ST/PC 38

7983

PROVISIONAL INTELLIGENCE REPORT

THE FOOD-CANNING INDUSTRY IN THE USSR

CIA/RR PR-38

21 September 1953

CENTRAL INTELLIGENCE AGENCY

OFFICE OF RESEARCH AND REPORTS

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PROVISIONAL INTELLIGENCE REPORT

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(ORR Project 3-52)

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THE FOOD-CANNING INDUSTRY IN THE USSR*

Summary

The food-canning industry in the USSR has grown from a small-scale, cottage-type industry, which produced 120 million standard** cans in 1913, to one of the major branches of the food-processing industry, which produced an estimated 1,637 million cans in 1951. Planned production of canned food in the USSR for 1952 is estimated at 2,187 million standard cans and for 1955, at 2,862 million standard cans.

Three ministries, the Ministry of Food Industry, the Ministry of Meat and Dairy Industry, and the Ministry of Fish Industry, are responsible for canned food production in the USSR.*** Plants under the Ministry of Food Industry produced an estimated 983 million cans in 1951 (60 percent of the total Soviet production) and an estimated 1,337 million cans in 1952 (61 percent of the total Soviet production). Plants under the second largest producer, the Ministry of Meat and Dairy Industry, produced an estimated 366 million cans in 1951 and 476 million cans in 1952 (22 percent of the total Soviet production in each year). Plants directed by the third largest producer, the Ministry of Fish Industry, produced an estimated 288 million cans in 1951 (18 percent of the total Soviet production) and 374 million cans in 1952 (17 percent of the total Soviet production).

Fruit and vegetable canning is centered in the following economic regions****: the Ukraine (III), the Lower Don-North Caucasus (IV),

* This report contains information available as of 1 December 1952.

** The standard, or statistical, can is a can with a net capacity of 353.4 cubic centimeters (21.57 cubic inches), or a net weight of 400 grams (14.11 ounces). The standard 400-gram can is the unit by which production of canned and preserved food products is measured.

*** Since the completion of this report, the government of the USSR has announced (on 15 March 1953) the integration of the three ministries previously controlling the production of canned food into one ministry, the Ministry of Food Industry.

**** The term region in this report refers to the economic regions as defined and numbered on CIA Map 12048, 9-51, USSR: Economic Regions.

the Transcaucasus (V), the Volga (VI), the Kazakh SSR (Xa), and Central Asia (Xb). The two largest fruit and vegetable canneries are the Krymskaya Canning Combine of Krasnodar Kray in the Lower Don-North Caucasus (IV) and the Stalin Gigant Canning Plant of Kherson Oblast in the Ukraine (III). Meat canning in the USSR is more scattered than fruit and vegetable canning, tending to concentrate in areas where pastures and meadows offer cheap feed for livestock. The more important meat-canning regions are the Lower Don-North Caucasus (IV), the Volga (VI), Central European USSR (VII), the Urals (VIII), West Siberia (IX), the Kazakh SSR (Xa), Central Asia (Xb), and East Siberia (XI). The Ulan-Ude (Buryat Mongol ASSR) and Moscow meat combines are the biggest and most important Soviet meat-packing plants. A recent development in meat canning has been the growth in importance of the Ulan-Ude Meat Combine and its subsidiaries at Irkutsk (Irkutsk Oblast), Chita (Chita Oblast), and Borzya (Chita Oblast), which import livestock for slaughter and canning from the Mongolian People's Republic and Manchuria. Milk canning is most prominent in the dairy cattle regions of Northern European USSR (Ib), Belorussia (IIb), the Volga (VI), Central European USSR (VII), and West Siberia (IX). Fifty percent of the Soviet fish pack is canned in the Far East (XII), which has access to the Pacific Ocean. Access to the Caspian Sea makes the Volga (VI) an important fish-canning area, and the Lower Don-North Caucasus (IV) and the Kazakh SSR (Xa), each of which fish several seas, are also significant.

Since the end of World War II the Soviet food-canning industry has made efforts to modernize and mechanize its plants and equipment. Although reparations from Germany and imports from the US have facilitated Soviet attempts at modernization, the Soviet food-canning industry remains backward by US standards. Inefficient utilization of plant capacity, lack of adequate refrigeration, shortages of containers, inadequate transportation, and unreliable sources of canning machinery tend to retard the development of this industry. An especially important inhibitor to rapid expansion is the disproportionate use of labor in relation to available machinery.

Under peacetime conditions, canned food produced in the USSR is either stockpiled, exported, or consumed directly by civilian consumers and, to a lesser extent, by the military. It is believed that the greatest share of Soviet canned food output goes into stockpiles.

The concentration of food-canning facilities in a few areas close to the raw material source of supply, the great distances from the plants to the consumers of canned food, and carelessness in preparing and

handling canned food render the Soviet food-canning complex vulnerable to attacks of various sorts. To offset these weaknesses and to increase availability of certain types of canned food, Soviet fruit and vegetable canneries, through the use of additional machinery or modifications of their canning lines, might be capable of canning meat or fish. More thorough utilization and exploitation of the resources of the Soviet Satellites might make larger quantities of canned food available to the USSR.

Soviet intentions may be indicated by (1) the priority the Russians give to food canning as a segment of the over-all economy in any given period, as contrasted with the priority placed on this industry in other periods; (2) the utilization of the output of the food-canning industry; and (3) the size of cans. The Fifth Five Year Plan (1951-55) calls for an increase of $2\frac{1}{2}$ to 3 times in the consumption of canned foods by civilians. An increase of this magnitude could be brought about only by a substantial cutback in stockpiling of canned food products. A cutback in the stockpiling program would seem to imply either attainment of goals or a change in policy.

I. Introduction.

The food-canning industry is one of the most important branches of the food-processing industries in the USSR. The canning of such seasonal foods as fruit and vegetables, meat, and fish makes these foods available for consumption throughout the year. The balanced diet thus available aids the population in attaining a year-round level of working efficiency. 1/* Canning furthers the state policy of substituting processed food products, sold only through state channels of distribution, for raw foods available from private individuals on the collective farm market thus tightening state control of food distribution. Canning facilitates stockpiling of perishable foods and, to a certain extent, offsets the serious lack of refrigeration facilities in the USSR. 2/ Canning further supplies choice luxury items such as crabmeat, caviar, and salmon for export to the West and thereby provides much needed foreign exchange. 3/ Finally, because of the relative ease of

* Footnote references in arabic numerals are to sources listed in Appendix K.

transport and storage, canned food represents a very important requisite of the rations of the armed forces, especially in time of war. The Soviet Army lives off the land as much as possible in time of war, but as the tempo of destruction increases it becomes more and more difficult to live off the devastated land. Canned food becomes an ever more necessary supply component, ultimately representing, as in the late stages of World War II, an important source of protein foods for both the armed forces and the civilian population. 4/

II. History.

A. Food Canning under the Tsarist Regime.

In Tsarist Russia, food canning was a primitive small-scale industry, largely of the cottage type, producing hors d'oeuvres, delicacies, relishes, and desserts. Meat and fish were the principal foods canned commercially, with most of the production being used for army supplies. Meat canning had been introduced into Russia in the 1870's to provide a meat ration for the Russian Army in the Khiva War. Production of canned meat tended to keep pace with the needs of the Army, increasing somewhat during the Russo-Japanese War and to a much greater extent during World War I 1914-17). Compared to other European armies, however, the absolute quantity of canned meat supplied to the Russian Army was relatively small. 5/

In prerevolutionary Russia there were about 100 canning plants, of which only 10 to 15 were commercially important. In 1913 the Russian canning industry produced a total of 120 million standard 400-gram cans* of meat, fish in oil or tomato sauce, fruit, vegetable hors d'oeuvres, and tomato purée. 7/ Much of the canned food eaten in Tsarist Russia was imported. 8/

* The total of standard 400-gram cans given may actually include 400-gram cans, 1-kilogram cans, and other cans of varying sizes as well as glass jars, all of which are converted to 400-gram-can equivalent. 6/ Any reference to cans of food in this report will be in terms of standard 400-gram cans unless otherwise stated.

Following the outbreak of the Bolshevik Revolution, the commercial production of canned goods, with the exception of canned meat for military needs, was almost completely discontinued. 9/

B. Food Canning under the Soviet Government.

1. Early Years.

The food-canning industry developed slowly during the early years of the Soviet government, remaining a semicottage industry until 1926-28. 10/ Production of canned food in 1928 was about 90 million cans of food of which 33 million were fish, 21 million meat, and the remaining 36 million, fruit and vegetable products. 11/ Some of the factors tending to retard the development of a modern canning industry in the USSR during this period were poor organization; a lack of modern plants, equipment, and technical skill; and an inadequate supply of raw foodstuffs.

2. First Five Year Plan (1928-32).

Starting with the First Five Year Plan (1928-32), the USSR made strenuous efforts to build a modern canning industry. Most canneries, except those which formed an organic part of meat or fish enterprises, were brought under the administration of Soyuzkonserv (All-Union Canning) by a special decree issued by the government in 1930 organizing the industry. 12/

Substantial investments were made in the construction of from 25 to 30 new canning plants including the large plants in Krymskaya (Krasnodar Kray) and Kherson (Kherson Oblast). 13/ Although Soviet representatives visited the US to study in some detail the operation of US canning plants, US engineers and technicians were employed by the USSR to install many new canneries which were largely of US design and equipment and to train Soviet personnel in their operation. Krymskaya was one of the canning plants installed by US engineers. 14/

The collectivization drive of the early 1930's directly aided the Soviet canning industry by creating a more easily accessible source of supply of the raw foodstuffs necessary to keep the canning

plants in operation. Collective farms furnished over 50 percent of the fruit and vegetables required by the canning industry in 1930, as compared with 70 percent in 1933.*

3. Second Five Year Plan (1933-37).

Under the Second Five Year Plan (1933-37) the food-canning industry made marked advances. Over 200 million rubles were invested in the industry, and about 30 to 35 new canning plants, including the Nakhodka fish-canning plant in the Far East in the present Primorskiy Kray and the Kherson cannery in the Ukraine, were put into operation. 16/

Further efforts were made to improve the supply of foodstuffs available to the canneries. Collective farms in the vicinity of canneries were obliged to supply the canneries with fruit and vegetables, and numerous state farms were set up directly under the jurisdiction of the ministries controlling the canning industry.

A problem frequently encountered in the 1930's was the poor quality of the canned goods produced. 17/ For example, at the Petropavlovsk Meat Combine, spoilage of canned meat products in 1936 amounted to 2.5 percent of total canned meat production, and 150,000 cans of meat did not meet minimum standards. 18/

4. Third Five Year Plan (1938-42).

The primary objectives of the Third Five Year Plan (1938-42) for the food-canning industry were increases in plant production attended by an increase in the foodstuff base; decreases in production costs; and local development of the industry in such economic regions as the Far East (XII), with a view to cutting transport costs, eliminating bottlenecks, and making various outlying areas as nearly self-sufficient as possible. 19/

Canned food output increased slightly during the 3 years of the Third Five Year Plan actually completed (see Appendix A).

* By 1938, collective farms were supplying about 85 percent (406,500 metric tons) of all vegetables canned by plants of the People's Commissariat of the Food Industry and about 70 percent (115,000 metric tons) of all fruit. 15/

There was a decrease of about 30 percent in canned food production from 1937 to 1938. The official explanation given by the Russians for this decrease was that numerous unprofitable assortments of canned fruit and vegtables had been eliminated. 20/ Output of canned food leveled off in 1939 and 1940, attaining a total of 1 billion cans in 1940. 21/ The 1941 Plan, uncompleted because of war activities, called for the production of 1,262 million cans of food. 22/

Significant expansion of the foodstuff base of the food-canning industry was achieved during the completed portion of the Third Five Year Plan. Just before the outbreak of World War II, canning plants were supplied with foodstuffs by 70 state farms and about 3,000 collective farms, which had over 70,000 hectares* planted in vegetables and over 110,000 hectares in fruit. 23/ In addition to these farms specifically serving the canning industry, numerous other state and collective farms also supplied some fruit and vegetables to canning plants. 24/

By the outbreak of World War II an estimated 212 million rubles had been invested in the food-canning industry under the Third Five Year Plan (see Appendix B). Much of this investment went into the development of plants in regions where food canneries were not previously located. Although World War II interrupted this plan, it did speed up decentralization of the canning industry. During the war years, 12 canning plants and 2 glass container plants were constructed in Central Asia and Siberia. 25/

5. World War II.

a. Wartime Difficulties.

