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4 August 1965

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CIA/ [Redacted]

A STUDY OF THE SOVIET GROUND FORCE:
A SECOND REPORT

ASSESSMENT OF EVIDENCE
ON LAND COMBAT EQUIPMENT

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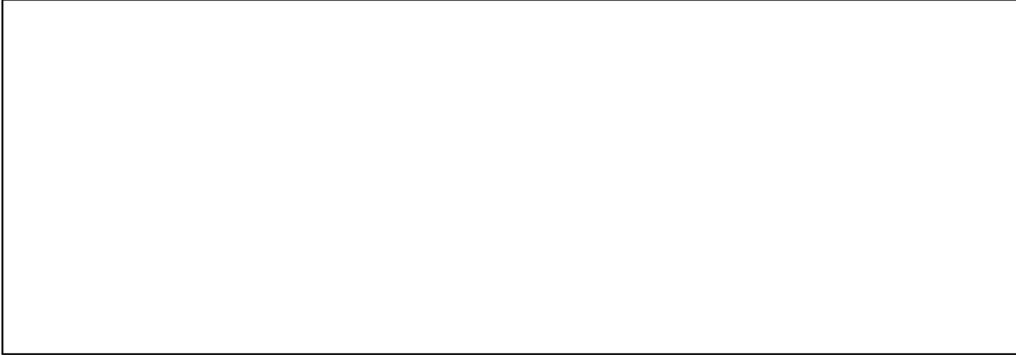
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CIA/DIA PANEL FOR A SPECIAL
STUDY OF THE SOVIET GROUND FORCE
FOR
SECRETARY McNAMARA

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A STUDY OF THE SOVIET GROUND FORCE:
A SECOND REPORT

The Problem:

To reexamine the evidence and assess the level of confidence or range of uncertainty applying to the inventories and rates of production of land combat equipment and conventional ammunition of the Soviet ground force.

The Scope of This Report

On 10 September 1963 an interim report, [REDACTED] prepared by a special CIA/DIA Panel, was forwarded to the Secretary of Defense. The 1963 report was, in effect, the answer by the CIA/DIA Panel to the Secretary's questions regarding the number of major line elements in the Soviet ground force and the gross capabilities and mobilization potential of the force in terms of available military manpower. The current report is concerned with the evidence on the inventory of Soviet land combat equipment** and conventional ammunition currently available to the Soviet ground force and the conclusions that can be based on the available evidence. As was the case in the previous Panel report, the findings presented in this report are based on exhaustive research and analysis.

[REDACTED]

** The terms land combat equipment and land armaments include armored vehicles, artillery and mortars, rocket launchers, small arms and other infantry weapons, and special vehicles (such as amphibians, artillery prime movers, and tank-recovery vehicles). These terms do not include tactical missiles, army or tactical aviation, communications and other electrical or electronic gear not integral to land combat equipment, or general-purpose vehicles and support equipment (such as trucks, graders, scrapers, dozers, cranes, and bridges).

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Summary

The Panel has examined the evidence from [REDACTED] on the inventory and rates of acquisition of land combat equipment and ammunition by the Soviet ground force. We find that the flow of information on this subject has diminished greatly since the period immediately after World War II with very little information having become available in recent years. Current information is fragmentary and inconclusive.

The Panel concludes from its review that the evidence is adequate for understanding the general nature of the Soviet effort to develop, produce, and maintain various types and models of modern equipment. The Panel also concludes reluctantly that evidence is insufficient to determine numbers of items in the existing inventory within useful confidence limits. The Panel further finds that evidence on rates of production is inadequate to determine with confidence a range of inventories from possible cumulative production. The evidence permits a wide selection of assumptions concerning production capacities, rates, and duration, except for a small number of unrelated items. Various estimating procedures were examined, but none was found that would reduce the range of uncertainty to useful proportions.

[REDACTED]

The Panel has little doubt that the Soviets have produced and maintained large quantities of a wide variety of items. As many as 80 models of land combat equipment may have been produced in quantity since the end of World War II. There is firm evidence from a [REDACTED] which indicates quantity production of about 60 models. There also is reasonably good evidence to justify the belief that the extensive land armaments industry known to be in operation in early postwar years still exists and retains much of its output capacity. This capacity is almost certainly large enough to have produced in large quantities all

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of the 80 models and types observed. In addition, the evidence has shown that the Soviets go to remarkable lengths to preserve the useful life of their inventory.

New equipment has been sent to field units at a gradual, sometimes almost leisurely, rate. The Panel has not been able to determine the rates of production or distribution of equipment or the relationship between them. It is possible that some new equipment is sent directly to storage as combat reserve, although reason would seem to rule otherwise. The distribution pattern for new equipment has been uneven, and in some cases the development and production of new models overtook the gradual issue of previous models. Soviet military leaders have spoken of the heavy cost of furnishing modern equipment to the ground force and have said that not all units would have the latest models. Although [REDACTED] has revealed stocks of weapons associated with some of the active units, it has not as yet revealed any large general storage areas for land armaments.

The Panel believes that the Soviets probably have enough land armaments in inventory to provide all active units, regardless of their manning levels, with land combat equipment in quantities adequate for their training and commitment to combat, that few if any units are likely to be completely equipped with the latest models, and that some are almost certainly equipped wholly with older models. The Soviets have planned to mobilize additional forces, if need be, by detaching cadres from existing units to form new ones and to call reserve personnel into active service. It is uncertain how many additional divisions and supporting units could be equipped from existing stocks. Doctrinal and technical developments and continuing budgetary stringencies may have prompted a reconsideration of mobilization plans with a resultant change in the requirements for stocks of equipment.

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I. Nature of the Evidence

The evidence available for the assessment of the levels of output or of the inventory of Soviet land armaments originates, with one exception, from those [redacted] that have been discussed in the Panel's first interim report -- [redacted]

[redacted]

[redacted]

A. [redacted]

The variety of materiel and the problems outlined above on production, storage, and deployment limit the scope of information obtainable by [redacted]. Even accurate information which might be

