per cent, which are almost wholly (1959) or partly (1960) offsetting, suggest possible reclassification of activities. Since the figures for gross (capital and current, material and wage) outlays on "science" and on administration in 1959 and 1960 are the same in both the 1960 and 1961 yearbooks,<sup>1</sup> and since many Soviet sources lump defense with administration and science in this type of breakdown,<sup>2</sup> it would seem not implausible that the changes noted in items 1.B and 1.C involve reclassification of some part of military outlays. As the reshuffling, if such it was, increased outlays in "institutions servicing the population" and decreased outlays in "science and administration," the motivation may have been connected less with foreign policy than with domestic political considerations of a familiar sort.

The revision of the 1960 yearbook values for "accumulation and other expenditure," shows that the change in net fixed capital investment in 1959 is a minor increase of only 1.3 per cent. The decline for 1960 is a bit larger but still less than four per cent of the 1960 yearbook figure.<sup>3</sup> As for inventories and reserves, the change in both years is a decline -- .8 and .6 billion rubles or 5.9 and 4.4 per cent respectively. For comparison again, the 1962 yearbook's revision of the 1961 values is insignificant in the case of net fixed capital investment and represents an increase of less than 2 per cent in item 2.B.

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<sup>1</sup>N.kh. 1960, pp. 844, 848, and N.kh. 1961, pp. 761, 764. For "administration," the relevant figure is the state budget appropriation; for "science," it is the expenditures from the budget and from other funds of enterprises and organizations.

<sup>2</sup>M. Eidel'man, "Opyt sostavleniia otchetnogo mezhotraslevogo balansa proizvodstva i raspredeleniia produktsii v narodnom khoziaistve SSSR," Vestnik statistiki, 1961, No. 7, p. 14. See also the Central Statistical Administration's Summary Table of the Balance of the National Economy as shown in Sobol', Appendix.

<sup>3</sup>Paraphrasing, an independent reconstruction of net fixed investment in 1959 and 1960 (my Soviet National Income and Product 1959-1962, forthcoming), using what is thought to be Soviet methodology, agrees more closely with the revised 1961 than with the 1960 yearbook figures.

The calculation of net fixed capital investment is too complex for an assessment of the changes indicated above. However, for inventories and reserves, it is striking that the 1961 yearbook presents the same inventory data for 1959 as does the 1960 yearbook; official data for 1960 and 1961 published subsequently are explicitly linked with the earlier pre-1961-yearbook figures.<sup>1</sup> Therefore, the revisions made in this category of the national income accounts by the 1961 yearbook must relate to (a) inventories in collective farms and the private sector, or (b) unfinished construction in the public sector, or (c) additions to state reserves, or all three.

Although the evidence is not conclusive, it suggests that for 1959, at least, estimates of collective farm investment were not revised: a source published in 1962 and two sources published in 1961 provide the same information for collective farm inventories in 1959.<sup>2</sup> Unfinished construction values appearing in an official source published just six months after the 1960 yearbook was signed to the printers are the same as those in the 1961 yearbook.<sup>3</sup> Tentatively, it may be concluded that for 1959, at least, and very likely for 1960, too, the revisions introduced by the 1961 yearbook involve the category of additions to state reserves.

If we then recalculate additions to state reserves with the same deductions but using the 1960 yearbook values of the "increase of material working capital and reserves," we obtain values that may be

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<sup>1</sup>Vestnik statistiki, 1962, No. 12, p. 83. The link is to data published in Vestnik statistiki, 1961, No. 6, pp. 85-93, which are identical with those in N.kh. 1960, pp. 92-101.

<sup>2</sup>Akademiia nauk SSSR, Institut ekonomiki, Obshchestvennye fondy kolkhozov i raspredelenie kolkhoznykh dokhodov, Moscow, Ekonomizdat, 1961, pp. 196-198; Vsesoiuznyi nauchno-issledovatel'skii institut ekonomiki sel'skogo khoziaistva, Povyshenie urovnia razvitiia kolkhoznogo proizvodstva, Moscow, Ekonomizdat, 1961, pp. 106-108; L. N. Kassirov, Oborotnye sredstva kolkhozov, Moscow, Sel'khozizdat, 1962, p. 21.

<sup>3</sup>Kapital'noe stroitel'stvo v SSSR, p. 126 and N.kh. 1961, p. 554. The former volume was signed to the printers in December 1961, the latter in May 1962.

compared with those previously computed, as follows (billion rubles):

	<u>1959</u>	<u>1960</u>	<u>1961</u>
Additions to state reserves			
1960 yearbook basis	2.0	6.3	
1961-yearbook basis	1.2	5.7	6.3

Reference was made earlier to the hypothesis that the mid-1961 planned 50 per cent increase in identified budget defense outlays was partly or wholly spurious -- that is, at least part of the change consisted of an accounting shift of outlays to "defense" from another budget category where these expenditures had been previously located for concealment. Is that hypothesis consistent with the reduction in the 1959 and 1960 values of additions to state reserves? Soviet sources state that additions to state reserves are financed from budget outlays on the "national economy." Hence, a "surfacing" of military outlays from "national economy" to "defense" could mean a slower growth or an actual decline in "additions to state reserves."<sup>1</sup>

It may be that the relatively small increase in total stockpiling in 1961, calculated on the basis of 1961 yearbook data, in itself implies a reclassification, particularly if there occurred any increase in accumulation of nonmilitary reserve stocks. However, the relation of the revisions in the 1959-1960 values of additions to state reserves (assuming we have correctly computed them) to the hypothesis of "surfacing" in 1961 seems tenuous. Were the revisions introduced in an attempt to conceal the size of the actual 1961 change in stockpiles? That is, is that change closer to zero (1961 value of 6.3 billions less 1960 value on 1960 yearbook basis of 6.3 billions) than to the difference between 6.3 billions (1961 value) and 5.7 billions (1960 value on 1961 yearbook basis)?

The reasoning seems labored. In view of the multiple uncertainties involved in calculation of the additions to state reserves, it

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<sup>1</sup>This, of course, assumes that state reserves is an accounting category rather than an institutional reality. If it is the latter, however, the financing change would, presumably, make no difference in the destination of the armaments and hence need not be reflected in a change in the national accounts.



is perhaps wiser to desist from further conjecture. At any rate, to return to the question that introduced this section, whatever reclassifications may have taken place do not explain the remarkably rapid growth of additions to reserves in 1959-1960 and again in 1962.