The Russo-German phase of World War II, which surged back and forth through the key food-producing and food-canning areas of Moldavia, the Ukraine, the Crimea, the Lower Don-North Caucasus, and Stalingrad Oblast badly crippled the Soviet food-canning industry in these devastated regions. The area planted with vegetables available to canneries was reduced to half the prewar acreage, and over 30 canning plants were completely cut off from their areas of supply. 26/

In addition to the losses in foodstuffs, the food-canning industry also lost over half of its equipment. The productive

* A hectare equals 2.471 acres.

capacity of the industry decreased by about 70 percent. Among the larger canneries destroyed during World War II were the Krymskaya Canning Combine imeni Mikoyan; the Stalin Gigant Canning Plant; the Odessa canneries imeni Lenin and imeni Voroshilov; the Tiraspol' "First of May" cannery; and the Krasnodar, Kropotkin, Stalingrad, Adygey, and Cherkassk canneries. 27/

During World War II, limited resources of food for canneries, shortages of labor, and a scarcity of materials for containers resulted in utilization of a variety of low-quality raw materials and in a lowering of standards in the preparation of various recipes. An example of the substitution of low-quality for high-quality foodstuffs was the substitution of wild berries for cultivated berries. 28/

b. Lend-Lease Imports.

The Soviet food-canning industry was buttressed by US Lend-Lease shipments throughout the war from 1941 to 1945. The US exported 169,953 short tons (154,181 metric tons) of tinplate to the USSR during World War II. Substantial amounts of this tinplate were consumed by the Soviet food-canning industry, especially by Far Eastern fish-canning plants. The food-canning industry was also supported by such measures as the shipment of 7 million tin cans by the American Can Company to the Soviet Far Eastern fishing industry. 29/

Over 0.5 million metric tons of canned meat products, primarily pork and beef tushonka (a type of stew) were exported to the USSR by the US 30/ (see Appendix C). Although most of this tushonka was used to feed the Soviet Army, 31/ civilians consumed sizable quantities, as indicated by the fact that tushonka cans were scattered about village dwellings from above the Arctic Circle to the Black Sea.

6. Postwar Recovery.

During the immediate postwar years, dismantled German canning plants supplied machinery and other equipment for reconstruction of Soviet canning plants, 32/ and German, Japanese, and other prisoners of war furnished the manpower necessary to rebuild and re-equip old plants and to set up new plants in various sections of the country. 33/ Under the Fourth Five Year Plan (1946-50), 24 wholly or

partially destroyed canneries were rebuilt, 7 new canneries were put into operation, collective farms in the vicinity of canneries were re-established, and their prewar production was restored. 34/

The re-establishment of the food-canning industry resulted in significant increases in production. Output of canned food increased from an estimated 379 million cans in 1945 to an estimated 1,074 million cans in 1949, thus exceeding prewar (1940) production only 4 years after termination of hostilities. Production of canned food rose to an estimated 1,363 million cans in 1950 and an estimated 1,637 million cans in 1951. The 1952 Plan indicated an estimated production of 2,187 million cans (see Appendix A).

The Fifth Five Year Plan (1951-55) anticipates an estimated 2,862 million cans of food by 1955. 35/

III. Organization.

Administration of the Soviet food-canning industry is divided among the following ministries: the Ministry of Food Industry, which cans primarily fruit and vegetables; the Ministry of Meat and Dairy Industry, which cans meat and dairy products; and the Ministry of Fish Industry, which cans fish products.*

The plants under the Ministry of Food Industry, are estimated to have produced 983 million cans in 1951 -- 60 percent of total canned food production. The plants under the Ministry of Meat and Dairy Industry, the second largest group of canned food producers in the USSR, are estimated to have produced 366 million cans in 1951 -- 22 percent of total canned food production. The plants under the Ministry of Fish Industry, the third largest group of canned food producers in the USSR, are estimated to have produced 288 million cans in 1951 -- 18 percent of total canned food production.

IV. Location.

A. Fruit- and Vegetable-Canning Plants.

1. Location of Fruit- and Vegetable-Canning Facilities.

The two largest fruit and vegetable canneries are the Krymskaya Canning Combine of Krasnodar Kray and the Stalin Gigant Canning Plant of Kherson Oblast. Other important fruit and vegetable canneries

* See footnote, p. 1, referring to merger of ministries.

in European USSR are located in Stavropol' Kray; Rostov, Stalingrad and Groznyy oblasts; the Dagestan ASSR; the North Osetian ASSR; the Ukrainian SSR; and the Moldavian SSR.

In recent years the Moldavian SSR has become increasingly important in the canning of fruit and vegetables. 36/ The huge Tiraspol' canneries, "First of May" and "Tkachenko," and the recently built Kalarash Canning Plant, along with numerous smaller plants, enabled the Moldavian SSR to double its prewar output of canned foods in 1951 despite slipshod work by many plants. 37/ Present plans call for 3 new canning plants to be built in the Moldavian SSR during the period 1953-55. 38/

2. Eastward Expansion.

During World War II, 12 new canneries were constructed in eastern regions, and since the war there has been an even more significant eastward movement of the fruit- and vegetable-canning industry to the Central Asiatic republics, particularly to the southern Kazakh SSR, which in 1951 produced 6 times as many canned goods as before the war and to the Kirgiz SSR, which in 1951 quadrupled its prewar canned food production. 39/ Important canning centers are also found in the Uzbek SSR and the Tadzhik SSR in Central Asia, as well as in the three republics of the Transcaucasus -- the Georgian SSR, the Armenian SSR, and the Azerbaydzhan SSR.

B. Meat-Canning Plants.

1. Location of Meat-Canning Facilities.

Much of the canned meat in the USSR is produced by the large meat-packing plants of Ulan-Ude, Moscow, Leningrad, Semipalatinsk, Petropavlovsk, Baku, Leninakan, Chkalov, and Alma-Ata. However, meat is also canned in numerous small- and medium-sized meat-packing plants of the Ministry of Meat and Dairy Industry throughout the country and, as a slack season operation, by canneries of the Ministry of Food Industry such as Krymskaya. 40/

2. Eastward Expansion.

There has also been an expansion eastward in meat canning, and one of the largest meat-canning plants in the country is now in Ulan-Ude. The Ulan-Ude meat-packing plant, along with its subsidiaries at Irkutsk, Chita, and Borzya, built up a wartime canning industry, which supplied the army with canned meat, taking the place of the many important packing plants overrun by the Germans. Imports of cattle,

sheep, goats, and horses from the Mongolian People's Republic and of swine from Manchuria, 41/ as well as the increasing indigenous herds which were augmented by wartime livestock shifts eastward, would indicate that these eastern plants have continued large-scale operations in the postwar period. 42/

C. Milk-Canning Plants.

Milk canning is most prominent in the dairy cattle regions of the Northwest (Ia) and West Siberia (IX). 43/ Important milk canneries are the Sukhona, located at Sokol in Vologda Oblast, the Kansk in Krasnoyarsk Kray, the Alekseyevka in Tatar ASSR, the Yalutorov in Chelyabinsk Oblast, and the reconstructed Rogachev milk cannery in Belorussia (IIb). 44/

D. Fish-Canning Plants.

Fish canneries are operated primarily by the Ministry of Fish Industry and are located along the shores of various seas, lakes, and rivers with a few inland exceptions including the Krymskaya cannery of the Ministry of Food Industry, where, as in the case of meat, fish canning constitutes a slack season operation during the winter months. 45/

In the Far East (XII), most of the crab canning and some fish canning is done by floating canneries, several of which were "inherited" with the dispossession of their former Japanese owners. Approximately 50 percent of all Soviet fish canning takes place in the Far East. 46/

E. Distribution of Food-Canning Plants by Economic Regions.

The packing plants of each of the canning industries operate in the areas best adapted to supplying them with the raw material inputs that they require. Thus the Ministry of Food Industry, as indicated in Appendix H, packs 25 percent of its output in the Ukraine (III), 47/ 25 percent in the Lower Don-North Caucasus (IV), 15 percent in the Transcaucasus (V), and 15 percent in Central Asia (Xb).

The Ministry of Meat and Dairy Industry has distributed its packing plants more diffusely but tends to concentrate in areas where pastures and meadows offer cheap feed for livestock. Fourteen percent of the canned meat output is packed in the Kazakh SSR (Xa), 12 percent

in East Siberia (XI), and 10 percent in the Urals (VIII). Some 19 to 20 percent of the canned milk is processed in Northern European USSR (Ib) and in West Siberia (IX); 17 to 18 percent in the Volga (VI); 12 to 13 percent in Central European USSR (VII); and 10 to 11 percent in Belorussia (IIb). Fully 50 percent of all the USSR's canned fish is packed in the Far East (XII), which has access to the resources of the Pacific Ocean. Another 10.5 percent is packed in the Lower Don-North Caucasus Region (IX) which has access to the Caspian Sea, the Black Sea, and the Sea of Azov; and 9.9 percent, largely from the Caspian Sea, is packed in the valley of the Volga (VI). A more detailed breakdown of the canned food production by region and by category of food canned is given in Appendix H.

F. Location of Individual Plants.

Appendix E shows the location of individual food-canning plants by economic region and by republic, oblast, or kray. Information that is available on individual plant capacity and labor force is also included.

V. Recent Developments.

A. Postwar Developments in the Location of Plants.

After World War II a determined effort was made to rebuild canning facilities near their prewar locations and thereby utilize those resources of local skilled personnel, living quarters, and transportation and power facilities which had originally made the sites good cannery locations. 48/

For example, the 2 modern giant canneries of the prewar Soviet fruit- and vegetable-canning industry, the Krymskaya Canning Combine imeni Mikoyan of Krasnodar Kray and the Stalin Gigant Canning Plant of Kherson Oblast, with a combined productive capacity of 200 million cans, which accounted for over 20 percent of the prewar total Soviet production, 49/ were destroyed during World War II. 50/ Since World War II, these plants have been reconstructed, with dismantled German canning plants initially supplying the necessary machinery. Subsequently, new US and Soviet equipment has been installed. At present the Krymskaya and Kherson canning plants have more modern equipment than before World War II and have already regained and perhaps surpassed their prewar production. 51/

B. Mechanization.

1. Utilization of US and German Equipment.

Modern US canning and tin-plating machinery was sent to the USSR during World War II under Lend-Lease and, since World War II, through normal trade channels 52/ (see Appendix C). Among the tin-plating machinery exported to the USSR were two complete hot-dip tinning units. The hot-dip process is considered obsolete in the US, having been superseded to a great extent by the electrolytic process. 53/

Much German canning machinery was transferred to the USSR as reparations. 54/ Most of this German canning machinery is reported to have been exceedingly useful to the USSR, although it is similar to equipment used in the US during the 1930-35 period and is therefore obsolete by US standards. 55/

2. Soviet Plans and Achievements.

Plans are under way to replace obsolete canning machinery with more modern equipment and to mechanize time-consuming hand processes such as the washing of glass containers and the loading, unloading, and sorting of raw materials. 56/ The planned construction of steam and electric power plants at Kherson, Tiraspol', and Kamyshin will increase the power base of food-canning plants located in the vicinity of these plants. 57/

Despite these grandiose Soviet plans for mechanization of canning equipment and actual increased production of canned food, the food-canning industry in the USSR, with the exception of a few big plants, is still backward by US standards. Recipes sent to US canners for the wartime production of tushonka called for hand labor in many operations which are performed by machines in the US. Filling cans was a hand operation broken down into several activities, with each component of the final product, onion, spices, meat, lard, and bayleaf, requiring separate handling. Preparation of the various raw materials, cooking, and loading and unloading of kettles, all of which are mechanized in the US, were also hand operations in the USSR. 58/

C. Current Problems.

1. Utilization of Capacity.

Canning plants are supplied with seasonal foods. Canning of fruit and vegetables coincides with the months in which these products are harvested in the USSR, roughly the middle of May through the middle of October. Meat canning coincides with the period of large-scale slaughter of livestock, which runs from the middle of October through January. Some fish are caught and canned throughout the year, but the periods of heaviest catch and, consequently, maximum canning activity, come in the spring and in the fall. Milk is canned on a year-round basis.

If the canning industry were located in a small area, the pattern of production outlined above would provide some form of foodstuff for canning plants on a year-round basis so that these plants could remain active by switching from production of canned fruit and vegetables to canned meat and then to canned fish. However, except for Krymskaya and a few other large plants, switching from one product to another with the season has not proved feasible for Soviet canning plants. Areas providing fruit and vegetables are not always near livestock-producing or fish-catching areas. Furthermore, because of high transportation costs and the fact that transportation facilities are operating near capacity, hauling of raw materials over long distances to processing centers is not practicable. As a consequence, it is frequently cheaper to keep a small fruit-canning plant in a non-meat-producing area idle during the off-season than to import meat. However, in the case of Krymskaya, which employs over 1,000 workers and is equipped with modern and costly machinery, it would seem desirable to import raw food if this were necessary to keep the plant operating continuously. Krymskaya does have a rich hinterland for the supply of livestock products as well as fruit and vegetables and is close enough to the Black Sea coast for the supply of fish. It therefore receives an excellent year-round supply of raw foodstuffs, but even this plant must import meat products from Hungary and Rumania to keep its assembly lines rolling. 59/

The division of canning facilities among three ministries also acts as a deterrent to year-round activity in individual enterprises. Meat combines and fish-processing plants are set up to process products in various ways, including canning, whereas canning combines of the Ministry of Food Industry are set up for canning only.

Although meat and fish canneries are equipped to process a whole animal, their facilities are not flexible enough to engage in the canning of fruit and vegetables. Canning combines of the Ministry of Food Industry on the other hand are frequently equipped to can widely different commodities such as fruit and fish by making relatively slight adjustments in supply, processing, and distribution channels.