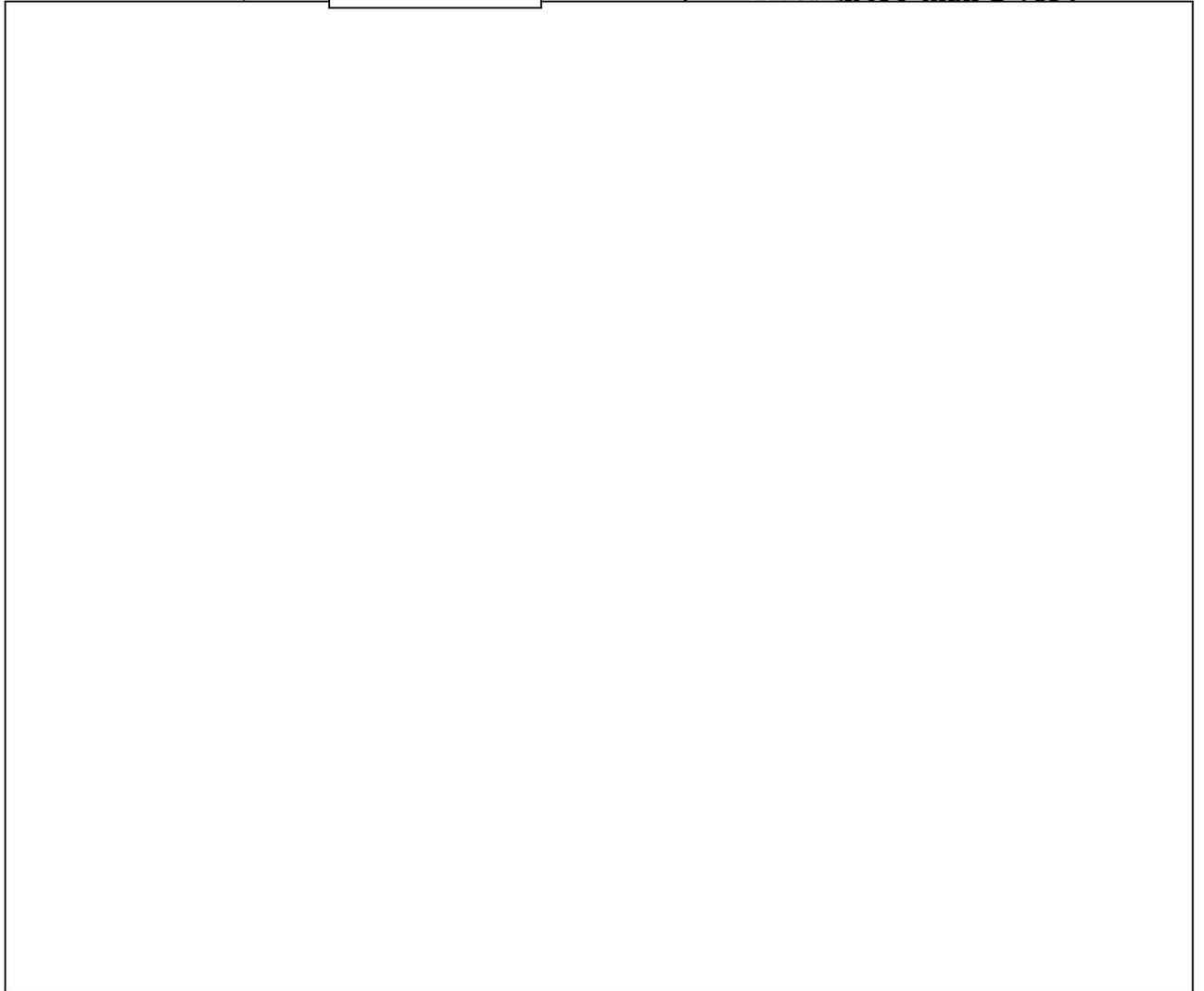
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gleaned by a given [redacted] is unlikely to cover more than a very



B. Soviet Documents

[redacted] unclassified Soviet documents have been obtained which included generalized references to the supply of equipment and to economic limitations on procurement, but none has been of value in assessing the quantities of items programed, produced, or maintained in inventory. [redacted]



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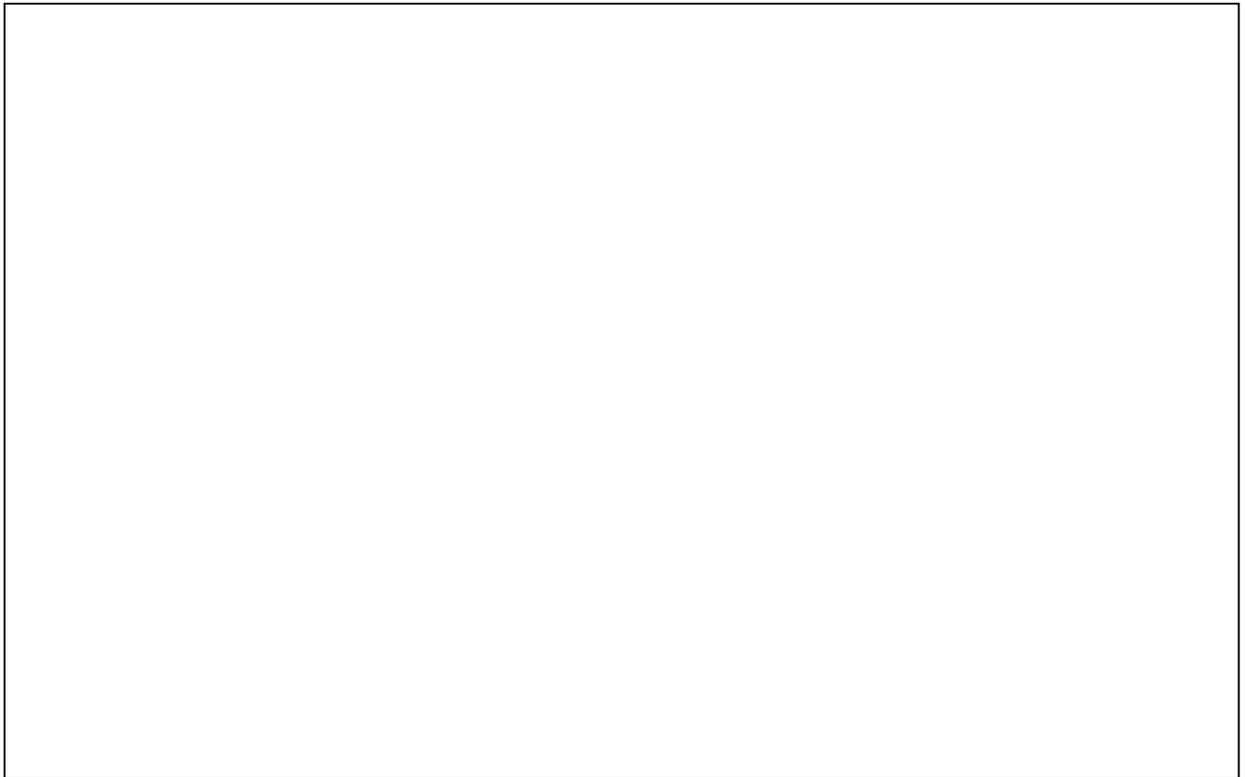
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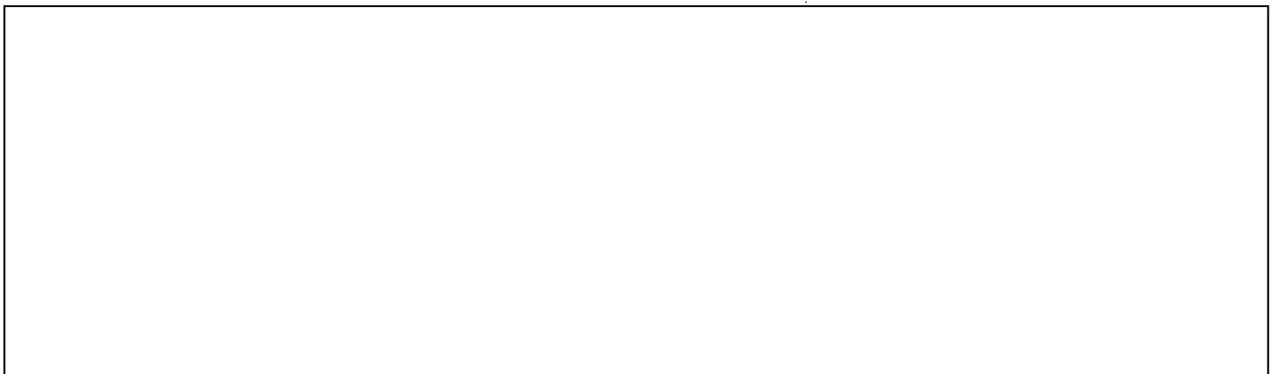
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II. Assessment of the Evidence