## V. CONCLUSIONS

To return to the question posed in the Introduction, what do we know and what don't we know about military outlays?

1. Those who argue, as does the CIA, that Soviet military outlays in the 1950s are not coterminous with the "defense" allocation in the Soviet budget have the weight of the evidence with them. It seems most unlikely that the budget outlay residuals do not also contain military expenditures, or that military R&D is not financed through the category of "education" rather than through "defense." The negative conditional phrasing of these findings is deliberate and unavoidable.

2. It is likely that military outlays did decline in the middle 1950s; both the official and the estimated series in Table 7 suggest that. After 1958, the series agreement evaporates. Although the official claim would have us believe that no real increase took place from 1957 to 1961, the estimated values show a sharp rise in 1959, with some small decline in 1960. What happened in 1961-1962 is still very unclear, judged by the behavior of the estimated values. Military expenditures may have at least held their own or nearly so in 1961; possibly they increased further and perhaps even more sharply than in 1959. The 1962 data almost defy comparison with earlier years.

3. The manipulation of machinery production and investment data produces some limited confirmation of the estimates of total military outlays, at least for a few years. Figure 2 supports the Greenslade-Wallace contention of divergence between civilian and military machinery output growth after 1957. Between 1957 and 1960 the estimated military outlay series behave more in keeping with the residual machinery output index than does the series of "defense" expenditures. Compared with an estimate of military production in 1959, the total outlays estimates appear much more reasonable than does "defense," after deduction of pay and subsistence, operation and maintenance, and R&D, as appropriate. This suggests, however, that "defense" cannot include all of pay and subsistence, operation and maintenance, construction, and procurement. Exactly what is included remains unknown.

4. If the hypothesis of "surfacing" of military outlays in 1961-1962 means a decrease in concealment, the verdict of Fig. 3 is a Scotch judgment, "not proven." Nor do the revisions in national income estimates discussed in Section IV lead to any apparent conclusion.

5. Something clearly of significance happened with regard to increments of state reserves in 1959-1960, but whether the significance attaches to the relatively low value in 1959 or the relatively high increment of 1960 is not clear. We know little about the magnitude of conventional state stockpiling; we can only guess at the possible role of armaments procurement in the sharply rising rate of stockpiling in 1960-1962. Nevertheless, it seems hard to dismiss as mere coincidence the spurt in additions to reserves in 1960 that follows hard on the heels of a sharp increase in all military outlays, shown in Table 7. In absolute and relative terms, the scale of stockpiling in those years is impressively large; between four and five per cent of national income, in the official calculation, was distributed in net additions to state reserves.

It is perhaps appropriate to end the study on the note of caution that introduced, and, hopefully, permeated it. Apart from all the qualifications in which the fragile structure of the argument has been packed, it is necessary to bear in mind the possibility that we have barely touched on the full range of concealment procedures available to the Soviet government. Perhaps the difficulty of this enterprise can be highlighted by reference to a dramatic case of successful U.S. concealment: Until recently revealed, the development of the A-11 hypersonic aircraft was apparently unknown to all but a handful in Congress and in the administration, despite the enormous amount of information on the U.S. military effort released to the public. The a fortiori argument for the Soviet Union certainly need not be spelled out. On the other hand, as a reminder not to yield to the temptation of assuming perfect Soviet subtlety and seeing concealment everywhere, it is sobering to recall our experience in World War II. As Burton Klein has shown, we consistently overestimated German military

expenditures in the prewar mobilization and almost equally consistently overestimated their military production during the war.<sup>1</sup> It is hoped that this Memorandum has maintained at least an uneasy balance between the extremes.

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<sup>1</sup>Burton H. Klein, Germany's Economic Preparations for War, Cambridge, Massachusetts, Harvard University Press, 1959, pp. 16-17, 101-103.

Appendix A

MILITARY CONSTRUCTION AND SOVIET INVESTMENT STATISTICS

In recent years Soviet statistical yearbooks have provided a variety of data on investment. These include gross investment at constant prices (excluding capital repairs and some minor investment expenditures), capital brought into operation during the year at constant prices, and the value of unfinished construction at the end of the year at actual current cost. Is military investment included in these series? As expected, the evidence is skimpy.

The official gross investment data published in the statistical yearbooks break down the destination of investment into the following branches: industry,<sup>1</sup> agriculture, transport and communication, housing construction, and a residual category labeled "construction of trade and communal enterprises, institutions of science, culture, education, health protection." There is no mention of military investment. However, the distribution exhausts the total investment volume and if military investment is included in the total, it is also to be found in one of the branches of destination.

A number of other branches of the economy are not specifically mentioned in the distribution -- the procurement and supply-sales organizations, miscellaneous branches of material production, and government administration. It seems likely that the miscellaneous branches of material production (for example, publishing, film production) are included with industry in the above breakdown. The location of investment in procurement and supply-sales facilities is conjectural; it is possible that "trade," one of the components of the residual category, is broader in definition than usual and includes all distribution activities.

Classification of investment in Soviet sources on planning are markedly different. The Balance of Capital Investment, which forms

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<sup>1</sup>From breakdowns of the investment in "industry" it is clear that the construction industry is included in this category.

part of the system of national balances employed by the Central Statistical Administration, develops the following breakdown:<sup>1</sup>

- I. Investment in Productive Fixed Capital
  - A. Socialist property (subdivided by state, cooperative, and collective farm)
    1. Industry
    2. Construction
    3. Agriculture
    4. Forestry
    5. Transport
    6. Communication
    7. Trade, procurement, material-technical supply
  - B. Personal property of collective farmers
  - C. Petty private property of individual peasants and artisans
- II. Investment in Nonproductive Fixed Capital
  - A. Socialist property (subdivided by state, cooperative, and collective farm)
    1. Housing
    2. Communal economy
    3. Education
    4. Health protection
    5. Administration
  - B. Personal property of workers, employees and collective farmers
  - C. Personal property of individual peasants and artisans

This classification also omits military construction as do all the tables relating to the capital stock in the national balances. On the other hand, "defense" is grouped with administration in national product balances of the system.<sup>2</sup>

A text for economic-statistical institutes and university faculties by the well known writer on financial matters, D'iachkov, classified investment as follows:<sup>3</sup>

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<sup>1</sup>Sobol', pp. 224-225.

<sup>2</sup>Ibid., Tables 1 and 5 of the national balances in the insert between pp. 226 and 227.