Because of the long-enforced inactivity, the Russians are making strenuous efforts to utilize capacity to the fullest during the canning season. In spite of these efforts, the coefficient of utilization never exceeded two-thirds of capacity during the war years and dropped well below this figure in the postwar period. Even though the Fourth Five Year Plan called for special attention to be given to the problem of increasing seasonal utilization of capacity, some plants were operating below capacity as late as the 1951 fruit- and vegetable-canning season. 60/

2. Lack of Adequate Refrigeration.

The lack of adequate refrigeration capacity to store foods awaiting processing, or already processed, is a serious weakness in canned food production and distribution. Although many plans have been made to increase refrigeration capacity, this was still a major problem in 1951. 61/

3. Botulism.

It cannot be accurately determined whether botulism exists as a serious problem in the Soviet food-canning industry. Food poisoning, which was called botulism, was noted in Odessa and Dnepropetrovsk in 1935 and was attributed to carelessness. 62/ Botulism was reported in Lithuania in 1940-41, where it was attributed to sabotage. 63/ No other information is currently available on the occurrence of botulism. Both pork and beef tushonka are excellent media for the development of bacteria which produce the toxin. The toxin, however, is destroyed if exposed to heat at 212°F for 5 minutes. 64/

4. Shortages of Containers.

Before 1930 the containers used in the canning industry consisted mainly of tin cans. However, since much of the tin utilized in the tin cans had to be imported, attempts were made to increase the use of glass containers. As a consequence of these efforts, the number

of glass containers used in the Soviet food-canning industry increased from 5 million in 1930 to a planned 100 million in 1936, about 8 percent of total canned food production. 65/ By 1940, almost half of the total canned food production was being put up in glass jars. 66/

In 1936, despite greater utilization of glass jars, the shortage of containers in the food industry led A.I. Mikoyan, then People's Commissar for the Food Industry, to complain of "a lack of tinplate and glass for tins and jars." To alleviate the shortage of containers, the Ordzhonikidze (now Dzaudzhikau) plant with a capacity of 75 million jars per year, and the Stalingrad plant, with a capacity of 35 million jars per year, were set up to produce glass jars for the food-canning industries; and the Novomoskovskiy tinplate rolling plant was constructed to supply tinplate for canning factories. 67/

As a consequence of tin shortages during World War II, there was an increased tendency to preserve foods in bottles and jars that would normally have been preserved in tin cans. Because of a lack of packing boxes, canned or bottled goods were often stored in the open and were loaded, unpacked and in bulk, on railroad cars resulting in considerable breakage and loss. 68/

The packaging of canned goods continues to be a problem in spite of the numerous efforts that have been made to increase the supply of containers. To compensate for the short supply of tin to the food-canning industry and to reduce consumption of tinplate, the use of lacquered blackplate cans of a type used in Germany during World War II has been introduced. 69/ Although increased use is being made of glass jars, 70/ the glass industry has experienced difficulty in meeting its obligations. This industry has too many small plants producing haphazardly and maintaining outmoded techniques and unproductive labor methods. Another difficulty encountered by the glass industry is the unprofitable distribution of glass enterprises of similar type among many different ministries. 71/

Available information indicates that the Russians still rely primarily on the hot-dip method of tinplating, which has been replaced by the electrolytic method in the US. The hot-dip method utilizes a higher ratio of tin in the tinplate than the electrolytic method but requires less space and machinery and costs less. In 1949, tinplate plants of meat combines processed 3 million rubles worth of electrolytic tinplate. The 1950 Plan called for production of 5 million rubles worth of electrolytic tinplate by the meat industry. 72/

D. Current Assortment of Canned Food.

In 1912, about 90 different varieties of canned food were produced in Russia, whereas by 1949, 517 varieties were being produced. These included 120 varieties of meat, 150 of fish, 70 of vegetables, 150 of fruit, 22 of fruit and vegetable juices, and 5 of canned milk. 73/ (See Appendix F for names of varieties and sizes of cans.)

VI. Pattern of Canned Food Utilization.

A. Type of Container.

In the USSR, canned food is packed in tin cans or glass jars, depending on the availability of raw materials for the containers, the type of product canned, and the utilization pattern of the canned food. Appendix B briefly traces the history of the relative position of tin cans to glass jars in total canned food production. Based on the historical developments and on information from numerous individual plants, it is estimated that about 90 percent of all canned meat, fish, and dairy products and about 25 percent of all canned fruit and vegetables are packed in tin cans and that the remainder is packed in glass jars. Of the estimated total 1951 production of 1,637 million cans of food, an estimated 675 million were packed in glass jars and the remaining 962 million packed in tin cans.

B. Outlets.

Canned food produced in the USSR is consumed by the military or the civilian population or is exported or stockpiled. It is difficult to determine accurately the quantity of canned food going into each of the above channels, but the military takes priority as a consumer, either for immediate use or for future use of stockpiled canned food.

1. Civilian Consumption.

Despite Soviet claims that, by 1948, consumption of canned food by the civilian population had increased 10 times in comparison with 1913, 74/ that 1951 sales of canned food were 27 percent greater than 1950 sales, 75/ and that prices of canned fruit and vegetables had been reduced 20 to 10 percent, respectively, in 1952 as compared with 1951, 76/ only small quantities of canned food are

available to urban consumers. Since only a very small fraction of the total 1913 population of Tsarist Russia consumed canned food, a tenfold increase in per capita canned food consumption over a 35-year period is virtually meaningless. As for the increase noted in civilian consumption between 1950 and 1951, members of the American Embassy in Moscow frequently note the absence of canned food in Soviet food stores and the very small actual per capita consumption of canned food.

Since over one-third of the 1951 canned food production was canned in glass jars not useful for either stockpiling or army rations, it is assumed that most of the Soviet canned goods output going into civilian channels is preserved in glass jars. Circulars advertising the canned food products of the Ministry of Food Industry for civilian consumption always show illustrations of glass jars of fruit and vegetables, never of tin cans. 77/

2. Military Consumption.

In 1949 a British Military Intelligence report estimated a 1-year peacetime divisional reserve of canned food at 25 metric tons of canned meat and 25 metric tons of canned fish, which, when converted, would total about 125,000 standard 400-gram cans. 78/

Under normal peacetime garrison conditions in Germany or the USSR the Soviet Army apparently does not consume very much canned food. 79/ Each division's annual needs is met through consumption of the previous year's divisional reserves, and little or no canned food is consigned for immediate consumption. 80/

3. Exports.

Exports of canned food by the USSR are insignificant except for canned fish. As long ago as 1937 the Russians exported about 6,900 metric tons of canned fish, 81/ or about 17 to 18 million standard 400-gram cans. The post-World War II expansion of the Soviet canning industry in the Far East, primarily caused by the acquisition of Japanese canning facilities and the attendant elimination from the export market of the Japanese canning industry, formerly one of the world's leading exporters of canned fish and seafood, enabled the Soviet Far Eastern fish-canning industry to monopolize the Far Eastern export market until very recently. 82/ The Russians have long been capitalizing on the export of high-value canned fish products such as

caviar, lobster, and salmon to Western Europe, the British Commonwealth, and the US while importing much larger quantities of cheap Norwegian salted herring for domestic consumption. 83/ In this manner the USSR gained in total food tonnage and also picked up much needed foreign currency in exchange. If a small tonnage of canned fish from other areas such as the Baltic (IIa) or the Volga (VI) is added to Far Eastern exports, an estimate of about 100 million cans of fish is obtained as the export total for 1951.

In January 1952 a new All-Union export-import association, Prodintorg, was set up to handle among other products the export of canned fruit, vegetables, meat, and fish. Prodintorg thus replaces the former Eksportkhleb in the handling of canned food. 84/

4. Stockpiling.

Stockpiling is a major factor in Soviet wartime supply potential. It has been indicated that considerable quantities of canned food are currently going into stockpiles. 85/ Accurate figures on the number of cans of food stockpiled are, however, not obtainable (see Appendix G).

Two factors qualify the implementation of a stockpiling program: (a) production must be maintained or increased, or consumption decreased; (b) canned food must be stored for long periods of time to enable production to meet annual turnover and add to the stockpile.

The theoretical limit to the number of cans that can be stockpiled, given available storage facilities, depends upon production and the rate of stockpile inputs and withdrawals. Canned food cannot be stored indefinitely, but must be taken from storage and used after about 5 years. Thus, if increases in production or decreases in utilization permit larger inputs of food than must be withdrawn, stocks will show net increases. If, however, a decline in production occurs or the government, by decree, reduces annual inputs below the necessary withdrawals, stocks will show a net loss. A constant rate of inputs may even be accompanied by a net lowering of the level of stocks. If, for example, inputs level off at 5,000 units but withdrawals are 6,000 units because of high inputs a few years earlier, the level of stockpiling will show an absolute decrease until withdrawals likewise level off at 5,000 units.

The levels of stocks at any given time are not therefore determined by the rate of inputs alone, but estimates must be based on the moving and ever-changing ratios that exist between the accretions to and withdrawals from stocks.

Soviet production of canned food has shown continuous increases from year to year since the end of the war, ranging from a 20-percent increase from 1950 to 1951 to a 35-percent increase from 1948 to 1949, with an average annual increase of 30 percent in canned food production. The Plan for canned food production in 1952 called for a 33-percent increase over 1951 production, and 1955 production is to be 2.1 times greater than 1950 production (see Appendix A).

The Russians estimate the maximum storage period for lacquered tin cans to be 5 years and for unlacquered tin cans, 3 years. 86/ Only limited quantities of glass jars are stockpiled. On this basis, there would have to be a complete turnover of canned food stocks at least every 5 years.

VII. Vulnerabilities, Capabilities, and Intentions.

A. Vulnerabilities.

1. Location.

During World War II the Soviet food-canning industry suffered a loss of 70 percent of its productive capacity 87/ primarily because the most important canneries were located within the area overrun by the Germans. During and since World War II the Russians have made consistent efforts to move many of their plants eastward. Despite these efforts, almost two-thirds of total estimated Soviet canned food production in 1951 was still located west of the Urals inasmuch as canning plants must be located near the source of supply. Another 15 percent of production is concentrated in a few industrial areas of Central Asia, and 10 percent, representing fish canning, along the Pacific Coast. The remaining food-canning facilities, under 10 percent, are dispersed throughout Siberia. These Siberian plants, which are important in the canning of meat and include such large plants as the Ulan-Ude Meat Combine, produce about one-quarter of total Soviet

canned meat output (see Appendix H). In the case of canned meat, canning seems to be a sort of salvage operation. Only through canning and other forms of preserving is it feasible to transport to centers of consumption meat of poor quality grown in distant places.

2. Transportation.

The distance required to transport the canned goods from the canneries to the consumers may be a wartime source of weakness to the Soviet canned food industry (see Appendix B). Canned goods produced in the various canning centers in the southwestern European areas of the USSR and in the Transcaucasian and Central Asiatic republics have their primary civilian markets in Moscow, Leningrad, Sverdlovsk, and Rostov-on-Don but are also shipped to the Far East and the Far North. 88/

In the event of war, the output of these canning centers would have to be shipped to military forces scattered throughout the country. Strategically located stockpiles of canned food would tend to reduce the transportation difficulties of the food-canning industry.

3. Food Supply.

The raw food supply of the industry is a potential target. US chemical or biological attacks against livestock, crops, and fish might deny these sources of food to the canning plants. In addition, blockade and strategic bombing might cut down production of tin and steel, affecting directly the production of containers for the food-canning industry.

a. Improper Handling of Canned Food.

During World War II, improper handling of canned food by the Russians resulted in very severe losses. Labor shortages and a scarcity of materials for containers motivated destructive shortcuts. Cans were frequently stored in the open and were loaded unpacked and in bulk in railroad cars. 89/

Since both pork and beef tushonka are excellent media for the growth of bacteria, careless processing and handling of these products can result in considerable loss. Tushonka must be processed rapidly. If allowed to stand between operations, particularly between closure and processing, gassy meat with resultant loss of can vacuum may ensue. 90/

b. Improper Use of Equipment.

Finally, wartime speed-ups will result in additional pressures on already heavily taxed equipment and may well reduce the life of much machinery. Replacement of foreign equipment now being used by the USSR may be virtually impossible, and replacement with Soviet-made equipment will depend on the priority attached to food canning by Soviet planners.

c. Emphasis on Labor over Machinery.

An especially important inhibitor to rapid expansion is the disproportionate use of labor in relation to available machinery. Such dependence on labor might very well prevent necessary expansion in canning production at a time when labor is badly needed for other wartime operations.

B. Capabilities.

1. Unused Capacity.

Experience in the canning industry in the US has shown that expansion of production to meet military needs depends first on the industry having a potential capacity to produce in excess of that currently being used in peacetime. This potential is made up of physical plant equipment that can be speeded up or used for longer periods than is the usual practice in peacetime. In the US the excess capacity was enough to permit an increase in production of about 70 to 80 percent during World War II. It is usually not feasible in any country to build machinery, install it, and train men to operate the machinery rapidly enough to increase the production soon enough to become effective under about $1\frac{1}{2}$ to 2 years. Therefore, even though the USSR does have a considerable unused capacity, it may not have the capability to utilize this unused capacity because of a lack of managerial ability and trained workers.