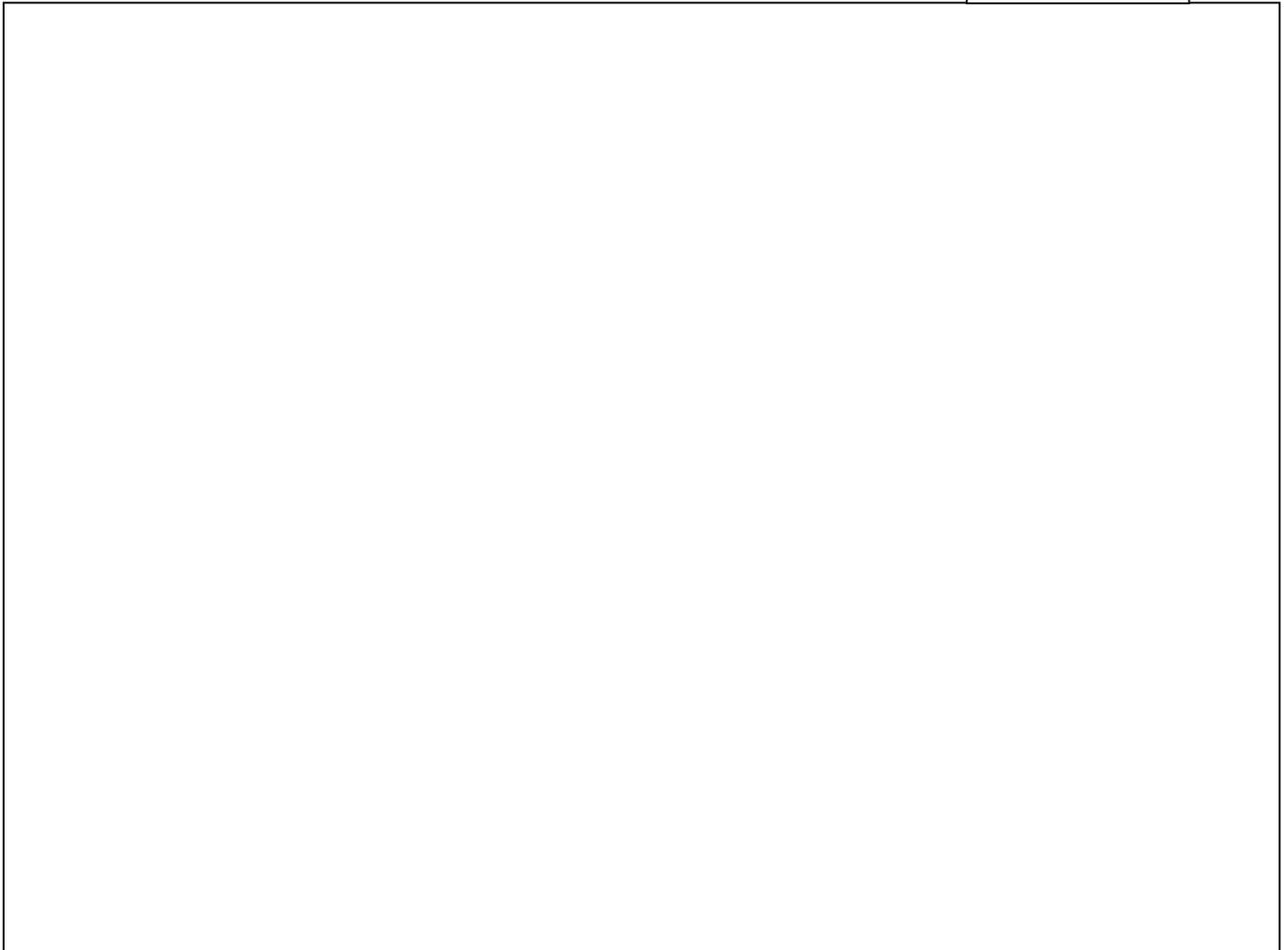
After observing the absence of evidence applicable to the direct determination of inventories, the Panel proceeded perforce along very basic lines in its assessment. It reviewed the evidence relating to the existence of items and the probability of quantity production and then examined evidence that might permit derivation of inventories through methods such as cumulating annual production or surveying the equipment in the hands of troops.

A. Direct Establishment of National Inventories



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B. The Existence of Items and the Probability of Quantity Production

1. The Existence of Items

The Panel is satisfied that, with the exception of very new items, the types and models of land combat equipment and ammunition in the Soviet inventories since World War II have been identified by the



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2. The Probability of Quantity Production

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[Redacted]

[Redacted]

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C. Assessment of Cumulative Production

Analyses of information on Soviet capabilities to produce land armaments and ammunition, past production patterns, distribution of some of the items produced, and length of production runs for specific items permit only an approximation of annual and cumulative production within quite broad limits of confidence.

1. Capabilities and Requirements

a. Production Organization and Facilities

Since the end of World War II the organizations managing production of land combat equipment and ammunition have changed several times. At the end of World War II the Ministries of Armaments and Munitions were separate. In 1953 the Ministry of Armaments was combined with the Ministry of Aviation into the Ministry of Defense Industry. In 1954 the Ministry of the Aviation Industry became a separate ministry once again. In 1957 the Ministry of Defense Industry was combined with the Ministry of General Machine Building into the State Committee on Defense Technology, which organization continued into 1965. In 1946, the Ministry of Munitions was incorporated into the Ministry of Agricultural Machine Building; in 1952 into the Ministry of Machine Building; and in 1954 into the Ministry of Automobile, Tractor, and Agricultural Machine Building. Subordination after the general reorganizations of 1957 is uncertain, but responsibility for ammunition probably was placed under the State Committee for Defense Technology along with responsibility for land armaments. In March 1965 the state committees associated with defense production were reorganized into USSR ministries, one of which is the Ministry of Defense Industry. It is likely that this ministry has resumed control of those plants subordinate to the pre-1957 Ministry of Defense Industry. A Ministry of General Machine Building also has been reconstituted, although its area of responsibility is uncertain. In none of the organizational patterns noted above have primary production facilities been known to have been directly subordinate to the Ministry of Defense.

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[REDACTED]

Design and development of materiel may be handled either jointly or separately by the responsible military arms or services and by the design institutes and plant design bureaus. Designs are allocated to plants for the production of prototypes with the developmental work and testing of the prototypes under the supervision of military representatives. General direction and final decisions on all major programs are given by the highest government officials.

This apparatus has available to it a large, well-equipped industrial base for the production of conventional armaments -- 7 plants have been identified as producers of armored vehicles, 9 for artillery, 7 for small arms, and 57 for ammunition.

It is believed that the plants producing armaments are among the most efficient in Soviet industry, having first call on new production equipment and skilled labor.

[REDACTED] Soviet designers have achieved an enviable record in development of simple, rugged land armaments that do the jobs for which they are designed with a minimum of weight and complex mechanisms. The record achieved by the Soviets in the design and production of land armaments during World War II borders on the incredible. This record should be taken into account in any assessment of Soviet capabilities. Soviet industry probably still has the capability to increase its production of land combat equipment and ammunition very rapidly and to add significant quantities of these items to the existing inventory within a period of months.

Information on production facilities and their operations for the period 1946-53 was received in large quantities from [REDACTED]. This information on production techniques, labor force, types of armaments, and the destination of finished articles furnishes the base of our knowledge of the industry at the present time. Information received since the early 1950's has little more than confirmed the probability of continued production of some items and provided some small insight into the direction and scope of present activities.