<sup>3</sup>M. F. D'iachkov, Statistika kapital'nogo stroitel'stva, Moscow, Gosstatizdat, 1962, pp. 13-14.

Productive capital investment

- Industry
- Construction
- Agriculture
- Transport
- Communication
- Trade and public catering
- Material-technical supply and sales
- Other branches of material production

Nonproductive capital investment

- Housing
- Communal economy and household services (bytovoe obsluzhivanie)
- Health protection, physical culture, and social security
- Education, culture, science, art
- Other nonproductive branches

In a rather sophisticated and detailed comparison of U.S. and USSR investment, Ia. B. Kvasha evades explicit confrontation of the issue of comparability with respect to military construction. Since he does not deduct military investment from the American data, he implies the inclusion of these outlays on the Soviet side too.<sup>1</sup>

To return to the published gross investment data, it would seem that if military investment is included at all, it is to be found in the residual, "construction of trade and communal enterprises, etc." The residual category is further broken down in only one of the post-war statistical handbooks, Capital Construction in the USSR. In this source, the investment residual is shown divided in two subcategories -- "construction of institutions of science, culture, education and health protection," and "construction of trade and communal enterprises" (million rubles):<sup>2</sup>

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Ia. B. Kvasha, Kapital'nye vlozheniia i osnovnye fondy SSSR i SShA, Moscow, Izdatel'stvo Akademii nauk SSSR, 1963, pp. 58, 68-70.

2

Kapital'noe stroitel'stvo v SSSR, p. 187. The data for item 1 in the following tabulation are taken from pp. 56-57 of the same source.

	1951-1955 <u>Cumulated</u>	<u>1956</u>	<u>1957</u>	<u>1958</u>	<u>1959</u>	<u>1960</u>
1. "Construction of trade and communal enterprises, institutions of science, culture, education, health protection," by all sectors, including collective farms	9936	3157	3541	4266	4896	5799
2. "Construction of institutions of science, culture, education, and health protection," by all sectors	4158	1378	1539	2001	2450	2853
3. "Construction of trade and communal enterprises," by all sectors	5778	1779	2002	2265	2446	2946

Items 2 and 3 exhaust item 1 without a remainder.

There is some scattered independent information on investment in trade and communal enterprises that is somewhat at variance with the entries for item 3 in this tabulation:

1. The 1959 state plan called for 100 million rubles of investment in trade, to be financed from the budget, enterprise retained profits, and amortization allowances.<sup>1</sup> It seems clear that so-called noncentralized investment is excluded. The coverage of "trade" is not indicated.

2. "From funds of the budget and own resources of state and cooperative organizations, about six billion [old -- 600 million new] rubles are expended annually on the expansion of the trade network, the equipping of enterprises of trade and public catering."<sup>2</sup> Inventory investment is not included in this figure. Again, the scope of "trade" is not defined.

<sup>1</sup>A. Zverev, "Gosudarstvennyi biudzhët pervogo goda semiletki," Planovoe khoziaistvo, 1959, No. 1, p. 6.

<sup>2</sup>V. Garbuzov, "Biudzhët novogo pod"ema ekonomiki i kul'tury strany," Planovoe khoziaistvo, 1959, No. 12, p. 13.



3. Total financing -- capital and current, budget and enterprise "own" -- of the communal economy was planned to be 3.14 billion rubles in 1960.<sup>1</sup> Based on these data and the budget financing for 1961, the 1961 plan figure corresponding might be four billion rubles.<sup>2</sup> In 1960-1961, the gross fixed capital of communal services increased two billion rubles. If the relationship between gross investment and increase of gross capital stock for housing holds as well for communal services, gross investment in communal services in those two years could not have exceeded 2.5 billion rubles,<sup>3</sup> or an average of 1.25 billion a year.

4. In the same two years, the gross fixed capital of procurement, supply-sales, trade and catering, and miscellaneous material production organizations increased by only one billion rubles. On this basis, even if all these branches were subsumed under item 3 of the tabulation above, their share of gross investment would hardly have exceeded three-quarters of a billion rubles per year.

Recent data on investment in education and culture enable some further refinement of item 2 in the above tabulation (million rubles):

	<u>1951-1955</u>	<u>1956</u>	<u>1957</u>	<u>1958</u>	<u>1959</u>	<u>1960</u>
"Construction of institutions of science, culture, education and health protection," all sectors	4158	1378	1539	2001	2450	2853
Less: construction of "educational and cultural institutions," all sectors <sup>4</sup>	2862	3337			1462	1647
Equals: investment in "science" and "health protection," all sectors	1296	1581			988	1206

<sup>1</sup>Ibid., p. 8.

<sup>2</sup>Izvestiia, December 21, 1961.

<sup>3</sup>N.kh. 1959, p. 67 and N.kh. 1961, pp. 69, 540-541.

<sup>4</sup>Vestnik statistiki, 1963, No. 5, p. 95. This source gives annual values beginning only with 1959 and cumulated totals for 1951-1955 and 1956-1958. Investment values at constant prices are given separately for construction of educational institutions -- further defined as

Of the 1956-1958 investment by all sectors in "science" and in "health protection," investment in "health protection" alone could account for perhaps 1.00-1.15 billion rubles.<sup>1</sup> The remainder of .43-.58 billion is hardly large enough to contain investment in science

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"schools, higher educational institutions, tekhnikums, children's institutions, and the like" and for construction of cultural institutions -- defined as "theaters, movie houses, clubs, houses of culture, and the like."

<sup>1</sup>These are sums of separate estimates for collective farms and the rest of the public sector. Collective farm investment is obtained as follows (million rubles):

	<u>1956</u>	<u>1957</u>	<u>1958</u>
1. "Construction of trade and communal enterprises, institutions of science, culture, education, health protection," all sectors	3157	3541	4266
2. Less: The above, state-cooperative sector only	2816	3216	3908
3. Equals: The above, collective farms only	341	325	358
4. Less: Investment in education and culture, collective farms	<div style="border-top: 1px solid black; width: 100%; margin-bottom: 5px;"></div> <span style="display: block; margin: 0 auto;">891</span>		
5. Equals: Collective farm investment in trade, communal enterprises, health protection	<div style="border-top: 1px solid black; width: 100%; margin-bottom: 5px;"></div> <span style="display: block; margin: 0 auto;">133</span>		

Lines 1 and 2 are taken from Kapital'noe stroitel'stvo v SSSR, pp. 56-57 and 60-61; line 4 is from Vestnik statistiki, 1963, No. 5, p. 95. Collective farms are assumed to make no investment in science. Of the residual sum of 133 million rubles, perhaps 65-100 million represented investment in health protection, physical culture, and social insurance. This category accounted for 63.4 per cent of the combined value of capital on all collective farms (including fishing cooperatives and inter-kolkhoz organizations) at the end of 1961 in trade and catering, communal economy and household services (bytovoe obsluzhivanie), and in health protection, physical culture and social insurance (N.kh. 1961, p. 421; figures are based on capital revaluation of that date).