Likewise, the age of the available machinery and its life expectancy under more intensive conditions of use, for example, 3 shifts per day instead of 1 or 2 shifts, is a limiting factor in determining how much of unused capacity can actually be put to effective use.

2. Conversion of Fruit- and Vegetable-Canning Plants to Meat- or Fish-Canning Plants.

If the necessary fresh meat and fish were available, many plants such as Krymskaya, now canning meat or fish as an off-season sideline to fruit and vegetable canning, might be able to step up their canned meat or fish output with a few additional adjustments. However, a qualification should be noted in the Soviet conversion potential. At present the Soviet food-canning industry is packing a wide variety of products in relation to the total volume (see Appendix F). Speed in processing and elasticity in the use of machinery depends to a considerable degree on specialization in the packing of a relatively small number of items, each in considerably larger volume than is presently the case in the USSR.

3. Other Sources of Supply.

Additional sources of canned meat and fish supply for the Soviet Army may be found in the Soviet Satellites, particularly East Germany. During World War II the German food-canning industry over-expanded and, since World War II, local civilian consumption has been unable to absorb more than a small fraction of the canneries' capacity. 91/ The Soviet Army in East Germany is being currently supplied in part by the Germans with both canned meat and canned fish, 92/ and in a future war the supply of German canned food to the Soviet Army could probably be increased, approaching World War II levels of production for the German Wehrmacht.

C. Intentions.

1. Introduction.

Soviet intentions may be indicated by the following aspects of the food-canning industry: (a) the priority which the USSR gives to food canning as a segment of the over-all economy in any given period as contrasted with the priority placed on this industry in other periods, (b) the utilization of the output of the food-canning industry, and (c) the size of cans.

2. Priority.

During World War II the USSR considered the production of canned goods less important than the production of munitions and

converted several glass jar and tin can manufacturing plants into munitions plants. For instance, the Kamyshin Glass Container Plant made cartridges, and various can-making plants made land mines. 93/ Information on the diversion of tin, steel, coal, and other raw materials which limit canned food output might also indicate the relative importance that the government attaches to the canning industry in relation to the economy as a whole and, particularly, as indicating diversion of plant capacity to military utilization.

3. Utilization Pattern.

The relative quantities of canned food allocated for civilian or military consumption, for exports, or for stockpiling might indicate Soviet military intentions. Continued extensive stockpiling at the expense of other segments of the economy might even indicate preparations for war.

Consideration should be given to the canned food utilization pattern as indicating the extent to which the Russians plan to supply canned food to the civilian population. Even in time of a meat and fish shortage the Soviet government may desire to maintain the animal protein and fat ration of workers in certain key industries or of certain groups of government employees.

The Fifth Five Year Plan (1951-55) looks forward to an increase of $2\frac{1}{2}$ to 3 times in the sale of canned food to the civilian population. 94/ Based on estimates indicated in Appendix G, sales of canned food for civilian consumption alone would, by 1955, amount to between 1,640 million and 1,968 million standard cans, a figure which would exceed the total production in 1950 estimated at 1,363 million standard cans.

The Fifth Five Year Plan calls for an increase of 2.1 times in the production of canned food from an estimated 1,363 million cans in 1950 to an estimated 2,862 million cans in 1955.* If the supplies of fish, meat, and other raw materials were available, it might be possible to increase the output of the canning industry to the present maximum plant capacity, but this capacity is probably not great enough to

* The canned food production envisioned by the 1955 planned maximum would indicate a 75-percent increase over the estimated 1951 production of 1,637 million cans and a 31-percent increase over the estimated 1952 planned production of 2,187 million cans.

produce 2,862 million cans. It is probably for this reason that the Plan envisions a 40-percent increase in the capacities of fish, fruit, and vegetable canneries during the period ending in 1955. It is also planned to increase capacities of meat-canning plants by 40 percent and milk canneries by 160 percent. 95/

It appears from the steady annual postwar rise in canned food production that fulfillment of the canned food production phase of the Fifth Five Year Plan would be possible if the Russians were willing to divert from other channels the raw materials and capital necessary to meet the planned goals.

Despite the grandiose promises outlined by the Plan, past consumption patterns indicate little likelihood of an increase in civilian consumption of the proportions planned. The stockpiling program has priority over civilian consumption. If the USSR actually increased retail sales of canned food to the population as planned, it would be only because the stockpiling objectives had already been achieved, or because the USSR had abandoned its stockpiling program. Since neither of the latter two assumptions are regarded as realistic, it seems safe to conclude that the USSR will not increase retail sales of food as indicated by the Plan.

The application of the utilization pattern of canned food as an indicator of the USSR's intentions is valid because of the importance placed upon canned food by Soviet planners and also because of its extensive use by the Soviet Army in World War II. The validity of the assumption that changes in canned food production and stockpiling indicate warlike or peaceful intentions of the USSR may, of course, change with the development of different methods of preserving food which can be substituted for canning. It may be assumed that the USSR is capable of adopting and developing innovations in food preservation such as dehydration of milk and eggs and the manufacture of food similar to the US Army's World War II "D" ration, a food product containing a high concentration of vitamins and nutrients. If these concentrates were manufactured in large quantities and became important stockpile items, the appearance of greatly increased numbers of cans on the civilian market might, or might not, indicate the attainment of canned food stockpiling objectives -- it might only represent the release of one type of food product from stockpiles to make room for another type.

To the extent that these substitutions take place, the use of canned food as a measure of intentions becomes less reliable. Substitution is, therefore, a development that must be scrutinized at all times. At the present time, however, since canning is a very important method of food preservation, its observation may reveal intentions.

4. Size of Cans.

The size of the cans of food packed in the USSR may afford a clue to Soviet intentions. Based on US experience and depending on the commodity canned, a 300- to 800-gram can normally meets the needs of the average civilian family for 1 meal and represents the most popular size of can for civilian use. 96/ For military purposes, a 100- to 150-gram can, suitable for feeding 1 soldier for 1 meal, or cans of 1,000 grams and up, suitable for feeding groups of men for 1 meal, are the most useful can sizes. Consequently, the size of the cans being produced will generally indicate the type of consumer, civilian or military, for whose ultimate use the can is intended. Furthermore, mass production of one size of can usually requires a certain amount of retooling by the canning and auxiliary industries. Any retooling activity by the Soviet food-canning and can-manufacturing industries would be a possible indication of the direction the Soviet food-canning industry was taking.

APPENDIX A

PRODUCTION OF CANNED FOOD IN THE USSR

1. Tsarist Russia to World War II.

In 1913, under the Tsarist regime, the following canned commodities were produced: meat, fish in oil or tomato sauce, fruit, vegetable hors d'oeuvres, and tomato purée. The total quantity produced was equivalent to 120 million standard 400-gram cans. 97/

In 1928, production of canned food under the Soviet government had not yet reached prerevolutionary totals and was only about 90 million cans, of which 33 million cans were fish; 21 million cans, meat; and the remaining 36 million cans, fruit and vegetables. 98/

As indicated in Table 1*, annual production of canned food increased to 906 million standard cans by 1932 and showed steady increases for the next 5 years, reaching a prewar peak of 1,371.9 million cans in 1937. Production dropped sharply in 1938 to 990 million, 28 percent below the peak level of the previous year. This sharp drop has been attributed by the canning industry to the elimination of certain assortments of fruit and vegetables. 99/ From 1938 to 1940, canned food production leveled off to about 1 billion cans, of which in 1940, 750 million were turned out by the People's Commissariat of Food Industry, and the remaining 250 million were divided between the People's Commissariats of Meat and Dairy Industry and Fish Industry. 100/

The 1941 Plan called for the production of 1,262 million cans, broken down among various people's commissariats as shown in Table 2.**

War and the invasion by the Germans of several regions important to the canning industry disrupted the execution of the 1941 Plan. Immediately following the close of hostilities, however, new goals were set by the canning industry.

* Table 1 follows on p. 28.
** Table 2 follows on p. 28.

Table 1

Numbers of Cans of Food Produced Annually
in the USSR
1932-40

Year	Million Standard 400-Gram Cans Amount
1932	906.1 101/
1933	900.4 102/
1934	1,121.9 103/
1935	1,290.1 104/
1936	1,274.4 105/
1937	1,371.9 106/
1938	990.0 107/
1939	1,060.0 108/ a/
1940	1,000.0 109/

a. Planned.

Table 2

Planned Production of Canned Food in the USSR
by People's Commissariat 110/
1941

Producer	Standard 400-Gram Cans Millions	Percent
People's Commissariat of Food Industry	900	71.3
People's Commissariat of Meat and Dairy Industry	202	16.0
People's Commissariat of Fish Industry	160	12.7
Total	1,262	100.0

2. Postwar Years.

a. Ministry of Food Industry.

In 1946, planned production of canned food for the Ministry of Food Industry was set at 308 million cans. 111/ This 1946 planned total was reported to have been 30 percent greater than actual 1945 production, 112/ which would set 1945 production at 237 million cans. I.K. Sivolap, former Minister of Food Industry, in a 1950 publication indicated the progress of canned food production on a percentage basis, as shown in Table 3.

Table 3

Reported Production of Canned Food in the USSR by the Ministry of Food Industry a/ 113/ 1945-50

Year	Percent
1945	100
1946	118
1947	146
1948	206
1949	264
1950 b/	337

a. 1945 equals 100.
b. Planned.

The conversion of these percentages into numbers of cans, employing the estimated 1945 production of 237 million standard cans as a base, indicates the annual output as shown in Table 4.*

These figures are substantially confirmed by other Soviet sources. Production in 1947 was reported 25 percent greater than in 1946, 114/ or 350 million cans, as compared with 346 million cans

* Table 4 follows on p. 30.

Table 4

Computed Production of Canned Food in the USSR
by the Ministry of Food Industry
1945-50

Million Standard 400-Gram Cans

Year	Amount
1945	237
1946	280
1947	346
1948	488
1949	626
1950 a/	799

a. Based on planned percentage.

computed in Table 4. In 1948, production was reported to have been about 41 percent greater than in 1947, 115/ or 488 million cans, which is the same as the 1948 total computed above. Production in 1949 was reported to have been 35 percent greater than in 1948, 116/ or 659 million cans, as compared with 626 million cans computed above. Another source indicates a doubling of canned food production between 1946 and 1949, 117/ or 560 million cans. The accepted figure of 626 million cans based on Sivolap's percentages falls between the upper and lower extremes of 659 million and 560 million cans.

According to one source, production in 1950 was 33 percent greater than in 1949, 118/ or 833 million cans and, according to another source, about 3 times 1946 production, 119/ or about 840 million cans. Although these calculated production figures indicate an

appreciable overfulfillment of Plan, the lower figure of 833 million cans (4.4 percent above Plan) has been accepted as the tentative approximation of 1950 production.*

Production in 1951 was reported by one source as having been 118 percent of 1950, 122/ indicating 833 x 1.18 equals 983 million standard cans. Another source reports 1951 production for the first 11 months as having been about 150 million cans more than during the same period of 1950. 123/ This would indicate the 1951 production at 983 million plus cans for the year.

To determine the approximate quantities of the various commodities canned by the food industry, the detailed breakdown given by the 1941 Plan was utilized. This breakdown showed about 80 percent of the canning production of the food industry in fruit and vegetables, 15 percent in meat products, and the remaining 5 percent in fish and dairy products. 124/ Applied to 1940, this breakdown gives 650 million cans of fruit and vegetables and 100 million cans of meat, fish, and dairy products turned out by the People's Commissariat of Food Industry. The figure of 100 million cans agrees with a statement made by Zotov in 1947 that the People's Commissariat of Food Industry produced about 100 million cans of meat, fish, and dairy products in 1940. 125/ The above ratios of 80, 15, and 5 percent for food industry products were carried through to 1952, since no contradictory material has been turned up for later years.

Additional confirmation for this breakdown by the Ministry of Food Industry is afforded by a 1948 statement that the Ministry of Food Industry was producing 100 million more cans of fruit and vegetables

* Planned production for 1952 was given by Sivolap as 178 percent of 1940, 120/ or 1,335,000 cans. Another statement by Sivolap in the same article gives 1950 production as 148 percent of 1940, 121/ or 1,110,000 cans. This percentage (148 percent) is irreconcilable with all other figures available for the Ministry of Food Industry but may actually stand for canned production by all ministries, or 1,480 million cans, in 1950 as compared with 1 billion cans in 1940. The difference between 1,363 million and 1,480 million cans might represent production of local ministries, or, less likely, production of the Ministry of Internal Affairs in Far Eastern fish canneries.

for the first 11 months of 1948 as compared with 1947. 126/ The computed figures for canned fruit and vegetables in 1947 were 277 million cans and in 1948, 390 million cans, or an increase of 113 million cans between the 2 years. The planned increase for canned fruit and vegetables from 1945 to 1946 was 25 percent, 127/ or an increase from 190 million to 237 million cans. The computed figure for actual 1946 production of canned fruit and vegetables was 224 million cans.

b. Ministry of Fish Industry.