[REDACTED]

Most of the plants which produce land armaments also produce civilian goods such as tractors, railway equipment and machinery, and heavy industrial machinery. Because much of the equipment used to

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[redacted]
[redacted]
[redacted] produce the civilian goods also is suitable for armaments, these plants offer the capability of rapid expansion of armaments production. [redacted]

[redacted] on the production of civilian goods by these plants as a counter-indication of armaments production. Not enough is known, however, about changes in production techniques, changes in plant capacities, or the range of articles produced to provide more than a general idea of the amount of plant capacity not devoted to civilian production and thus presumably available for armament production at any specific plant.

That evidence which is available on production policies indicates that the Soviets prefer rather long production runs at fairly constant levels. Analysts believe that a period of 5 to 10 years usually is used to schedule the production cycle for a major equipment model. The Soviets appear to prefer to make periodic major modifications on items in production rather than to redesign them completely.

Analysts believe that in most cases information is adequate ultimately to fix the date of initial quantity production to within 1 to 2 years of the actual date and to fix the date of the end of production to within 2 or 3 years of actual termination. Some considerable time may elapse, however, before the evidence permits fixing limits with even the indicated precision. Often the cessation of production of a given item may be only inferred from the identification of an item which appears to be a replacement.

b. Program Requirements for Production of Equipment

Little is known about how the Soviets program production of land armaments and ammunition. Available information has yielded no evidence as to the level of new equipment generally programed for the active field forces or reserves, the size of the inventory required to keep a given quantity operational, or whether Bloc and non-Bloc military trade requirements are included. Response in the production programs to changes in force levels, force composition, and tables of equipment of units is unknown.

[redacted] that not all would receive any given item of new equipment, but it is uncertain how [redacted] relates to the issuance of new equipment to the various military units. How the ground force fares in competition with other forces that

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also may use the same model of equipment is not known. Air defense forces received some models of anti-aircraft guns before the ground forces. Both Bloc and non-Bloc forces also have appeared to receive some Soviet equipment before the Soviet groups of forces were fully equipped with the same items. As first-line ground force units are re-equipped with new items, displaced items may be reconditioned for reissue or placement in reserve. If this is the typical practice, units to be mobilized probably would be equipped largely with obsolescent or obsolete items. It is also possible that some new material is placed in reserve to provide for replacement of early combat losses. As yet, however, there is no confirmation of long-term storage by the Soviets of new land combat equipment.

2. Establishing Minimum Production

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b. Equipment in the Hands of Troops

The Panel has surveyed the possibility of identifying quantities of equipment in the hands of troops to gain some knowledge on minimum production and inventories of equipment. The information available on all troop areas was clearly inadequate for the purpose. Although the information on the GSFG greatly exceeds that from other areas, it was found to be severely restricted in scope and failed to prove generally rewarding for establishing minimum production.

On the basis of the information that is available, the troops of the GSFG seem to have no notable deficiencies in equipment. In some instances, however, models which are known to have been in production for years have not completely replaced earlier models. The outstanding example is the medium tank. As shown in the table, in 1962 some 900 T-34 tanks were estimated to be still in troop units, although production ceased in the 1940's and a second-generation successor, the T-55, was present in some units in East Germany. The

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Quantities of Selected Items Estimated
for Troop Units of the GSGF, 1962

	Quantity Required by Estimated TOE's of Divisional Force, 1962	Quantity Estimated to Be in Hands of Troops 1962 <input type="checkbox"/>	Quantity Confirmed by Count of Imports 1954-62 ^{b/}
Light tanks			
PT-76	480	340	120
Medium tanks			
T-34 } T-54/55 }	4,190	{ 900 3,790	4,240
Heavy tanks			
JS-2/3 } T-10 }	950	{ 770 200	280
Armored personnel carriers			
BTR-40	1,070	560	510
BTR-152	2,380	3,240	1,040
BTR-50p	3,020	200	290
Other			
160-mm mortar	180	180	340
100-mm gun } 85-mm gun }	240	{ 240	110
57-mm AA, S-60	540	720	80
ZSU-57-2 SPAA	240	160	340

b. Partial counts of are available for the years 1954-63. Coverage over the period is variable with an estimated 80-percent coverage for the years 1954-60 and 40 percent for the years 1961-63. Some equipment that was imported may have been subsequently returned to the USSR or turned over to the East German army as well as being subject to normal attrition.

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presence of only 340 PT-76 tanks could be attributed to the GSFG in 1962, although the requirements of the table of organization and equipment (TOE) were believed to be for 480, and the tank had been in production 12 years. Only 200 BTR-50p armored personnel carriers could be identified despite the estimated TOE requirement of more than 3,000 and the fact that production started in 1954. About half of the expected number of BTR-40 armored personnel carriers was estimated to be in East Germany, although production started in 1950. The validity of the figures shown in the table is subject to ranges of error believed to be as wide as 10 to 40 percent, and no definite correlation between supply to the GSFG and production can be established.

Information [REDACTED] [REDACTED] indicates that new ground combat materiel is sent to the GSFG initially in small numbers and is used for demonstration, familiarization, and initial training at headquarters of large units. Some field testing also may be accomplished in the GSFG.* Subsequently, additional shipments are used for reequipment on a unit-by-unit basis within priorities based on types of units and location. [REDACTED] stated that new equipment is not issued to troops near the border. If the policy were applied to all areas where Western observation is likely, a part of the GSFG could be reequipped with an item not known by Western observers to exist.

Analysis of the information on imports of equipment into the GSFG during the years 1954-63 leads to the conclusion that for whatever reason, the supplying of new equipment is indeed a gradual process regardless of when production started or the rates of production believed to obtain. Information on areas other than the GSFG is not adequate to confirm that this is a general procedure. Another curious aspect of this situation is that some models of equipment have been exported in quantity to other countries, both Bloc and non-Bloc, before the GSFG was fully reequipped. This raises a question, which the Panel has not been able to resolve, of the relative priority of the GSFG for new equipment.

* It is possible that some of the items first identified [REDACTED] in the GSFG may be in this category. If so, the type of testing done is likely to be of a final nature immediately before large-scale series production. Unfortunately, the evidence is too sparse to confirm [REDACTED] of small numbers of an item as a guide to the initiation of series production.

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The evidence from East Germany, supported also by evidence from other areas, has shown that the Soviets follow practices in the use of equipment which are intended to maximize its combat life. Some of these practices are questionable by Western standards. The Soviets place very limited annual norms on the use of most combat equipment, particularly vehicles. Training is accomplished through the use of either a small part of the regular inventory held by a unit or with surplus older equipment retained solely for training. The remainder of the line inventory is kept in storage by the unit where the vehicles, although fueled and combat loaded, are kept on blocks. The tanks in storage are actually segregated in a separately secured area. Although it receives regular attention from the crews that would operate it in combat, the equipment in storage is used only during large-scale unit exercises. In Western experience, deterioration of equipment is not necessarily a function of the days used or miles traveled. In addition, competence of a crew is related to the use of and familiarity with the piece of equipment to which the crew is assigned. The Panel cannot judge the degree to which the Soviets have overcome these negative aspects of the storage of equipment, but the Soviets do manage to keep the equipment in East Germany in operable condition without notably high rates of failure in road marches. Also, older equipment has been shipped to non-Bloc countries on very short notice without unusual complaints about the state of maintenance from buyers.

c. Other Approaches

In view of the inadequacy of direct evidence, of calculations of cumulative production, or of sightings of equipment on which to base estimates of inventories, the Panel sought other approaches that might yield estimates with a greater degree of certainty. Among the approaches examined was a reckoning of equipment levels from requirements indicated by the tables of organization and equipment and order of battle. It was discovered in this approach, as with all others tried, that the lack of evidence forced resort to a number of assumptions such as those on production scheduling and replacement policy which had a critical influence on the inventories calculated. Changes in these basic assumptions, permissible within limits established by the evidence, could result in widely varying inventories. Thus no approach examined improved the situation so far as yielding inventories which could be claimed to be more solidly based on evidence. Inventories could be calculated that seemed to have improved internal consistency between types and models of equipment.