State-cooperative sector investment in health protection and physical culture came to .27 billion rubles in 1955, .33 billion in 1956 and .33 billion in 1957. Investment in social insurance added an additional .01 billion in each of the three years (N.kh. 1958, p. 905). These data -- unfortunately, the latest available -- are almost certainly at current prices, but revaluation on an estimate price basis would most likely make little difference. Considerably more problematical is whether the figures include capital repairs.

A distribution of only state budget outlays on health protection shows the following investment flows at current prices (Raskhody na sots. kul't., p. 71; billion rubles):

and military investment: the latter must have been around one billion rubles for the three years cumulated, considering that in 1955 and 1956 military investment accounted for somewhere near 500 and 400 million rubles, respectively.<sup>1</sup>

The conclusion would seem to be again that the evidence is inconclusive. We cannot rule out the possibility that military investment is in fact excluded from the official investment statistics. At any rate, the locus of concealment is not readily apparent.

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	<u>1955</u>	<u>1956</u>	<u>1957</u>
Construction and procurement of equipment	.095	.114	.155
Capital repairs	.085	.096	.115
Total	<u>.180</u>	<u>.210</u>	<u>.270</u>

Considering the probably small size of other, non-budget investment in health and physical culture (all non-budget outlays on health and physical culture totaled .57 billion rubles in 1955 and .63 billion annually in 1957-1958, N.kh. 1958, p. 905), it would appear that the figures for state-cooperative investment cited above include capital repairs. However, the distribution in Raskhody omits 540-604 million rubles in these years. By analogy with omissions in similar breakdowns of budget outlays on education and on science (see Nimitz, Soviet Expenditures on Scientific Research), the unidentified outlays are assumed to be those of complete institutions. If construction and equipment accounted for the same proportion of unidentified as of identified outlays, unidentified investment excluding repairs would have come to 21, 23, and 30 million rubles, respectively, in 1955-1957. If this is the case, the inclusion of capital repairs in the state-cooperative sector investment figures no longer seems so likely.

To sum up: collective farm investment in health protection, physical culture, and social insurance facilities in 1956-1958 has been estimated as 65-100 million rubles. State-cooperative sector investment in these activities was officially given as .33 billion rubles in both 1956 and 1957. Assuming a 1958 value of .40 billion, the 1956-1958 total is 1.06 billion rubles. If this figure does not include capital repairs, investment (excluding repairs) by all sectors came to 1.13-1.16 billion rubles; if capital repairs are included, they probably amounted to about .10-.15 billion rubles.

<sup>1</sup>See above, p. 11, note 4.

Appendix B

SOURCES FOR TABLE 5

Figures for 1937-1948 in Table 5 are taken from Appendix Table B-1 below. The BE residual is item 7, the NE residual is item 1.F, and the IC residual is item 1.A(4).

## Appendix Table B-1

USSR STATE BUDGET EXPENDITURES, 1937, 1940, 1944, 1948  
(billion rubles)

	1937	1940	1944	1948
1. National economy				
A. Industry and construction				
(1) Fixed capital investment	.92	1.37	1.51	3.97
(2) Working capital investment	.33	.30	.20	.89
(3) Subsidies	.25	.45	.70	3.38
(4) Unidentified	<u>.18</u>	<u>.74</u>	<u>.60</u>	<u>1.18</u>
(5) Total	1.67 <sup>a</sup>	2.86	3.01	9.42
B. Agriculture (including MTS)	.95	1.26	.73	2.04
C. Trade and procurement	.32	.20	1.20	.45
D. Transportation and communication	.81	.69		1.63
E. Housing and communal economy	.28	.25		.50
F. Unidentified	<u>.31</u>	<u>.57</u>	<u>.43</u>	<u>.92</u>
G. Total	4.34	5.83	5.37	14.96
2. Social-cultural measures	3.09	4.09	5.13	10.57
3. Administration	.44	.68	.74	1.30
4. Defense	1.75	5.68	13.78	6.63
5. Loan service	.35	.28	.32	.35
6. Internal security	.30	.71	.66	2.58
7. Unidentified	<u>.35</u>	<u>.17</u>	<u>.40</u>	<u>.70</u>
8. Total expenditures	10.62	17.44	26.40	37.09

Note:

<sup>a</sup>Minor discrepancy between total and sum of components is due to rounding.

Sources:

Items 1.A (4), 1.F and 7 are obtained as residuals, subtracting other components from the relevant totals.

1. National economy.

  A. Industry and construction. 1937: SNIP 1937, p. 129.  
1940-1948: SNIP 1940-1948, pp. 179-180, except that 1940 fixed investment in industry is taken from Finansy i sotsialisticheskoe stroitel'stvo, p. 349, and 1944 total industry and construction is taken from

Sources to Appendix Table B-1 (continued)

K. N. Plotnikov, Ocherki istorii biudzheta sovetskogo gosudarstva, Moscow, Gosfinizdat, 1959, p. 410.

Other national economy (1.B - 1.E, 1.G). 1937, 1940, 1948: Plotnikov, pp. 193, 255, 410. 1944: Agriculture, ibid., p. 335; the sum of appropriations to trade and procurement, transportation and communication, housing, and communal economy represents an adjustment of preliminary figures to fit the final control total of all national economy expenditures (ibid., p. 324). The preliminary figures are given in Odinnadtsataia sessiia Verkhovnogo Soveta SSSR, 24 apreliia - 27 apreliia, 1945 g.; Stenograficheskii otchet, Moscow, Izdanie Verkhovnogo Soveta SSSR, 1945, p. 14.

2. Social-cultural measures; 3. Administration; 4. Defense;  
8. Total expenditures.

Plotnikov, pp. 206, 209, 213, 215 (1937); 260, 263, 268 (1940); 324 (1944); 407, 433, 434 (1948).