The total Soviet fish catch in 1940 has been estimated at 1.4 million metric tons landed weight. 128/ The USSR canned 3.2 percent of this catch, 129/ or 44,800 metric tons. On the basis of 400 grams per can, production of canned fish amounted to 112 million standard cans in 1940. The planned output of the fish-canning industry in 1941 was 160 million standard cans. 130/

Little data are available for the years from 1941 through 1944, but the fish catch for 1945 was reported at 1,060,000 metric tons. 131/ Based on the 1940 pattern and the generally chaotic conditions prevailing in the fish-canning industry during and immediately after the war, 132/ it was assumed that 2.5 percent of the 1945 fish catch, a processed equivalent of 26,500 metric tons, or 66 million standard cans, was produced in 1945.

The next year for which data on canned fish production are available is 1950, when the fish catch was reported as being 27 percent greater than in 1940, 133/ or about 1.8 million metric tons. The output of canned fish in 1950 was reported at 182.5 percent of 1940, 134/ or 204 million standard cans, equivalent to 81,600 metric tons. This quantity of input is 4.5 percent of the estimated catch.

To obtain canned fish production for the years 1946-49, the percentage of total catch was interpolated between the 2.5 canning factor of 1945 and the 4.5 factor of 1950, allowing an annual increase of 0.4 percent in the percentage of the landed weight canned.

The 1951 catch was reported to be 22 percent greater than that of 1950, 135/ or a computed 2.2 million metric tons. In 1951 the output of canned fish was reported to be 41.3 percent greater than in 1950, 136/ or 288 million* standard cans, equivalent to an input of 115.2 thousand metric tons. This quantity of input is equivalent to 5.2 percent of the estimated catch. (See Table 5 for figures on the Soviet fish catch and canned fish production in 1940 and 1945-51.)

Table 5

Estimated Fish Catch and Production of Canned Fish in the USSR by the Ministry of Fish Industry
1940, 1945-51

Year	Fish Catch 138/ (Thousand Metric Tons)	Canning Percentage	Fish Canned	
			Thousand Metric Tons 139/	Million Standard 400-Gram Cans
1940	1,400	3.2	44.8	112
1945	1,060	2.5	26.5	66
1946	1,170	2.9	33.9	85
1947	1,500	3.3	49.5	124
1948	1,530	3.7	56.6	142
1949	1,870	4.1	76.7	192
1950	1,800	4.5	81.6	204
1951	2,200	5.2	115.2	288

c. Ministry of Meat and Dairy Industry.

The Ministry of Meat and Dairy Industry produces canned meat and dairy products. Production by this ministry for 1940 was 138 million standard cans, the difference between 250 million cans produced by people's commissariats other than the People's Commissariat of Food Industry less the 112 million-can output of the People's Commissariat of Fish Industry.

* The 1952 output of the fish-canning industry was also reported as being 156.4 percent greater than in 1940, 137/ or 286.7 million cans.

The Fourth Five Year Plan called for 1950 production of 116 million cans of milk, which would have been 189.2 percent of 1940 production. 140/ Therefore, 1940 production of canned milk must have been 61 million cans. Actual canned milk production in 1950 was 118 percent of 1940, 141/ or 72 million cans. Canned milk production planned for 1951 was to have been 79 percent greater than 1950 production, 142/ or 129 million cans, but was actually only 44 percent greater than the 1950 figure. 143/ On this basis, estimated 1951 production was 104 million cans of milk. Production of milk in 1950 was greater than the output of 63 million cans in 1949, which was the first postwar year to exceed the prewar 1940 production of 61 million cans. 144/ The estimates for 1947 and 1948 are based on Plans, growth patterns for subsequent years, and monthly performances in the dairy industry.

Total production by the People's Commissariat of Meat and Dairy Industry for 1940 has already been estimated at 138 million cans, of which 61 million cans were milk and 77 million cans, meat and meat products. A comparison of postwar production of canned meat with prewar production shows that 193 million cans were produced in 1949, or 2.5 times greater than that in 1940, 145/ 254 million cans, in 1950, 146/ or 3.3 times greater than in 1940, and 262 million cans in 1951, 147/ or 3.4 times greater than in 1940.

Since the 1949 Plan for canned meat was fulfilled by 140 percent 148/ and actual production in 1949 was 193 million cans, the 1949 Plan must have called for production of about 138 million cans of meat. The 1949 planned production was to have been 28.2 percent greater than 1948 production. 149/ The 1948 actual production was, therefore, about 108 million cans. In turn, production of canned meat in 1948 was 43.2 percent greater than in 1947, 150/ indicating a 1947 output of 75 million cans of meat.

To obtain 1945 and 1946 production of canned goods by the meat and dairy industry, the position of this industry's canned food production relative to total canned food production was obtained for the years 1940, 1941 (planned), and 1947-51, as noted in Table 6.*

The average of these percentages indicates that the meat and dairy industry produces about 20 percent of the total canned food

* Table 6 follows on p. 35.

Table 6

Estimated Percentage of Total Production
of Canned Food Produced in the USSR
by the Ministry of Meat and Dairy Industry
1940, 1941, 1947-51

Year	Percent
1940	14
1941	16
1947	21
1948	21
1949	24
1950	24
1951	22

output. Applying the 20-percent factor to 1945 and 1946 percentages, the estimated 1945 production is 76 million cans and the 1946 production, 91 million cans. Averages based on the relationship of meat to dairy products in total canned meat and dairy output for the years 1940, 1941, and 1947-51 indicate that roughly two-thirds of this output consisted of meat products. The resulting breakdown for 1945 and 1946 showed 51 million cans of meat products and 25 million cans of dairy products for 1945 and 61 million cans of meat products and 30 million cans of dairy products for 1946. (See Table 7* for a tabulation of the breakdown of the Soviet production of canned goods.) An independent survey of the Soviet food-canning industry made by a US firm in 1945 estimated Soviet canned meat production for 1945 at 50 million cans, thus agreeing with the above figures. The other estimates of this survey were a little further off, with canned fruit and vegetable production estimated at 150 million to 200 million cans and canned fish production at 300 million to 350 million cans. 151/

* Table 7 follows on p. 36.

~~S-E-C-R-E-T~~

Table 7

Estimated Production of Canned Food in the USSR by Ministries
1940, 1941, 1945-52, 1955

Million Standard 400-Gram Cans

Products by Ministry	1940	1941 Planned	1945	1946	1947	1948	1949	1950	1951	1952 Planned	1955 Planned
Ministry of Food Industry a/*											
Fruit and Vegetables	650	739	190	224	277	390	501	666	786	1,070	
Meat Products	88	141	35	42	52	73	94	125	147	200	
Fish and Dairy Products	12	20	12	-14	17	25	31	42	50	67	
Total	750	900	237	280	346	488	626	833	983	1,337	
Ministry of Meat and Dairy Industry b/											
Meat Products	77	117	51	61	75	108	193	254	262	341	
Dairy Products	61	85	25	30	47	55	63	72	104	135	
Total	138	202	76	91	122	163	256	326	366	476	
Ministry of Fish Industry c/											
Fish Products	112	160	66	85	124	142	192	204	288	374	
Total	112	160	66	85	124	142	192	204	288	374	
Grand Total	1,000	1,262	379	456	592	793	1,074	1,363	1,637	2,187	2,862 d/

*Footnotes to Table 7 follow on p. 37.

Table 7

Estimated Production of Canned Food in the USSR by Ministries
1940, 1941, 1945-52, 1955
(Continued)

a. People's Commissariat of Food Industry from 29 July 1934 to 15 March 1946; Ministry of Food Industry since 15 March 1946. 152/

b. People's Commissariat of Meat and Dairy Industry from 19 January 1939 to 15 March 1946; Ministry of Meat and Dairy Industry since 15 March 1946. 153/

c. People's Commissariat of Fish Industry from 19 January 1939 to 15 March 1946; Ministry of Fish Industry since 15 March 1946, except for the period from 8 May to 28 December 1946, when the Ministry of Fish Industry was split into the Ministry of Fish Industry for Western Regions and the Ministry of Fish Industry for Eastern Regions. 154/

d. Computed on the basis of planned 1955 total production, which is to be 2.1 times greater than actual total 1950 canned food production. 155/

APPENDIX B

INPUT REQUIREMENTS OF THE SOVIET FOOD-CANNING INDUSTRY

1. Tin Cans.

a. Tin Plate.

The analysis of the input requirements in the manufacture of tin cans for food was based on the number of tin cans required by the food-canning industry during the calendar year 1951.

The total output of the food-canning industry in the USSR in 1951 was computed to be equivalent to 1,637 million cans of 400-gram capacity each. This total output was broken down by commodities into tin cans and glass jars, as indicated in Table 8* of this appendix. No recent data are available as to the ratio of tin cans to glass jars in the total canned food output, but figures on these ratios are available for the years 1933 and 1934. In 1933, 100 percent of the total output of canned meat, 80 percent of the canned fish, 16 percent of the canned fruit and vegetables, and 67 percent of the canned dairy products were packed in tin cans. 156/ These ratios were fairly constant in 1934. 157/

During the immediate prewar years a tendency to increase the use of glass jars in place of tin cans was noticeable. In 1940, almost half of all the output of canned food was put up in glass jars. 158/ Wartime tin shortages and losses of tin-plate manufacturing facilities because of enemy action contributed to the continuation of the tendency toward the use of glass jars in the immediate postwar years. 159/

In the last few years, however, an increase in the relative number of tin cans packed by the food-canning industry as compared with the number of glass jars has taken place. One of the primary factors in this development has been the greater relative increase in the output of meat, fish, and dairy products, all of which are usually packed in tin cans, in comparison with the output of fruit and vegetables which are generally packed in glass jars.

* Table 8 follows on p. 41.

[p. 38 blank]

Based on the developments noted above and on information regarding numerous individual plants, it has been assumed that approximately 90 percent of all canned meat, fish, and dairy products and 25 percent of all canned fruit and vegetables are packed in tin cans and that the remainder are packed in glass jars. Table 8*, based on output as indicated in Table 1 of Appendix A, shows the output of canned food by type of container.

Based on US standards and on analyses of Soviet cans, a net weight of 3.2 ounces of tin plate per 400-gram can has been accepted. 160/ Applied to the total of 962 million tin cans, the 3.2-ounce weight factor indicates a total of 3,078.4 million ounces, or 87,272 metric tons, of tin plate, excluding solder, utilized in processing this number of tin cans.

In the US a standard box of tin plate weighing 100 pounds net would average 1.5 pounds of tin and 98.5 pounds of steel. This US ratio is equivalent to 12.342 kilograms of tin per metric ton of tin plate. The application of this factor to the total requirements by the Soviet food-canning industry in 1951 of 87,272 metric tons of tin plate, indicates a total required input of 1,077 metric tons of tin and 86,195 metric tons of steel.

Based on current US practice, an additional 1 ounce of tin would have been required to solder 140 400-gram cans. 161/ The requirement of tin for solder for 962 million tin cans is computed to be 195 metric tons.

Tin plate is also utilized in the screw caps of glass jars, with a requirement averaging about 18 kilograms of tin plate per 1,000 glass jars equivalent to 400 grams each. 162/ An output of 675 million glass jars would require 12,150 metric tons of tin plate, which is equivalent to 150 metric tons of tin and 12,000 metric tons of steel.

Total tin requirements, excluding loss, for packaging the quantity of food canned by the Soviet food-canning industry in 1951 is thus computed to be 1,422 metric tons and the corresponding steel requirements for tin plate would have been 98,195 metric tons. Assuming 10 percent for loss and waste, the over-all requirements for tin are indicated at 1,564 metric tons, and for steel, at 108,015

* Table 8 follows on p. 41.

Table 8

Estimated Production of Canned Food in the USSR, Showing Breakdown into Tin Cans and Glass Jars
1951

Products by Ministry	1951 Canned Food Production (Million Standard 400-Gram Cans)	Packed in Tin Cans (Percent)	Packed in Tin Cans (Million Standard 400-Gram Cans)	Packed in Glass Jars (Percent)	Packed in Glass Jars (Million Standard 400-Gram Jars)
Ministry of Food Industry					
Fruit and Vegetables	786	25	196	75	590
Meat Products	147	90	132	10	15
Fish and Dairy Products	50	90	45	10	5
Total	983		373		610
Ministry of Meat and Dairy Industry					
Meat Products	262	90	236	10	26
Dairy Products	104	90	94	10	10
Total	366		330		36
Ministry of Fish Industry					
Fish Products	288	90	259	10	29
Total	288		259		29
Grand Total	1.637		962		675

metric tons. Since, in the above calculations, no account has been taken of the USSR's ability to substitute lacquered thin steel plate or electrolytic tin plate for the hot-dip tin plate believed to be most widely utilized at present in the USSR, it is preferable to give a range rather than a firm figure for tin and steel utilized. Tin is thus estimated to range from 1,400 to 1,800 metric tons, plus or minus 15 percent, and the range for steel is 100,000 to 115,000 metric tons, plus or minus 8 percent.

b. Vegetable Oil.