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The Panel cannot be sure, however, that the Soviets have followed policies of production and inventory that are both consistent and reasonable by Western standards.

III. Findings

The Panel concludes from its review of the evidence on land combat equipment and conventional ammunition that the evidence is adequate only for a general appreciation of the subject. In these terms, the evidence is useful for an understanding of the general dimensions of the Soviet effort to develop and produce modern equipment for its ground force and the degrees of emphasis placed on various types and models of equipment. Even in these respects, however, the situation regarding the coverage and currency of the information received is similar to other aspects of the Soviet ground force -- our state of knowledge lags [REDACTED] behind the current period and is restricted in scope. Thus, at any given time, the Soviets could offer a surprise with a piece of equipment as they did when first employing the T-34 tank during World War II. Ordinarily, display in a parade is the most likely means of first observation.

The evidence reviewed by the Panel has proved unsatisfactory for quantifying the production and inventory of land combat equipment and ammunition within useful confidence limits. Crucial elements are missing from the available evidence, forcing the use of assumptions in estimating procedures. The reasonable variations in assumptions permitted by the evidence can cause large differences in the sizes of inventories calculated. The Panel examined various approaches to estimates but found none that would reduce the very wide ranges of uncertainty. Thus the Panel believes that, with the exception of a few items, formulation of estimates of production, inventory, and related subjects such as expenditures at this time would be misleading and would be a disservice because such estimates could not be justified by the evidence at hand.

The failure of the evidence to support useful quantitative estimates does not mean, however, that the Soviets have neglected development and production of new land combat equipment and conventional ammunition. The uncertainties are relative to the Soviet inventory objectives, rates of production and replacement, and disposition and extent of the inventory. In the opinion of the Panel there is no doubt that the Soviets

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have had an extensive, continuing program for the design, development, and production of land combat equipment and ammunition since World War II. As many as 80 models may have been in production at some time or other during the period 1946-63, and there is firm evidence relating to about 60 of these models of equipment, as follows:

<u>Category</u>	<u>Number of Models</u>
Armored vehicles	15 or 16
Field artillery	15
AA artillery	3
Mortars	3
Rocket launchers	6
Missile launchers (FROG)	2
Small arms and infantry weapons	11
Tracked prime movers and amphibians	4

Of the above items, 10 (excluding small arms) probably entered production in the period 1955-63. Appendix B presents in summary form the sources of information and the indicated dates of production for each item. Fourteen types of ammunition have been identified by observation or from Soviet documentary sources. Most of the weapons shown in Appendix B required ammunition of a new caliber or of a configuration different from that previously manufactured.

Although the materiel appears to reach the troops in a gradual flow and some troop elements may never have the latest models, no troop units on which there is direct information have been noted to have significant deficiencies of materiel when measured by the estimated TOE's. The Panel believes it probable that sufficient land combat equipment is in inventory to outfit all active units, including cadre units, although it cannot judge the proportion of current models.