5. Loan service.

1937: SNIP 1937, p. 131. 1940: N.kh. 1959, p. 801.  
1944: SNIP 1940-1948, pp. 27, 159. 1948: ibid., p. 160 (planned figure).

6. Internal security.

SNIP 1940-1948, p. 27.

Appendix C

SOURCES FOR FIGURE 2

Index of total machinebuilding output (official). N.kh. 1962, p. 168.

CIA index of civilian machinery output. CIA, Indexes of Civilian Industrial Production in the USSR 1950-1961, September 1963, p. 2.

Index of investment in machinery. Appendix Table C-1, item 4.B. This is a modification of the CIA index (ibid., p. 33) to take account of the machinery component of nonproductive collective farm investment and to revalue the series at producers' prices. In addition, the investment series is lagged six months. The last two adjustments are required in order to compare the investment index with the production indexes. As is the case with the original CIA index, investment by fishing cooperatives is ignored as negligible. The calculation proceeds in three steps:

1. The first step involves calculation of collective farm investment in machinery. Values in purchasers' prices are discounted by 15 per cent through 1960 and by 10 per cent in 1961-1962 to transform the data into producers' price values. (See text, p. 44.)

2. Investment in machinery by other sectors is discounted 10 per cent in all years to the same purpose.

3. Machinery investment by all sectors is summed and lagged half a year.

Residual machinery output index. Appendix Table C-2, column 6.

Appendix Table C-1  
 CALCULATION OF AN INDEX OF SOVIET INVESTMENT IN MACHINERY, 1950-1962  
 (billion rubles)

	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
<b>1. Collective farm investment</b>														
<b>A. Productive</b>														
(1) Total	..	.836	.962	1.029	1.226	1.812	1.906	1.860	2.462	3.050	2.721	2.739	2.965	
(2) Less: construction- installation	..	.584	.692	.711	.827	1.164	1.241	1.247	1.325	1.779	1.770	..	..	
(3) Less: other non- machinery	..	.084	.096	.103	.123	.181	.191	.186	.246	.305	.272			
(4) Equals: machinery	..	.168	.174	.215	.276	.467	.474	.427	.891	.966	.679	.684	.740	
<b>B. Nonproductive</b>														
(1) Total	..	.074	.101	.139	.199	.288	.339	.323	.355	.404	.405	.380	.235	
(2) Of which: machinery	..	.007	.010	.014	.020	.029	.034	.032	.036	.040	.041	.038	.064	
<b>C. Productive and non-         productive investment         in machinery</b>	..	.175	.184	.229	.296	.496	.508	.459	.927	1.006	.720	.722	.764	
<b>D. Total collective farm         machinery at         producers' prices</b>	.125	.149	.156	.195	.252	.422	.432	.390	.788	.855	.612	.650	.688	
<b>2. Investment in machinery     by other sectors</b>														
A. At purchasers' prices	3.118	3.114	3.318	3.433	4.173	4.987	6.275	7.017	7.714	8.340	9.306	10.479	11.487	
B. At producers' prices	2.806	2.803	2.986	3.090	3.756	4.488	5.648	6.315	6.943	7.506	8.375	9.431	10.738	11.855
<b>3. Machinery investment by     all sectors at     purchasers' prices</b>	2.931	2.952	3.142	3.285	4.008	4.910	6.080	6.705	7.731	8.361	8.987	10.081	11.026	11.553
<b>4. Machinery investment lagged</b>														
A. Values	2.942	3.047	3.214	3.647	4.659	5.495	6.393	7.218	8.046	8.674	9.534	10.554	11.581	
B. Index, 1955 = 100	53.5	55.5	58.5	64.6	81.1	100.0	116.3	131.6	146.6	157.9	173.5	192.1	205.4	

(continued)



Appendix Table C-1  
 CALCULATION OF AN INDEX OF SOVIET INVESTMENT IN MACHINERY, 1950-1962  
 (billion rubles)

	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
1. Collective farm investment														
A. Productive														
(1) Total	..	.836	.962	1.029	1.226	1.812	1.906	1.860	2.462	3.050	2.721	2.739	2.965	
(2) Less: construction- installation	..	.584	.692	.711	.827	1.164	1.241	1.247	1.325	1.779	1.770	..	..	
(3) Less: other non- machinery	..	.084	.096	.103	.123	.181	.191	.186	.246	.305	.272			
(4) Equals: machinery	..	.168	.174	.215	.276	.467	.474	.427	.891	.966	.679	.684	.740	
B. Nonproductive														
(1) Total	..	.074	.101	.139	.199	.288	.339	.323	.355	.404	.405	.380	.235	
(2) Of which: machinery	..	.007	.010	.014	.020	.029	.034	.032	.036	.040	.041	.038	.024	
C. Productive and non- productive investment in machinery	..	.175	.184	.229	.296	.496	.508	.459	.927	1.006	.720	.722	.764	
D. Total collective farm machinery at producers' prices by other sectors	.125	.149	.156	.195	.252	.422	.432	.390	.788	.855	.612	.650	.688	
2. Investment in machinery														
A. At purchasers' prices	3.118	3.114	3.318	3.433	4.173	4.987	6.275	7.017	7.714	8.340	9.306	10.479	11.487	
B. At producers' prices	2.806	2.803	2.986	3.090	3.756	4.488	5.648	6.315	6.943	7.506	8.375	9.431	10.338	10.855
3. Machinery investment by all sectors at purchasers' prices	2.931	2.952	3.162	3.285	4.008	4.910	6.080	6.705	7.731	8.361	8.967	10.081	11.026	11.543
4. Machinery investment lagged														
A. Values	2.942	3.047	3.214	3.647	4.459	5.495	6.393	7.218	8.046	8.674	9.534	10.554	11.285	
B. Index, 1955 = 100	53.5	55.5	58.5	66.4	81.1	100.0	116.3	131.4	146.4	157.9	173.5	192.1	205.4	

(continued)

Appendix Table C-1 (continued)

Sources:

1. Collective farm investment

A. Productive.

(1) Total. 1951-1960: Kapital'noe stroitel'stvo v SSSR, p. 155. 1961-1962: N.kh. 1962, entries on p. 434 minus corresponding entries on p. 435.

(2) Less: construction-installation. Ibid., p. 164.

(3) Less: other non-machinery. Following CIA (Index of Civilian Industrial Production, p. 33), assumed to be ten per cent of item 1.A.(1).