An important input requirement in the manufacture of tin plate is a vegetable oil, preferably palm oil. If palm oil is not available, cottonseed oil may be substituted. The vegetable oil, which must be edible since it comes in contact with food products, coats the tin plate with a thin film to facilitate the feeding of sheets into fabricating equipment and to prevent rust, scratching, and abrasion during fabrication by automatic equipment.

US practice requires 11.75 pounds of oil per long ton of tin plate, or 5.42 kilograms per metric ton. 163/ Applied to Soviet production of at least 110,000 metric tons of tin plate, the vegetable oil requirement would be about 600 metric tons. Despite the inferior performance of cottonseed oil in comparison with palm oil, which has a higher evaporating point, locally available cottonseed oil is probably the principal vegetable oil utilized by the Soviet tin-plate industry.

c. Acid.

Unknown quantities of acid, generally sulphuric acid, are required to pickle the steel, which must be cleaned prior to tinning. The pickling operation consists of immersing the steel in a mixture of acid and water to remove scale from the surface of the steel and to expose defects.

2. Glass Jars.

a. Glass.

In 1951 the number of glass jars used by the Soviet food-canning industry was statistically equivalent to 675 million jars with a

capacity of 400 grams each. Such a jar would contain 14 ounces of glass, indicating a requirement of 268,000 metric tons of glass to produce 675 million jars.

Based on standard US procedure, 164/ the input requirements in the manufacture of 268,000 metric tons of glass are as follows in Table 9.

Table 9

Estimated Input Requirements in the Manufacture of Glass in the USSR by the Food-Canning Industry

Metric Tons

Input Item	Quantity
Sand	192,000
Sulphate	64,000
Magnesium Borate (Asharite)	32,000
Dolomite	32,000
Soda Ash	13,000
Coal Dust	2,000

The loss factor is negligible, since broken glass, or cullet, may be utilized in the manufacture of glass.

b. Rubber.

Rubber is utilized in the screw caps of glass jars at an average rate of 2.7 kilograms of rubber per 1,000 jars. 165/ Production of 675 million jars would require between 1,800 and 1,850 metric tons of rubber.

3. Additional Raw Material Input Requirements.

To determine Soviet inputs for various raw materials required to maintain existing equipment and for normal expansion of the Soviet food-canning industry, a comparison was made with the US food-canning industry. Soviet and US practices and equipment are not strictly comparable, because many machines considered indispensable in the US

are replaced by hand labor in the USSR. For example, in meat canning, rotary meat cutters and fillers utilized in the US are replaced by hand labor in the USSR. Moreover, the Russians tend to use equipment longer than the period considered feasible in US practice. Although squeezing additional years of usefulness from worn-out equipment may cut down somewhat on replacement requirements, the apparent gain in utilization of machinery is offset by frequent breakdowns and over-all decreased productivity per machine in terms of labor, fuel, and other input factors. Finally, since the Russians are notorious improvisers, scarce materials may be completely or partially replaced by other materials. For repairing any US machinery being used by the Soviet food-canning industry, however, US standards would have to be followed if the machines are to function properly.

With the above qualifications modifying the results obtained, Soviet raw material requirements for the food-canning industry in 1951 were compared with US requirements for 1942 on the assumption that the Soviet food-canning industry as a whole is roughly 10 years behind the US industry. US canned food output in 1942 was estimated at 16 billion cans, 166/ whereas Soviet output in 1951 was estimated at 1,637 million cans (see Appendix A), or roughly one-tenth of the US figure. Based on the 10 to 1 ratio of 1942 US canned food output to 1951 Soviet output, current Soviet needs for all materials required for canning machines and equipment were carried at one-tenth of 1942 US needs as shown in Table 10.*

4. Labor Force.

a. Number of Workers.

The estimate of the labor force engaged in the food-canning industry in the USSR was obtained by totaling the number of workers in each canning plant listed in Appendix E. Where the number of workers were given, figures were accepted; where no figures were available for the number of workers in a given plant, estimates based on the relative size of the plant were made. Slight adjustments were also made to allow for plants which may not have been listed.

In 1936 the number of workers employed in the Soviet food-canning industry was estimated at 34,400. 167/ By 1951 the number of workers engaged in this industry had risen to an estimated 52,500 distributed regionally as shown in Table 11.**

* Table 10 follows on p. 45.
** Table 11 follows on p. 51.

Table 10

Estimated Raw Material Requirements of the Food-Canning Industry in the US and the USSR

Short Tons

Commodity	Estimated 1942 US Requirements Based on Production of 16 Billion Standard 400-Gram Cans 166/	Estimated 1951 Soviet Requirements Based on Production of 1.6 Billion Standard 400-Gram Cans
Aluminum		
Bars	5	0.5
Castings	91	9.1
Sheets	40	4.0
Tubing	4	0.4
Paint	60	6.0
Brass and Bronze		
Bars	134	13.4
Castings Miscellaneous	346	34.6
Valves and Seats	310	31.0
Sheets	52	5.2
Tubing	32	3.2
Copper		
Bars	108	10.8
Castings	7	0.7
Tubing	22	2.2
Rolled Copper Wire	1,850	185.0
Screen and Sheets	625	62.5

Table 10

Estimated Raw Material Requirements of the Food-Canning Industry in the US and the USSR
(Continued)

Short Tons

Commodity	Estimated 1942 US Requirements Based on Production of 16 Billion Standard 400-Gram Cans 166/	Estimated 1951 Soviet Requirements Based on Production of 1.6 Billion Standard 400-Gram Cans
Monel		
Bars	8	0.8
Castings	3	0.3
Sheets	48	4.8
Tubing	9	0.9
Stainless Steel		
Bars	1,185	118.5
Castings	135	13.5
Sheets	564	56.4
Tubing	177	17.7
Cutlery	4	0.4
Nickel		
Bars	2	0.2
Castings	7	0.7
Sheets	11	1.1
Tubing	4	0.4
Nickel Silver		
Sheets	2	0.2

Table 10

Estimated Raw Material Requirements of the Food-Canning Industry in the US and the USSR
(Continued)

Short Tons

Commodity	Estimated 1942 US Requirements Based on Production of 16 Billion Standard 400-Gram Cans 166/	Estimated 1951 Soviet Requirements Based on Production of 1.6 Billion Standard 400-Gram Cans
Waukesha Metal		
Castings	77	7.7
Dairy Metal		
Castings	3	0.3
Tin		
Ingots	53	5.3
Lead		
Sheets and Bars	25	2.5
Paint	1,800	180.0
Babbit		
Ingots	75	7.5
Solder		
Bars	75	7.5
Zinc		
Sheets	947	94.7

Table 10

Estimated Raw Material Requirements of the Food-Canning Industry in the US and the USSR
(Continued)

Short Tons

Commodity	Estimated 1942 US Requirements Based on Production of 16 Billion Standard 400-Gram Cans 166/	Estimated 1951 Soviet Requirements Based on Production of 1.6 Billion Standard 400-Gram Cans
Iron and Steel		
H and I Beams	12,200	1,220.0
Angles and T's	16,500	1,650.0
Channels	2,571	257.1
Plates	5,200	520.0
Reinforcing	4,500	450.0
Black Sheets	580	58.0
Galvanized Sheets	13,600	1,360.0
Galvanized Pipes	800	80.0
Black Pipe	1,000	100.0
Well Casing	2,250	225.0
Cast Iron Pipe	600	60.0
Galvanized Conducting Pipe	200	20.0
Miscellaneous Malleable Castings	8,006	800.6
Gray Iron Castings	7,266	726.6
Galvanized Pipe Fittings	200	20.0
Black Pipe Fittings	250	25.0
Valves	80	8.0
Bolts, Nuts, Screws, and Washers	1,400	140.0
Wire and Nails	800	80.0
Electric Conduit and Fittings	1,775	177.5
Boiler Tubing	6,800	680.0
Spring and Tool Steel	300	30.0

Table 10

Estimated Raw Material Requirements of the Food-Canning Industry in the US and the USSR
(Continued)

Short Tons

Commodity	Estimated 1942 US Requirements Based on Production of 16 Billion Standard 400-Gram Cans 166/	Estimated 1951 Soviet Requirements Based on Production of 1.6 Billion Standard 400-Gram Cans
Iron and Steel (Continued)		
Pails and Buckets	200	20.0
Miscellaneous Steel and Iron (Welding Rods, Pulleys, Shafting, Railroad Sidings, Cable, Auto Parts, Lift Trucks)	6,000	600.0
Rubber Belts	2,250	225.0
(Gloves, Boots, Suits, and Aprons)	59	5.9
	59	5.9
Rubber Hose	400	40.0
Chlorinated Washing Powder	700	70.0
Phosphate Washing Powder	1,650	165.0
Paper, Labels	42,000	4,200.0
Paper, Boxes	250,000	25,000.0
Stitching Wire	960	96.0
Lumber	14,500,000	1,450,000.0
Transmission Belt	N.A.	N.A.
Soda Ash for Waste Treatment	N.A.	N.A.
Lime for Waste Treatment	N.A.	N.A.
Ferrous Sulphate for Waste Treatment	N.A.	N.A.
Sodium Chromate for Waste Treatment	N.A.	N.A.

Table 10

Estimated Raw Material Requirements of the Food-Canning Industry in the US and the USSR
(Continued)

Short Tons

Commodity	Estimated 1942 US Requirements Based on Production of 16 Billion Standard 400-Gram Cans 166/	Estimated 1951 Soviet Requirements Based on Production of 1.6 Billion Standard 400-Gram Cans
Liquid Chlorine for Waste Treatment	N.A.	N.A.
Zeolite for Water Treatment	N.A.	N.A.
Lubricating Oil and Grease	N.A.	N.A.
Boiler Compounds	N.A.	N.A.
Lacquer and Enamel for Tin Cans	N.A.	N.A.
Inks for Lithographing Cans, Boxes, Labels	N.A.	N.A.
Paste for Labels and Cases	N.A.	N.A.
Total	14,899,997	1,489,999.7 a/

a. 1,351,728 metric tons. Lumber constitutes about 97 percent of the total.

b. Employment of Women, Prisoners of War, and Forced Labor.

The number of women in the labor force of individual plants ranges from 30 to 80 percent of the total number of workers. 168/ Large numbers of German and Japanese prisoners of war were also employed by canning enterprises as unskilled manual labor or for construction work through about 1949. 169/ Forced laborers are presently found in unknown numbers in canning enterprises, especially fish canneries in the Far East. 170/

Table 11

Estimated Numbers and Regional Distribution of the Labor Force of the Food-Canning Industry in the USSR 1951

Economic Region	Number of Workers
Northwest (Ia)	1,700
Northern European USSR (Ib)	300
Baltic (IIa)	1,700
Belorussia (IIb)	500
Ukraine (III)	7,000
Lower Don-North Caucasus (IV)	8,000
Transcaucasus (V)	5,000
Volga (VI)	2,500
Central European USSR (VII)	3,000
Urals (VIII)	3,000
West Siberia (IX)	2,000
Kazakh SSR (Xa)	4,000
Central Asia (Xb)	5,300
East Siberia (XI)	2,500
Far East (XII)	6,000
USSR Total	52,500

5. Energy Requirements.

Consumption of electric energy by the entire Soviet food-processing industry in 1934 was computed to be about 590 million kilowatt-hours. The food-canning branch of this industry is estimated to have utilized 12.8 million kilowatt-hours of electric energy, or a little over 2 percent of the total energy consumed by the food-processing industry as a whole.

The 1941 Plan called for the output of 560 million kilowatt-hours of electric energy by the People's Commissariat of Food Industry and an additional 66 million kilowatt-hours output by the People's Commissariat of Meat and Dairy Industry, which in 1934 was a branch of the food industry. The electric energy output of the food and meat

and dairy industries was smaller than the consumption requirements with the deficit being made up by power stations of other people's commissariats.

Based on the 1934 figure of 590 million kilowatt-hours' consumption of electric energy by the food industry and the 1941 total of 626 million kilowatt-hours by the food and meat and dairy industries, a 1940 consumption figure of about 600 million kilowatt-hours seems reasonable.

Although the food industry had lost 50 percent of its electric power installations during World War II, by 1950 electric energy consumption had increased 2½ times as compared with 1940, 171/ to an estimated annual consumption of about 1,500 million kilowatt-hours.

At the same time, the energy base of the food-canning industry was to have increased considerably with the construction of electric or steam-electric power stations at Kherson, Tiraspol', Kamyshin, and other canning centers. 172/ Based on the expansion and increase in mechanization in the canning industry, it is assumed that the food-canning industry would have consumed about 5 percent of the total electric energy consumption of the food industy, or about 75 million kilowatt-hours in 1950. The average increase per year in electric energy consumption for the years 1934-50 is computed to be about 3 million kilowatt-hours. If this average increase is added to the approximated 1950 consumption figure, the 1951 electric energy consumption by the food-canning industry may be considered to be about 78 million kilowatt-hours. This total is shown in Table 12,* broken down by regions on a direct ratio of output of canned food to electric energy consumed. See Table 29** for the estimated output of canned food produced in each Soviet economic region.