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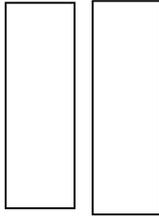
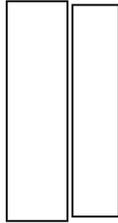
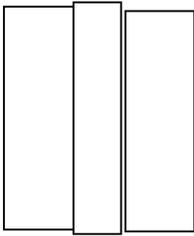
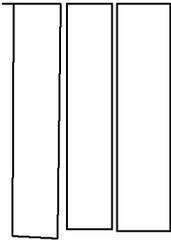
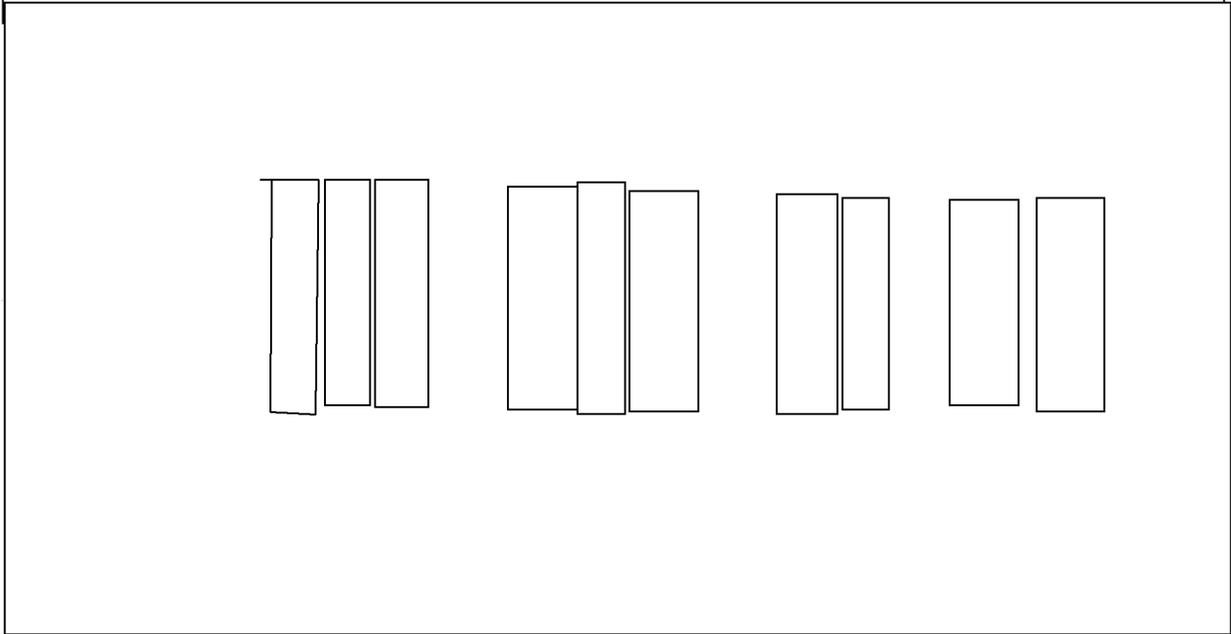
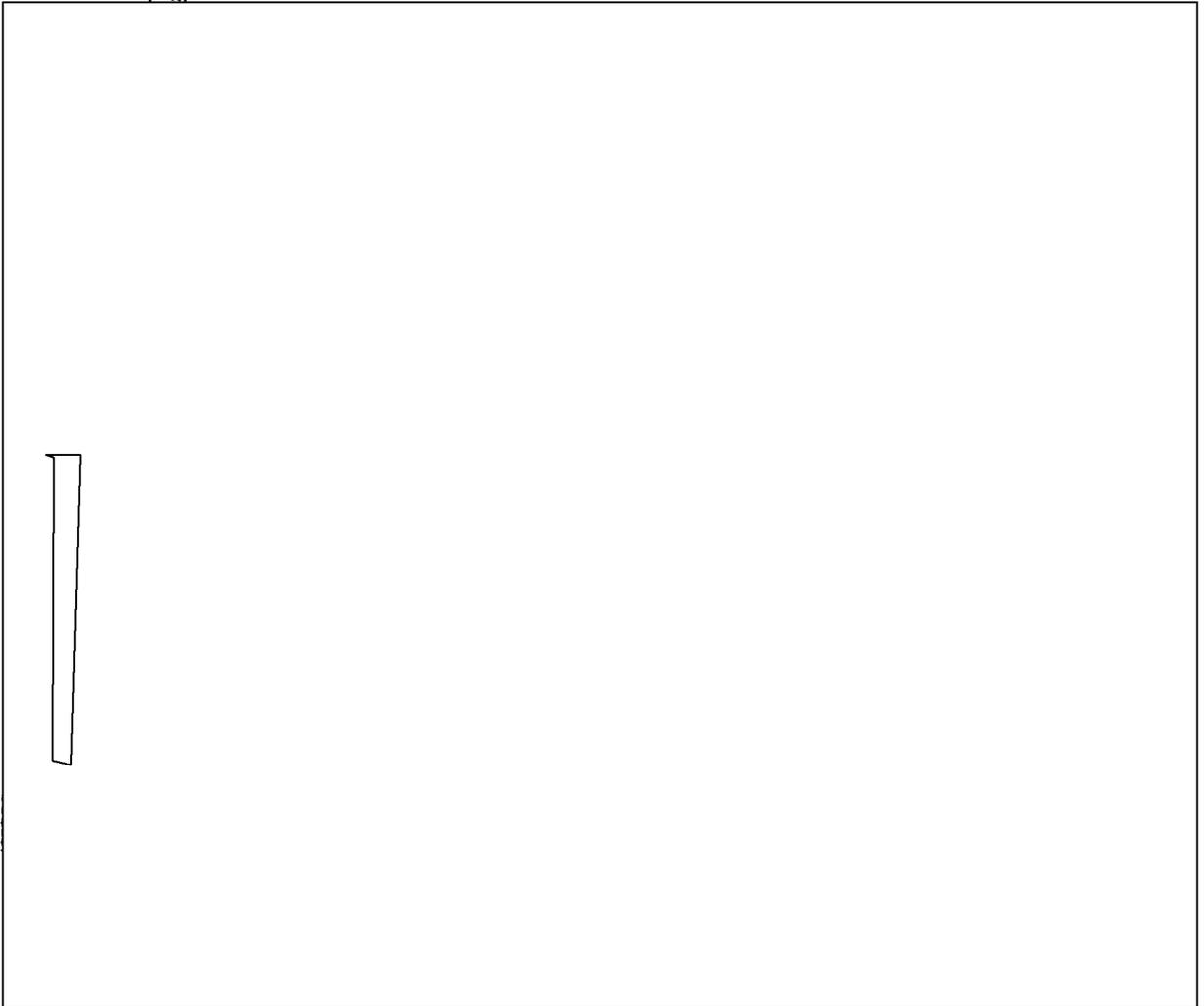
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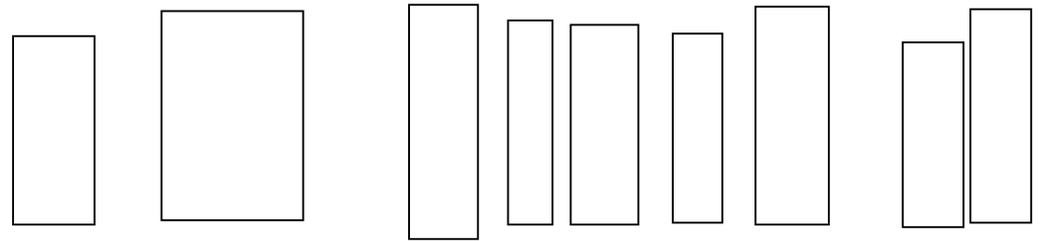