(4) Equals: machinery. The series is extended through 1961-1962 on the assumption that investment in machinery increased in proportion to the changes in item 1.A.(1).

B. Nonproductive.

(1) Total. The difference between (a) all collective farm investment, productive and nonproductive, and (b) productive investment, item 1.A.(1) above. Total investment is taken from Kapital'noe stroitel'stvo v SSSR, p. 152 (1951-1960), and N.kh. 1961, p. 546. The 1962 figure is estimated on the basis of a 1962 investment datum including investment by fishing cooperatives and an estimate of the fishing cooperative component based on data of earlier years (Kapital'noe stroitel'stvo v SSSR, pp. 40 and 152).

(2) Of which: machinery. It is assumed that only ten per cent of nonproductive investment consists of machinery whereas in productive investment this share is roughly one-quarter.

C. Productive and nonproductive investment in machinery.  
The sum of items 1.A.(4) and 1.B.(2).

D. Total collective farm machinery at producers' prices.  
Entries under item 1.C are discounted 15 per cent through 1960 and ten per cent in 1961-1962. See text, p. 44. Entries for 1950 and 1963 are somewhat arbitrary estimates.

2. Investment in machinery by other sectors

A. At purchasers' prices. 1950-1960: Kapital'noe stroitel'stvo v SSSR, p. 44. 1961-1962: N.kh. 1962, pp. 433-435.

B. At producers prices. A discount factor of ten per cent is applied to the series at purchasers' prices. See text, p. 44. The entry for 1963 assumes a five per cent increase: the 1963 plan fulfillment report (Pravda, January 24, 1964) speaks vaguely of a six per cent increase in gross investment and a four per cent growth of construction-installation. The figures probably refer to centralized investment, and, assuming construction-installation accounted for 60 per cent of the total, imply a nine per cent increase in other,

Appendix Table C-1 (continued)

primarily equipment, investment. It appears likely that noncentralized investment increased little if at all in a period of great resource tightness.

3. Machinery investment by all sectors at purchasers' prices

The sum of items 1.D and 2.B.

4. Machinery investment lagged

Each entry is obtained by averaging the entry for that year with the year following under item 3.

Appendix Table C-2

CALCULATION OF THE RESIDUAL MACHINERY OUTPUT  
INDEX, 1950-1962  
(billion rubles)

Year	Total Gross Output of Machinery	Less			Equals	
		Output of Consumers' Durables Excluding Electronics	Output of Consumer Electronics	Investment in Machinery	Residual Machinery Output Value	Index, 1955=100
	(1)	(2)	(3)	(4)	(5)	(6)
1950	5.7	.142	.059	2.942	2.6	34
1951	6.9	.187	.069	3.047	3.6	47
1952	8.0	.217	.074	3.214	4.5	58
1953	9.7	.265	.099	3.647	5.7	74
1954	11.5	.352	.190	4.459	6.5	84
1955	13.9	.435	.258	5.495	7.7	100
1956	16.3	.493	.285	6.393	9.1	118
1957	18.9	.542	.289	7.218	10.6	142
1958	21.7	.602	.346	8.046	12.7	165
1959	25.0	.652	.395	8.674	15.3	199
1960	29.0	.684	.466	9.534	18.3	238
1961	33.6	.732	.501	10.554	21.8	283
1962	38.9	.800	.533	11.285	26.3	342

Sources:

(1) Total gross output of machinery. The official index (N.kh. 1962, p. 168) was converted into a series of absolute values on the basis of an estimate of 13.92 billion rubles for the 1955 entry in the series. CIA, Index of Civilian Industrial Production in the USSR 1950-1961 (Supplement), October 1963, p. 149.

(2) Output of consumers' durables excluding electronics. 1950-1961: CIA, Index of Civilian Industrial Production in the USSR 1950-1961, p. 26. 1962:

Appendix Table C-2 (continued)

Arbitrary estimate. An error of plus or minus 50 per cent on this figure would offset the 1962 value in column (5) by less than two per cent.

(3) Output of consumer electronics. Computed as the sum of the values of output of radios and television sets. Values of output were computed using 1955 average prices of 53 rubles per radio and 142 rubles per television set, given in CIA, Index of Civilian Industrial Production in the USSR 1950-1961 (Supplement), October 1963, p. 111; physical output data, ibid., p. 34 and N.kh. 1962, p. 202.

(4) Investment in machinery. Appendix Table C-1, item 4.A.

Appendix D

Appendix Table D-1

PARTIAL BREAKDOWN OF USSR MILITARY OUTLAYS, 1955-1962  
(billion rubles)

	1955	1956	1957	1958	1959	1960	1961	1962
1. All military outlays								
A. "Defense"	10.74	9.73	9.12	9.36	9.37	9.30	11.6	12.7
B. Estimated total: low	12.46	12.11	11.52	11.59	14.77	13.72	13.3-22.4	14.5-19.5
C. Estimated total: high	15.00	14.81	14.39	14.63	18.00	17.15	17.0-26.1	16.6-23.4
2. Less:								
A. Military pay and subsistence	5.42	4.90	4.18	4.14	3.92	3.60	3.3	3.6
B. Military pensions paid from "defense" allocation	.30	.30	.30	.30	.30	.30	.3	.3
3. Equals: procurement and other outlays, as residual in								
A. "Defense"	5.02	4.53	4.64	4.92	5.15	5.40	8.0	8.8
B. Estimated total: low	6.74	6.91	7.04	7.15	10.55	9.82	9.7-18.8	10.6-15.6
C. Estimated total: high	9.28	9.61	9.91	10.19	13.78	13.25	13.4-22.5	12.7-19.5

(continued)

Appendix D

Appendix Table D-1

PARTIAL BREAKDOWN OF USSR MILITARY OUTLAYS, 1955-1962  
(billion rubles)

	1955	1956	1957	1958	1959	1960	1961	1962
1. All military outlays								
A. "Defense"	10.74	9.73	9.12	9.36	9.37	9.30	11.6	12.7
B. Estimated total: low	12.46	12.11	11.52	11.59	14.77	13.72	13.3-22.4	14.5-19.5
C. Estimated total: high	15.00	14.81	14.39	14.63	18.00	17.15	17.0-26.1	16.6-23.4
2. Less:								
A. Military pay and subsistence	5.42	4.90	4.18	4.14	3.92	3.60	3.3	3.6
B. Military pensions paid from "defense" allocation	.30	.30	.30	.30	.30	.30	.3	.3
3. Equals: procurement and other outlays, as residual in								
A. "Defense"	5.02	4.53	4.64	4.92	5.15	5.40	8.0	8.8
B. Estimated total: low	6.74	6.21	7.04	7.15	10.55	9.82	9.7-18.8	10.6-15.6
C. Estimated total: high	9.28	9.61	9.91	10.19	13.78	13.25	13.4-22.5	12.7-19.5