6. Fuel Requirements.

Based on consumption patterns in the US food-canning industry, the total fuel demand of the Soviet food-canning industry would be 1 million metric tons of coal equivalent in terms of average Soviet coal (10,450 Btu per pound). This figure for fuel consumption does not include the fuel required for the production of energy for the food-canning industry.

* Table 12 follows on p. 53.
** P. 132, below.

Table 12

Estimated Production of Canned Food in the USSR and Consumption of Electric Energy by the Food-Canning Industry 1951

Economic Region	Canned Food Production a/ (Million Standard 400-Gram Cans)	Percent of Total	Consumption of Electric Energy (Million Kilowatt-Hours)
Northwest (Ia)	42.0	2.6	2.0
Northern European USSR (Ib)	31.5	1.9	1.5
Baltic (IIa)	32.0	2.0	1.6
Belorussia (IIb)	38.5	2.3	1.8
Ukraine (III)	231.0	14.1	11.0
Lower Don-North Caucasus (IV)	264.5	16.2	12.6
Transcaucasus (V)	145.0	8.9	6.9
Volga (VI)	167.5	10.2	8.0
Central European USSR (VII)	86.0	5.2	4.1
Urals (VIII)	46.5	2.8	2.2
West Siberia (IX)	65.5	4.0	3.1
Kazakh SSR (Xa)	103.0	6.3	4.9
Central Asia (Xb)	156.0	9.6	7.5
East Siberia (XI)	68.0	4.1	3.2
Far East (XII)	160.0	9.8	7.6
USSR Total	1,637.0	100.0	78.0

a. See Appendix H.

The actual type of fuel utilized varies locally and may include coal, wood, peat, or petroleum depending on the location of the individual canning plants and the local availability of fuel resources.

7. Haulage Requirements.

Table 13 lists the average estimated haul for each major input commodity required by the food-canning industry together with the canned food output (in thousand metric tons) and expresses the overall transport requirements in ton-kilometers: that is, quantities multiplied by the average haul. Average haul for the various items was obtained from Soviet figures where available; otherwise it was estimated on the basis of locations of consumers, producers, and raw material sources and the distances between each of these elements.

Table 13

Estimated Haulage Required by the Food-Canning Industry in the USSR
1951

Commodity	Quantity (Thousand Metric Tons)	Average Haul (Kilometers)	Ton-Kilometers (Million)
Tin	2.0	2,000	4.0
Steel	115.0	250	28.8
Vegetable Oil	0.6	1,700	1.0
Rubber	1.8	1,200	2.2
Coal Equivalent	1,000.0	650	650.0
Equipment Requirements	1,350.0	600	810.0
Glass Jars	200.0	200	40.0
Tin Cans	100.0	200	20.0
Canned Food	700.0	1,200	840.0
Total	3,469.4	691	2,396.0

8. Capital Investment.

Figures were available for the periods of the First and Second Five Year Plans (1928-32 and 1933-37) for the total capital investment of the USSR, for the capital investment in the food-processing industry, and for the food-canning branch of this industry. The figure

for the total Soviet capital investment for the Third Five Year Plan (1938-42) to the time of the German invasion, a period of $3\frac{1}{2}$ years, was also available as was the planned figure for the food-processing industry and its food-canning branch for the entire Third Five Year Plan (1938-42). 173/ The Third Five Year Plan figures for the food-processing industries were divided by 5 to give average yearly planned figures, and the total for $3\frac{1}{2}$ years was computed. The fraction of total Soviet capital investment represented by the food-processing industry was then determined for each of the first 3 Five Year Plans as was also the food-canning fraction relative to food processing for the period of the same 3 Plans.

With the planned total Soviet capital investment for the Fourth Five Year Plan (1946-50) known, the fraction representing food processing for each of the first 3 Five Year Plans was averaged; and then this average was applied to the total Soviet capital investment to obtain the planned capital investment for the food-processing industry as a whole during the Fourth Five Year Plan. The food-canning fraction of the investment for the food-processing industry as a whole was calculated for each of the first 3 Five Year Plans and then averaged. The average thus obtained was applied to the total food-processing industry investment to obtain the capital investment in the food-canning industry.

The figures for capital investment in food processing and food canning for the three prewar Plans represent capital investment by the People's Commissariat of Food Industry. Both the food-processing and food-canning figures for the Fourth Five Year Plan (1946-50) include the planned capital investment of four ministries -- Food Industry, Meat and Dairy Industry, Fish Industry for Western Regions, and Fish Industry for Eastern Regions. The latter two ministries were merged in December 1946.

Of the estimated planned capital investment of 9.5 billion rubles for food processing in the Fourth Five Year Plan (1946-50), 5.6 billion rubles were planned capital investment for the Ministry of Food Industry. 174/ Fifty-nine percent of total food-processing capital investment seems to go into the Ministry of Food Industry. If the relationship between the Ministry of Food Industry and food-processing capital investment is carried over for food canning, a figure of 247 million rubles is obtained for capital investment in food canning by the Ministry of Food Industry. The remainder of 172 million rubles

represents capital investment in canning by the Ministry of Meat and Dairy Industry and the Ministry of Fish Industry. The capital investment of the food-processing and food-canning industries is shown in Table 14.

Table 14

Capital Investment of the Food-Canning Industry in the USSR According to the Five Year Plans 1928-50

Economic Sector	First Five Year Plan (1928-32) a/ 175/	Second Five Year Plan (1933-37) a/ 175/	Third Five Year Plan (1938-42) a/ 175/	Fourth Five Year Plan (1946-50) b/ 176/
Total Economy (Million Rubles)	51,000.0	115,000.0	130,000.0	250,000.0
Food Processing (Million Rubles)	1,574.2	5,313.9	4,822.0	9,525.0
Food Canning (Million Rubles)	69.6	233.4	212.1	419.1
Food Processing as Percent of Total Capital Investment	3.09	4.62	3.71	3.81
Food Canning as Percent of Food Processing	4.42	4.39	4.40	4.40

a. 1926-27 ruble value; actual capital investment.
b. 1945 ruble value; planned capital investment.

APPENDIX C

IMPORTS OF THE SOVIET FOOD-CANNING INDUSTRY FROM THE US

1. Lend-Lease.

During World War II the USSR imported (a) canned meat, (b) tin plate, (c) tin cans, and (d) canning machinery from the US under Lend-Lease, as follows:

a. Canned meat products, primarily pork or beef tushonka. 177/ (See Table 15.)

Table 15

Soviet Lend-Lease Imports of Canned Meat Products from the US
1941-45

Metric Tons

	1941-42	1942-43	1943-44	1944-45
Canned Beef	22	5,013	466	61
Canned Pork	19,072	79,692	53,153	50,842
Other Canned Meat	438	38,304	204,354	131,207

b. 169,953 short tons (154,181 metric tons) of tin plate. 178/

c. Tin cans, with at least 1 shipment of 7 million tin cans to the Soviet Far East. 179/

d. Among other canning machinery, the following was sent 180/:

(1) Double-seaming machines for attaching bottoms to cans in the can-making process. Capacity: 300 73-millimeter by 91-millimeter cans and 100-millimeter by 112-millimeter cans per minute.

(2) Can-closing machines. Capacity: 200 cans per minute.

(3) Tomato-paste-canning machines. Capacity: 40 to 60 US No. 10 cans per minute.

(4) Double-seamers and vacuum-sealers. Capacity: 150 84-millimeter by 108-millimeter, 54.8-millimeter by 71-millimeter, and 54.8-millimeter by 46-millimeter cans per minute.

2. Postwar.

a. Canning Machinery.

In 1950 the Russians were seeking the following canning machinery from US firms.

(1) Complete tomato juice installations. Capacity: 20 gallons per minute.
(2) Complete citrus juice (tangerine) installations. Capacity: 10 to 16 gallons per minute.
(3) Complete green-pea-canning installations comprising selection machines, hydraulic conveyors, blanching machines, washing machines, portion-measuring machines, vacuum-sealers for cans and bottles, and machines for emptying containers into the spiral of the autoclave and for discharging the autoclave. Capacity: 100 US No. 2.5 cans per minute.
(4) Complete sweet-corn-canning installations. Capacity: 100 containers per minute.
(5) Apple-peeling and core-removing machines. Capacity: 1 ton per 8 hours.
(6) Machines for the extraction of pits from cherries. Capacity: 1 ton per hour.
(7) Machines for snipping cherry stems. Capacity: 500 kilograms per hour.
(8) Vacuum-sealers for fruit juice.
(9) Shelling machines for leguminous vegetables.

b. Tin-Plating Machinery.

In the postwar period, among tin-plating machinery sent to the USSR by the US were 2 complete hot-dip, 75-inch, three-way tinning units. This equipment consisted of a large tinning pot and machinery to convey sheet or strip steel through a fluxing bath into the molten tin and, finally, through a palm oil bath. Buffing and polishing equipment was also furnished. The 2 units were designed for an annual combined capacity of 20,000 metric tons. This is obsolete equipment in comparison with the electrolytic process now in use in the US. 181/

APPENDIX D

ORGANIZATION OF THE SOVIET FOOD-CANNING INDUSTRY*

1. Ministry of Food Industry.

a. 1951 Production of Canned Food by the Ministry of Food Industry.

The Ministry of Food Industry 182/ has been the leading Soviet ministerial producer of canned food with its Main Administration of the Canning Industry (Glavkonservy) turning out an estimated 60 percent, or 983 million standard cans, of all Soviet canned food in 1951.

b. Main Administration of the Canning Industry.

The Main Administration of the Canning Industry, in turn, is broken down into regional canning trusts. Some of these trusts seem to represent the areas of entire republics -- the Moldavian SSR, 183/ the Ukrainian SSR, 184/ the Azerbaydzhan SSR, 185/ and the Georgian SSR canning trusts 186/ -- whereas other trusts apparently only represent certain areas within republics -- the Kanibadam Canning Trust of the Tadzhik SSR 187/ and the Leninakan Canning Trust of the Armenian SSR. 188/ These trusts, however, appear to be in every case subordinate to the Main Administration of the Canning Industry. It is possible that republican food ministries may also engage in food canning. 189/

The link between the Main Administration of the Canning Industry and the several trusts may not be direct. Administration (upravleniye), or comparable units, may form intermediate administrative organs between the Main Administration and the trusts.

In addition to the production of canned goods, the Main Administration of the Canning Industry of the Ministry of Food Industry shares responsibility with the Ministry of Trade for supplying fresh fruit and vegetables to industrial centers. In 1940 the canning industry supplied 27,000 tons of fresh fruit and vegetables to Soviet industrial centers. Export regions supplying fruit to industrial centers include: the Crimea Oblast, Krasnodar Kray, the Moldavian SSR, and all the Transcaucasian and Central Asiatic republics. 190/

* See footnote, p. 1, referring to merger of ministries.

c. Food Industry Canning Trusts.

The trusts appear to administer combines or individual enterprises (canneries). Under the Main Administration of the Canning Industry, the only distinction between combines and canneries seems to be the size of the canning complex, with combines such as Krymskaya merely being very large canneries. In practice, some of the larger combines may actually be bigger than certain of the trusts and perhaps on an administrative level comparable to the main administrations. 191/

d. All-Union Scientific Research Institute of the Canning Industry.

The All-Union Scientific Research Institute of the Canning Industry maintains research centers in several cities. 192/

2. Ministry of Meat and Dairy Industry.

a. 1951 Production of Canned Food by the Ministry of Meat and Dairy Industry.

The Ministry of Meat and Dairy Industry is the second largest producer of canned food in the USSR. Through its Main Administration of Meat Industry (Glavmyaso) and its Main Administration of Canned Milk Industry (Glavkonservmoloko), 193/ the Ministry of Meat and Dairy Industry in 1951 turned out an estimated 22 percent, or 366 million cans, of USSR canned food production. Of this ministerial total, roughly 72 percent, or 262 million cans, was estimated as being the contribution of the Main Administration of Meat Industry, and the remaining 28 percent, or 104 million cans, represented the 1951 output of various types of canned milk by the Main Administration of Canned Milk Industry (see Appendix A).

b. Main Administration of Meat Industry.

In the organization of the Main Administration of Meat Industry, there is a Canning Administration directly responsible to the main administration. 194/ There are also republican main administrations of meat industry, such as Rosglavmyaso (RSFSR Main Administration of Meat Industry). 195/

With a few exceptions in the case of individual meat trusts, it has not yet been ascertained whether the individual meat trusts, which cover the whole of the USSR on a regional basis, 196/ are subordinated directly to the Main Administration of Meat Industry under the Ministry of Meat and Dairy Industry or to republican main administrations, or whether both types of subordination exist side by side. 197/

There are apparently no meat-canning trusts as such. The meat trusts supervise canning activities merely as one of several forms of meat processing, such as sausage manufacturing and bacon production. 198/ The relationship of meat trusts to the Canning Administration is not known.

c. Meat Trusts.