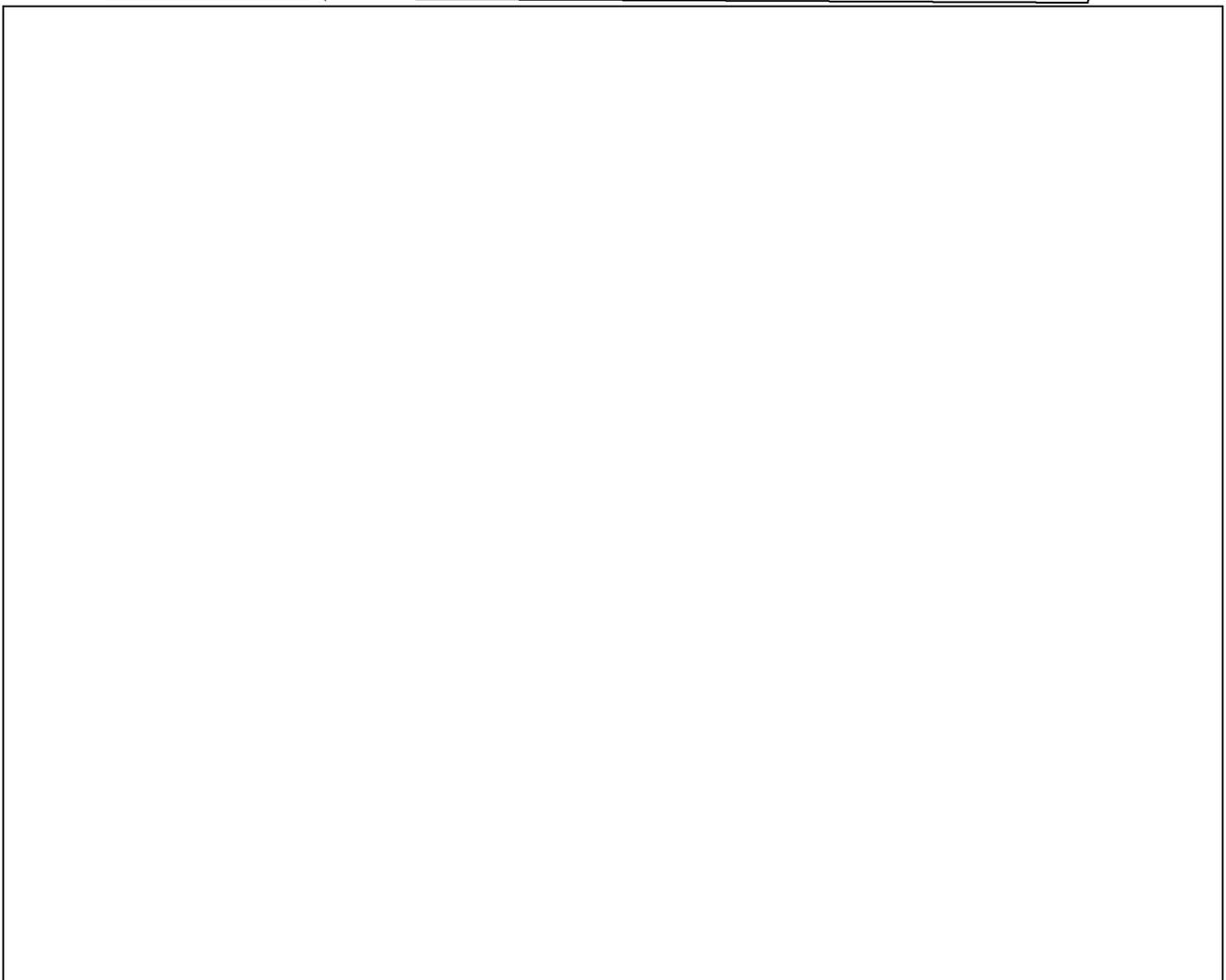
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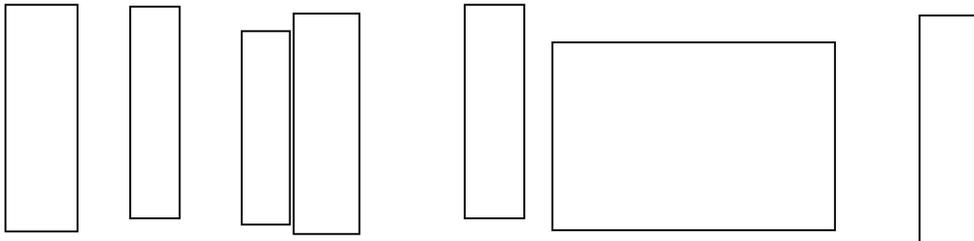
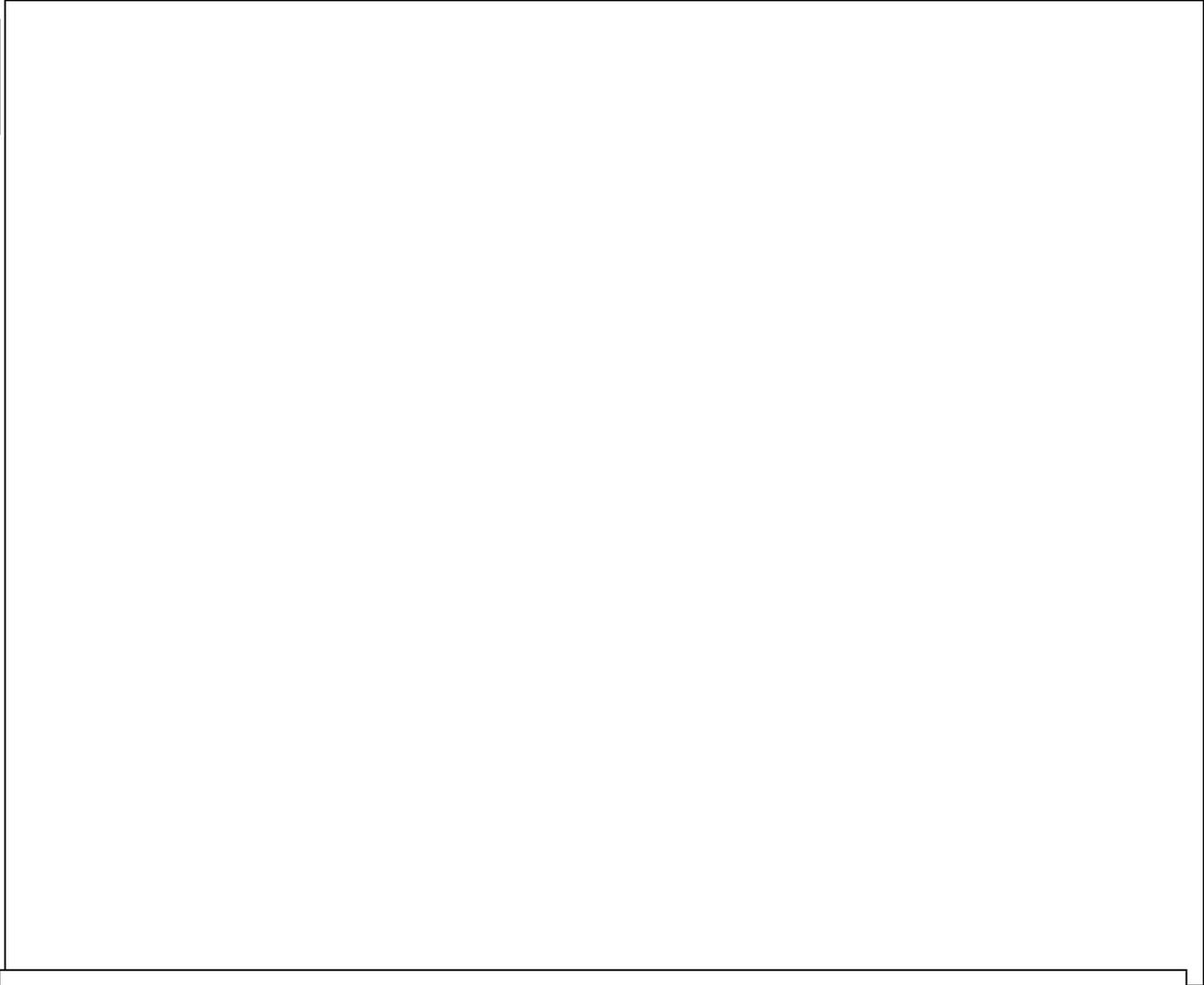
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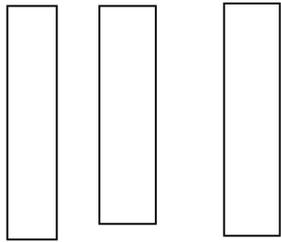
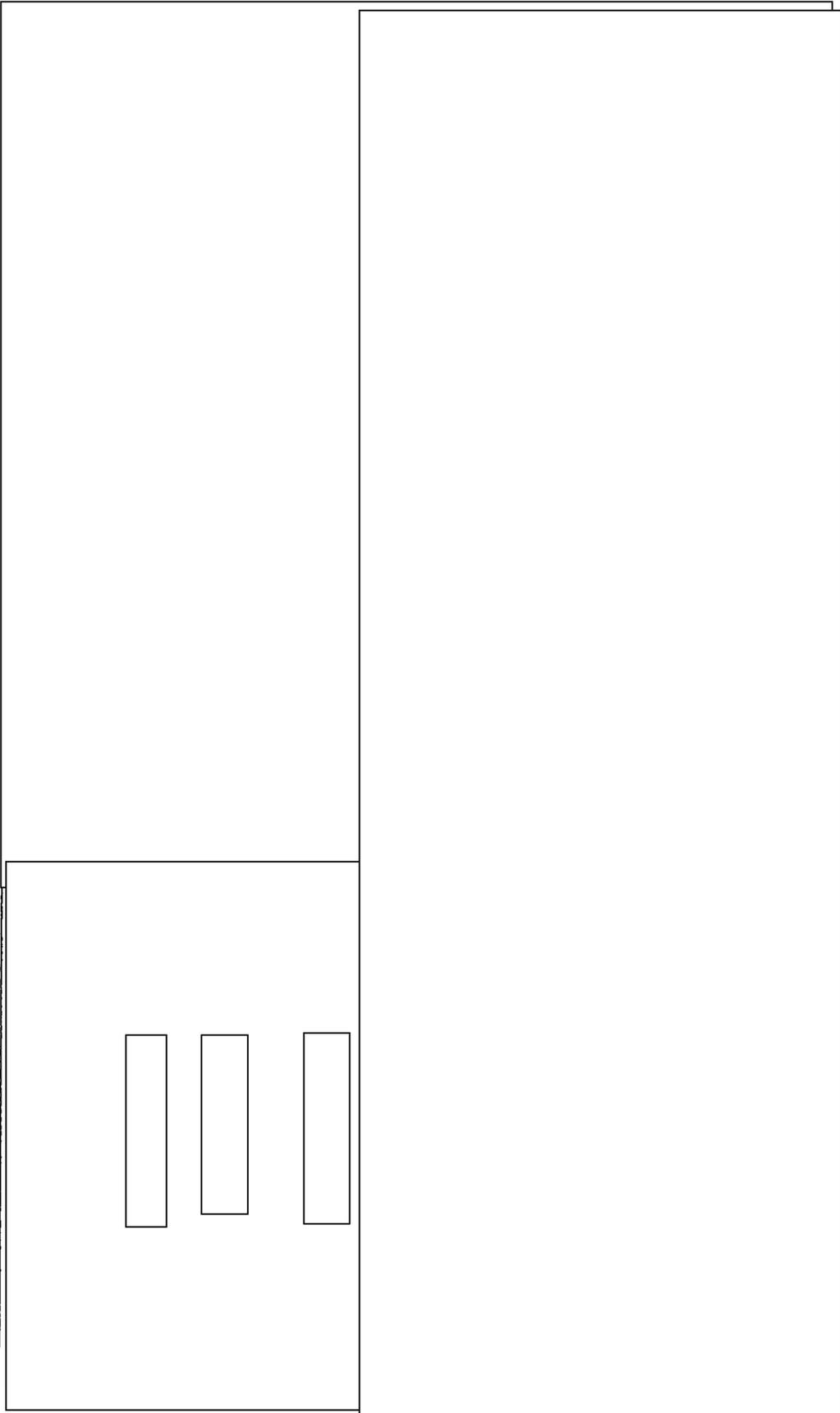
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APPENDIX B