(continued)

Sources to Appendix Table D-1 (continued)

1. All military outlays. Table 7.

2.A. Military pay and subsistence. 1956-1958: SNIP 1956-1958, p. 2. 1955: Assumes pay and subsistence levels of 1956 and an average force level in 1955 of 5.4 million men (*ibid.*, pp. 33, 50). 1959-1962: Average pay of 690 rubles and subsistence of 400 rubles per man per year estimated for 1958 are assumed constant through 1962. The force levels are estimated as 3.6 millions in 1959, 3.3 millions in 1960 and 3.0 millions in 1961, following J. G. Godaire's interpretation of Khrushchev's January 1960 demobilization speech and the announced suspension of the demobilization in mid-1961. (Godaire, "The Claim of the Soviet Military Establishment," Dimensions of Soviet Economic Power, 1962, p. 43.)

In his speech, Khrushchev indicated that he expected the demobilization of 1.2 million men to effect savings of 1.6 to 1.7 billion rubles, or 1333-1417 rubles per man. The pay and subsistence per man used here totals 1090 rubles. However, Khrushchev's figure undoubtedly includes manpower costs other than pay and subsistence.

2.B. Military pensions. A notional allowance for all years based on discussion in SNIP 1956-1958, p. 120.



Appendix E

INCREMENTS OF STATE RESERVES, 1953-1962

The national income category of "increment of material working capital and reserves" is defined as consisting of "the increment of working capital [material'nye oborotnye sredstva] (stocks of raw and other materials, fuel, finished output, trade balances [ostatki tovarov v trgovle]), stocks of agricultural products, unfinished capital construction and so forth), the increment of state material reserves, the increment of private stocks of agricultural products held by the population."<sup>1</sup> Official data on current assets held at the end of the year are now available for the years 1950, 1955, 1958-1962, and for the entire public sector excluding the collective farms.<sup>2</sup> From the above definition of additions to working capital and reserves, it would appear that the so-called "state reserves" are excluded from, and unfinished public sector investment is included in, the statistics of current assets in the public sector. Other sources make it clear that the first inference is true;<sup>3</sup> from internal and other evidence, the second inference appears to be incorrect.

The basic source of confusion is that although unfinished investment would seem to be to construction as unfinished production is to industry and agriculture, payment and accounting procedures in Soviet construction nullify the analogy. Construction organizations working on contract receive payment at regular short intervals on completion of elements of the project. Work paid for, though constituting only

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<sup>1</sup>N.kh. 1960, p. 154; N.kh. 1961, p. 599; N.kh. 1962, p. 483.

<sup>2</sup>Presumably, not only the agricultural collectives but also the small number of fishing kolkhozy.

<sup>3</sup>Sobol', p. 162, and Tables 3 and 5 of the Appendix thereto; I. A. Morozova, Balans narodnogo khoziaistva i metody ego postroeniia, Moscow, Gosstatizdat, 1961, pp. 75-76.

unfinished construction, represents finished output for the construction organization. The accounting treatment of this transaction will show the value of the completed element on the books of the contractor only as a financial item -- that is, as an addition to cash or bank accounts. At the same time, the completed element will not appear as an item in the contractee's current material assets but on a separate capital asset account.<sup>1</sup> Thus, only a small amount of unfinished construction is to be found in inventories; most unfinished construction is a capital item in enterprise accounting and for national income purposes must be added to reported inventories.<sup>2</sup>

There is an additional complication in the accounting of unfinished investment projects that leads to uncertainty with respect to coverage in the official national income accounts. This is the treatment of equipment requiring installation but whose installation has not yet been begun. Equipment not requiring installation is considered part of fixed capital put into operation -- that is, of completed investment -- as soon as it is received at the warehouse of the construction site. However, equipment requiring installation is not recorded in investment -- and, hence, neither in unfinished construction nor in capital put into operation -- until it is withdrawn from the project warehouse for the purpose of beginning installation.<sup>3</sup>

Warehouse stocks of equipment requiring installation are clearly not included in the current asset accounts. The value of uninstalled equipment sitting in warehouses of construction sites and enterprises

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<sup>1</sup> R. Belkina, Oborotnye sredstva podriadnykh stroitel'nykh organizatsii, Moscow, Gosfinizdat, 1962, pp. 17-18, 26-27; I.G. Galkin, Voprosy r'atmichnosti i zadela v stroitel'stve, Moscow, Gosstroizdat, 1962, p. 62.

<sup>2</sup> In the current-asset data, "unfinished nonindustrial production" for all branches of the public sector (again, excluding collective farms) on 1 January 1961 was 355 million rubles, while the total value of "unfinished construction" so-called in the sector was 21.4 billion rubles. N.kh. 1961, pp. 70, 73 and 554.

<sup>3</sup> M. F. D'iachkov, Statistika kapital'nogo stroitel'stva, Moscow, Gosstatizdat, 1962, p. 33; D. L. Maisel's, Statistika kapital'nogo stroitel'stva, Moscow, Gosstatizdat, 1962, p. 42.

came to "more than 1.4" billion rubles at the beginning of 1958 and "more than 2" billion on 1 July 1961.<sup>1</sup> There is nothing in the current asset data that remotely corresponds to this category of assets or to the magnitude of its indicated value; the value of all "unfinished nonindustrial production" in the public sector came to 236 million rubles at the beginning of 1956, 220 at the beginning of 1959, and 355 million at the beginning of 1961.<sup>2</sup>

It is, therefore, necessary to distinguish between "unfinished construction," the category appearing in Soviet statistics, and "unfinished investment," which includes in addition warehouse stocks of machinery requiring installation. It is assumed here that in regard to item 2.B of the text Tables 9 and 10, the statistical year-books mean to include not just "unfinished construction," but all "unfinished investment." Therefore, a separate estimate is required of warehouse stocks of equipment requiring installation.<sup>3</sup>

We may now estimate the increment to state reserves as a residual after deducting the value of other components of the category "additions to material working capital and reserves" (Appendix Table E-1). We shall not attempt to take account of unfinished construction in the private sector (private housing construction). Apparently, neither does the Central Statistical Administration, on the declared grounds that the construction cycle in this sector is short.<sup>4</sup> Inventory changes in the private sector must also be ignored, for lack of data, but the magnitudes involved are undoubtedly insignificant.