a/* AND DATES D/ OF INDICATED PRODUCTION OF LAND ARMAMENTS IN THE USSR

Item	Documentary Sources (Earliest Date)	Other Sources (Earliest Date)	In Groups of Forces	USSR	With Forces of Other Bloc Countries
Tanks					
PT-76	1957	1955	1957	1955	1957
T-34/85	World War II		1946	1944	1949
T-44	1946		1956	1946	
T-54	1948		1954	1950	1956
T-55	1949	1950		1958	1962
T-62	1958	1961	1963	1964	
JS-3	1961	1963	1963	1945	1953
JS-4	World War II		1946		
T-10	1947		1957	1957	
T-10M	1953		1962	1962	
JS-2	1961	1962	World War II	World War II	
	World War II				
Assault guns					
SU-76	World War II	1945	1946	1943	1958
SU-85	World War II	1945	1946	1944	1958
SU-100	World War II	1945	1946	1944	1958
JSU-122	World War II	1945	1946	1944	1958
JSU-152	World War II	1945	1946	1944	1958
ASU-57	World War II	1945	1946	1944	1958
ASU-85	World War II	1945	1946	1944	1958
SU-152	1958	1947		1957	
ZSU-57-2	1962	1962		1962	
	1955				1958
Armored personnel carriers					
BTR-40	1952	1952	1952	1951	1957
BTR-152	1949	1949	1952	1950	1956
BTR-50p or BRM-50	1956	1955	1957	1954	1961
BTR-60p	1962	1961	1962	1961	1962
BRDM	1963	1961	1961	1959	1962
ZIL-1485	1952	1951	1957	1952	1959
GAZ-46	1952		1957	1954	1959
K-61	1954	1951	1957	1950	1959
Field artillery					
57-mm M43	World War II	1945	1945	1945	1950
76-mm M42	World War II	1945	1945	1945	1950
85-mm D44, M45	World War II	1945	1945	1945	1955-56
100-mm M44	World War II	1945	1945	1945	1957
100-mm M55	World War II	1945	1945	1945	1957
122-mm gun M31/37	World War II	1945	1945	1960	1957
122-mm gun D-74, M55	World War II	1945	1945	1945	1950

* Footnotes follow on p. 29.

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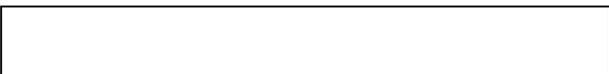
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Item	Documentary Sources (Earliest Date)	Other Sources (Earliest Date)	In Groups of Forces	USSR	With Forces of Other Bloc Countries
Field artillery (Continued)					
122-mm howitzer M38	World War II	1945	1945	1945	1950
122-mm gun/howitzer M63	1958	1945	1963	1963	1959
130-mm gun M46 (54)	World War II	1945	1954	1954	1959
152-mm howitzer M43	World War II	1945	1945	1945	1959
152-mm gun/howitzer M37	World War II	1945	1945	1945	1959
152-mm gun/howitzer D20	World War II	1945	1960	1955	1959
152-mm gun M35	World War II	1945	1945	1945	1959
203-mm howitzer M31	World War II	1945	1945	1945	1959
203-mm gun/howitzer M55	World War II	1945	1952	1945	1960-61
305-mm howitzer	1958	1945	1945	1945	1959
310-mm gun	1958	1957	1960	1960	1959
420-mm mortar	1958	1957	1960	1960	1959
Antiaircraft guns					
14.5-mm ZFU2, ZFU4	1958	1954	1956	1954	1957
37-mm M1939	World War II	1945	1945	1945	1950
57-mm S-60 (M-50)	1957	1949	1945	1945	1950
76mm 57-mm ZSU-57-2 (M-55)	1960	1958	1957	1957	1958
85-mm KS12, KS18	World War II	1945	1958	1958	1958
100-mm KS19 (M-49)	1958	1945	1945	1945	1950
130-mm M55	1958	1950	1958	1945	1950
130-mm M55	1958	1959	1955	1955	1959
Mortars					
82-mm M1937 M43 Mod	1947	1946	1945	1945	1950
120-mm M1938	1943	1946	1945	1945	1950
120-mm M1943	1947	1946	1945	1945	1950
160-mm M1943	1950	1946	1945	1945	1950
160-mm M-160	1950	1947	1945	1945	1950
240-mm M-240	1958	1953	1957	1959	1959
Antitank recoilless gun					
82-mm B-10 (M-51)	1958	1955	1958	1959	1959
107-mm B-11 (M-50)	1957	1956	1958	1959	1959
AT launcher RPG-2	1961	1956	1958	1958	1959
AT launcher M62-(?)	1961	1964	1964	1958	1965
Infantry weapons					
9-mm pistol, Makarov (PM)	1956	1954	1957	1958	1958
9-mm machine pistol	1959	1955	1957	1958	1958
Stechkin (APS)	1949	1948	1949	1955	1956
7.62-mm carbine SKS	1952	1949	1954	1954	1958
7.62-mm assault rifle AK-47	1963	1952	1962	1959	1964
7.62-mm assault rifle AKM	1956	1952	1954	1954	1957
7.62-mm machinegun RPK	1962	1960	1961	1961	1964
7.62-mm machinegun RPD	1952	1952	1952	1954	1956
7.62-mm machinegun RP-46	1958	1956	1958	1958	1958
7.62-mm machinegun SGM	1958	1956	1958	1958	1958
12.7-mm machinegun DShK	1957	1954	1957	1957	1958
M1938/46	1958	1954	1958	1954	1957
14.5-mm ZFU-2, ZFU-4	1958	1954	1958	1954	1957



Item	Documentary Sources (Earliest Date)	Other Sources (Earliest Date)	In Groups of Forces	USER	With Forces of Other Bloc Countries
Rocket launchers					
132-mm BM13	World War II	1945	1945	1945	1950
140-mm (16Rd) BM14, M54	1956	1954	1955	1954	1957
200-mm (4Rd) BM20, M54	1958	1954	1961	1954	
240-mm (12Rd) BM24, M53	1956	1954	1955	1954	
240-mm on A1S, M57	1959	1957		1957	
250-mm on 16AZ 214, M57	1959	1957		1957	
FROG 1	1959	1957	1959	1957	1962
FROG 2		1957	1964	1960	1962
FROG 3		1960	1964	1960	1964
FROG 4		1960	1964	1960	1964
FROG 5		1960	1964	1960	1964

a. The listing shows information from principal sources.
 b. Dates shown are those currently in hand. Acquisition of information containing the dates shown may have occurred some years subsequent to the indicated dates.
 c. The system of available factory markings has not been solved.



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