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<sup>1</sup>P. D. Podshivalenko, "Nekotorye voprosy ekonomiki stroitel'stva v novykh usloviakh," Voprosy ekonomiki promyshlennosti i stroitel'stva v novykh usloviakh, Vypusk I, Moscow, Izdatel'stvo VPSH i AON pri TsK KPSS, 1959, p. 122; Pravda, December 9, 1961, p. 5.

<sup>2</sup>N.kh. 1960, pp. 92, 96; N.kh. 1961, pp. 70, 73.

<sup>3</sup>I am indebted to Raymond P. Fowell for help in clarifying this question.

<sup>4</sup>D'iachkov, p. 91.

Appendix Table E-1

INCREMENTS OF INVENTORIES AND OF RESERVES, 1959-1962  
(billion rubles)

	1958	1959	1960	1961	1962
1. Stocks at the end of the year					
A. Inventories in the public sector excluding collective farms					
(1) "Commodity-material values" (tovarno-material'nye tsennosti)	57.284	66.312	70.988	78.415	85.527
(2) Less: expenditures of future periods in all branches except construction	.807	.937	1.072	1.183	1.290
(3) Goods shipped and services performed	7.551	8.329	8.461	8.534	8.357
(4) Less: goods shipped and services performed in construction and transport-communication	.323	.377	.420	.464	.478
(5) Equals: inventories	63.705	73.327	77.957	85.302	92.116
B. Inventories in collective farms	<u>7.562</u>	<u>7.783</u>	<u>7.75</u>	<u>7.75</u>	<u>7.5-9.0</u>
C. Total: inventories, all public sector	71.267	81.110	85.71	93.05	99.6-101.1
2. Annual increments to stocks					
A. Inventories, all public sector		9.84	4.60	7.34	6.5-8.0
B. Unfinished construction in collective farms		.08	.02	.10	.10
C. Unfinished investment in other public sector					
(1) Unfinished construction		1.54	2.34	3.43	1.34
(2) Warehouse stocks of equipment requiring installation		<u>.08</u>	<u>.12</u>	<u>.45</u>	<u>.31</u>
(3) Total		1.62	2.46	3.88	1.65
D. Additions to state reserves		1.3	5.8	6.3	6.7-8.2
E. Total, additions to inventories and reserves		12.8	12.9	17.6	16.5

Sources to Appendix Table E-1 (continued)

1. Stocks at the end of the year

A. Inventories in the public sector excluding collective-farms. N.kh. 1962, pp. 56, 57, 59, 61 and Vestnik statistiki, 1962, No. 11, pp. 83, 84, 86. Data are lacking in these sources for the share of "goods shipped and services performed" in all current assets of transport and communication in 1958, 1959, and 1962. The percentages shown for 1958 and 1959 in N.kh. 1960, p. 94 apply to a slightly smaller absolute base. The missing shares are here assumed to be uniformly eight per cent, the same as in 1960. This percentage is applied to the transport and communication totals shown in N.kh. 1962.

"Expenditures in future periods" in construction are not deducted because, according to a Soviet source, these "consist chiefly of outlays on temporary attachments and structures intended to service the construction site until the completion of operations" (Vysshaia partiinaia shkola pri TsK KPSS, Ekonomika stroitel'stva, Moscow, Gospolitizdat, 1962, p. 468).

B. Inventories in collective farms. For 1958-1960, SNIP 1959-1962. The 1961 stock is assumed the same as in 1960, whereas the range for 1962 is intended to allow for the price increases announced in the middle of that year.

2. Annual increments to stocks

A. Inventories, all public sector. From item 1.C.

B. Unfinished construction, collective farms. 1959-1960: R. P. Alekseeva and A. P. Voronin, Nakoplenie i razvitie kolkhoznoi sobstvennosti, Moscow, Ekonomizdat, 1963, pp. 58-59. 1961: National data that appear to relate to only part of money investment -- possibly, to investment from "own resources" alone -- indicate that the increment of unfinished investment dropped 20 per cent in 1960 and in 1961 was about 14 per cent above the 1959 level (K. Ereemeev, "Ekonomicheskaja otsenka kapital'nykh vlozhenii v sel'skokhoziaistvennoe stroitel'stvo," Ekonomika sel'skogo khoziaistva, 1963, No. 12, p. 62. On this basis, 1961 is estimated as .10 billion rubles. 1962: Arbitrary estimate.

C. Unfinished investment in other public sector.

(1) Unfinished construction. N.kh. 1962, p. 439.

(2) Warehouse stocks of equipment requiring installation. 1959-1960: Stocks on 1 January 1958-1961 are assumed equivalent to five per cent of the reported value of unfinished construction. The basis for this assumption is as follows: The warehouse stock of uninstalled equipment at the beginning of 1958 (see above, p. 95) was equivalent to more than eight per cent of unfinished construction on that date (17.6 billion rubles -- N.kh. 1961, p. 554). The corresponding values for July 1961 are "more than two billion rubles" for uninstalled equipment and, say, 23.1 billion rubles for unfinished construction (end-year values for 1960 and 1961 were 21.4 and 24.8

Sources to Appendix Table E-1 (continued)

billion rubles -- N.kh. 1962, p. 439). Hence, uninstalled equipment was perhaps 9-10 per cent of unfinished construction in the middle of 1961. It is possible that the indicated values of uninstalled equipment also include equipment that does not require installation. To minimize the error in both directions, it is assumed here that only half of these values refer to equipment requiring installation. 1961-1962: Warehouse stocks of equipment requiring installation increased 42 per cent between 1 January 1961 and 1 January 1962 and 71 per cent in the two years following 1 January 1961. P. Zel'tser, "Rezervy uvelicheniia parka deistvuiushchego oborudovaniia," Vestnik statistiki, 1963, No. 12, p. 12.

D. Additions to state reserves. Residual obtained as the difference between item 2.E and the sum of items 2.A, 2.B, and 2.C(3).

E. Total, additions to inventories and reserves. N.kh. 1962, p. 484.

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