The trusts are composed of various meat-packing combines which are the basic productive units, the equivalents of the enterprises in other industries. 199/ For operational purposes, the combines are further broken down administratively into plants, the plants into shops, the shops into sections, and the sections into brigades. In most combines, canning represents the functions of one particular shop. A canning shop seems to be a part of most meat combines. 200/ In addition, there were in the past, and there still may be, a few small local enterprises directly subordinate to the meat trusts which handle one particular processing operation such as canning, sausage manufacturing, or bacon production. 201/

d. Main Administration of Canned Milk Industry.

There is as yet no form of information available on the organization of the Main Administration of Canned Milk Industry. The existence, however, of canned milk plants in various regions has been established (see Appendix E), and it may be assumed that there are intermediate organs, possibly trusts, linking the canned milk plants and the Main Administration of Canned Milk Industry.

3. Ministry of Fish Industry.

a. Production of Canned Fish by the Ministry of Fish Industry.

The Ministry of Fish Industry is the third most important producer of canned food with an estimated 18 percent, or 288 million cans, of the total Soviet canned food output in 1951.

b. Organization of the Ministry of Fish Industry.

Administratively, canning is a more decentralized operation in the Ministry of Fish Industry than in the Ministry of Food Industry or the Ministry of Meat and Dairy Industry. Main administrations have been set up on a regional rather than a commodity basis for all the important fishing areas -- the Northern, the Azov-Black Sea, the Caspian, the Siberian, the Amur, the Primorskiy Kray basins, and Sakhalin, and Kamchatka. 202/

Although there are administrations subordinated to certain of the main administrations of the Ministry of Fish Industry, there is no record of any administrations under the regional main administrations. Sectional trusts which handle various phases of fish catching and processing seem to be placed directly under the regional main administrations. Under the trusts are combines, which represent another step in the geographical delimitation of administration. 203/ Finally, the combines are broken down into fish-catching bases and fish-processing plants which include fish canneries. 204/

An example of the organizational pattern of the Ministry of Fish Industry may be traced in the Main Administration of Fish Industry in Kamchatka. Subordinate to the main administration, either directly or through an intermediary, is the West Kamchatka Fish Trust. At the next level of subordination are the Ozernoye Fish Combine, which has various plants under it, including Fish Cannery No. 55; the Avacha Fish Combine, which has, among other subordinate units, the Mokhovaya Base; and the Kikhchik Fish Combine, which has canneries Nos. 44 and 45 under its administration. 205/

The numbering of fish canneries in the Far East seems to be on a consecutive basis with all canneries carrying a numerical designation. Not enough canneries have as yet been identified to establish any pattern. 206/

4. Other Food-Canning Organizations.

In the past, small-scale food canning has also been carried out by various other organizations such as ministries of local industry, industrial cooperatives, and consumers' cooperatives. 207/ It is not known whether the MVD does any canning in its own enterprises, but slave laborers have been observed in numerous canneries in the USSR, especially in the Far East. 208/

5. Auxiliary Enterprises Servicing the Soviet Food-Canning Industry.

Each of the three principal ministries interested in food canning has numerous auxiliary enterprises which service the canning industry. Appendix E lists a few of these diverse plants by ministry.

APPENDIX E

SIZES AND LOCATIONS OF SOVIET FOOD-CANNING PLANTS

1. Canning Plants.

In 1951, almost 400 food-canning plants were identified as operating in the USSR under the control of three ministries: (a) Ministry of Food Industry; (b) Ministry of Meat and Dairy Industry; and (c) Ministry of Fish Industry. These plants are irregularly distributed throughout the USSR, both as to type and capacity, depending upon the nature and quantity of input food materials available in the various republics, oblasts, and krays as shown in Table 16.

Table 16

Regional Distribution of Food-Canning Plants in the USSR a/

Region	Number of Plants
Northwest (Ia)	10
Northern European USSR (Ib)	5
Baltic (IIa)	24
Belorussia (IIb)	8
Ukraine (III)	59
Lower Don-North Caucasus (IV)	36
Transcaucasus (V)	34
Volga (VI)	25
Central European USSR (VII)	28
Urals (VIII)	18
West Siberia (IX)	20
Kazakh SSR (Xa)	22
Central Asia (Xb)	31
East Siberia (XI)	15
Far East (XII)	61
Total	396

a. Incomplete: includes only plants identified as of July 1952.

[p. 64 blank]

Canning plants vary greatly in size and capacity, ranging from the Krymskaya in Krasnodar Kray, employing 2,000 workers and having an output capacity of more than 80 million standard cans per year to the Salyn Cannery in the Crimea, which employs 50 persons and has an annual capacity of only 360 thousand standard cans.*

The type of the plants located in any given region is characteristic of the nature of the raw food materials available for processing. In the Far East (XII) for example, 38 plants are engaged in canning fish, 7 plants can fish and crabs, 10 plants can only crabs, 3 plants can vegetables, 2 plants can meat, and 1 plant cans whale meat. Not only do the enterprises of the Ministry of Fish Industry in the Far East and other regions of the USSR engage in canning, but some of the canning plants, as well as other fish enterprises, smoke, salt, pickle, fillet, and freeze fish.

In the Transcaucasus (V), 9 plants are engaged in canning fruit; 13 plants can fruit and vegetables; 1 plant cans fruit , vegetables, and meat; 5 plants can meat; 1 plant cans fruit, vegetables, meat, and fish; 3 plants can fish; 1 plant cans milk; and 1 plant has not been classified. Enterprises of the Ministry of Food Industry also put out dried or frozen fruit or vegetables, which are sometimes listed along with canned food under the heading of Konservy (preserved foods).

In the Urals (VIII) the Ministry of Meat and Dairy Industry operates 17 plants canning meat, 2 of which also can fish. The enterprises of the Ministry of Meat and Dairy Industry process various meat and dairy products including fresh meat, sausages, bacon, cheese, and whole milk, as well as canned goods. The Ministry of Fish Industry operates 2 plants in the Urals and the Ministry of Food Industry operates 1 plant canning fruit and vegetables.

* The estimate of capacity of the plants given in the accompanying table (Table 17, Appendix E) must be treated with caution since in most cases these estimates do not represent actual output but rather the potential output of a plant working approximately a year-round 8-hour day and a 5-day week. In actual practice the plants will usually work on a seasonal basis, 3 to 9 months a year, but may work around the clock on a three-shift basis during the season.

Table 17* attempts to locate alphabetically within economic regions all plants in the USSR engaged in food canning. The products canned by each plant are also given. Available information on the number of workers and the capacity of various plants is listed as an indicator of the comparative sizes of Soviet food-canning enterprises.

Only those meat combines and fish-processing plants specifically cited in available sources as having canning facilities have been included. Many additional meat combines and fish-processing plants may possibly carry out canning operations but have not been included because of a lack of specific confirmation.

In the listing of individual plants, one plant has been listed for each locality known to have a local canning enterprise unless there is proof of the existence of additional plants in the vicinity. Variant names used for a plant may, however, have resulted in a single plant having been listed twice in 1 town, or even 2 or more towns. Far Eastern fish combines frequently have a main plant located at one point where the combine has its administrative headquarters and subsidiary plants in other localities, but only the main plant may have been listed.

The constant geographical name changes indulged in by the Russians have tended to obscure the location of some of the older plants which may be listed by an old name, or even by both old and new names as a consequence of a lack of positive identification.

War destruction may have resulted in a plant's disappearance or movement to another locality. Although most canning plants destroyed during World War II were rebuilt in their old locations, some were never rebuilt, and others were moved to new locations, where they may have retained their old name or acquired a new name.

In approximating the number of workers engaged in canning food, the entire labor force was taken into consideration in the case of canneries, but, in the case of meat combines which perform processing functions other than canning, only a fraction of the total are actually employed in the canning shops. Depending on the information available on the individual meat combines, the number of workers engaged in canning was estimated at 10 to 15 percent of the meat combines' total estimated labor force.

* Table 17 follows on p. 68.

Table 17

Food-Processing Plants in the USSR: Location, Type, Labor Force, and Capacity by Economic Region

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
Northwest (Ia)					
Belomorsk 209/	Karelo-Finnish SSR	Fish		150	1947
Kandalaksha 210/	Murmansk Oblast	Fish			
Kuganavolok (Vodlozero) 211/	Karelo-Finnish SSR	Fish			
Leningrad	Leningrad Oblast				
Kirov Meat Combine 212/		Meat	400		
Konzentrat 213/		Vegetable	350		
Pishchevik 214/		Fish			
Vkusprom 215/		Vegetable			
Murmansk 216/	Murmansk Oblast	Fish			
Petrozavodsk 217/	Karelo-Finnish SSR	Fish			
Svir'stroy 218/	Leningrad Oblast	Fish			
Vodlozero (Kuganavolok) 219/	Karelo-Finnish SSR	Fish			

* Unless otherwise indicated, all information is postwar.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
Northern European USSR (Ib)					
Kadnikov 220/	Vologda Oblast	Meat			1943
Molochnoye 221/	Vologda Oblast	Milk			
Ruch'yevskiy 222/	Arkhangel'sk Oblast	Fish			
Sokol Sukhona 223/	Vologda Oblast	Milk		10,000	1938
Ust'-Usa 224/	Komi ASSR	Fruit and Vegetables		1,500	1938
Baltic (IIa)					
Daugavpils 225/	Latvian SSR	Fruit and Vegetables	500		1949
Jelgava (Yelgava) 226/	Latvian SSR	Fruit and Vegetables			
Kaliningrad 227/	Kaliningrad Oblast	Fish			
Kaunas 228/	Lithuanian SSR	Fish, Meat, and Vegetables	300		Prewar
Klaipeda 229/	Lithuanian SSR	Fish	100	500	1946

* Unless otherwise indicated, all information is postwar.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
Baltic (IIa) (Continued)					
Kuressaare 230/	Estonian SSR	Fish			
Liepaja (Lepaya)	Latvian SSR				
Meat Combine 231/		Meat			
Cannery 232/		Fish			
Narva**	Estonian SSR	Fish			
Panevezys 233/	Lithuanian SSR	Meat	200		Prewar
Pyarnu 234/	Estonian SSR	Fish		9,000	1952
Riga	Latvian SSR				
Daugava 235/		Fish			
Kayya 236/		Fish			
Latviyas Konservi 237/		Fish and Fruit		1,600	1947
Meat Combine 238/		Meat	100		
Saaremaa Island	Estonian SSR				
Sandla Cannery 239/		Fish		6,000	1952
Siauliai (Shyaulyay) 240/	Lithuanian SSR	Meat	200		Prewar

* Unless otherwise indicated, all information is postwar.
** Probably not in existence.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
Baltic (IIa) (Continued)					
Tallin	Estonian SSR				
Cannery 241/		Fruit and Vegetables		5,000	1950
Meat Combine 242/		Meat		1,000	
Fish Combine 243/		Fish			
Tartu 244/	Estonian SSR	Meat		1,000	
Toyla 245/	Estonian SSR	Fish			
Ventspils 246/	Latvian SSR	Fish			
Vil'nyus	Lithuanian SSR				
Baltika 247/		Fish			
Belorussia (IIb)					
Baranovichi Meat Combine 248/	Baranovichi Oblast	Meat			
Gomel' 249/	Gomel' Oblast	Fruit and Vegetables			

* Unless otherwise indicated, all information is postwar.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
Belorussia (IIb) (Continued)					
Kobrin 250/	Brest Oblast	Fruit and Vegetables		1,500	1947
Khoyniki 251/	Poles'ye Oblast	Fruit and Vegetables			
Rogachev 252/	Gomel' Oblast	Milk		11,000	1949
Vasilevichi 253/	Mogilev Oblast	Milk			
Vitebsk Meat Combine 254/	Vitebsk Oblast	Meat			
Volkovysk 255/	Grodno Oblast	Fruit and Vegetables			
Ukraine (III)					
Balaklava 256/	Crimea Oblast	Fruit and Vegetables		10,000	Prewar
Bakhmach 257/	Chernigov Oblast	Milk			
Belgorod-Dnestrovskiy 258/	Izmail Oblast	Fish			

* Unless otherwise indicated, all information is postwar.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
Ukraine (III) (Continued)					
Bendery 259/	Moldavian SSR	Fruit and Vegetables			
Cherkassy 260/	Kiev Oblast	Fruit and Vegetables		22,500	Prewar
Darnitsa 261/	Kiev Oblast	Meat	300		1950
Dnepropetrovsk Cannery 262/	Dnepropetrovsk Oblast	Meat and Vegetables	200		
Meat Combine 263/		Meat			
Dubno Meat Combine 264/	Rovno Oblast	Meat			
Dzhankoy 265/	Crimea Oblast	Vegetables		2,000	1949
Feodosiya 266/	Crimea Oblast	Fruit and Vegetables		7,300	1938
Gaysin 267/	Vinnitsa Oblast	Fruit			
Genichesk 268/	Kherson Oblast	Fish			

* Unless otherise indicated, all information is postwar.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
Ukraine (III) (Continued)					
Grigoriopol' 269/	Moldavian SSR	Fruit and Vegetables			Planned 1956
Kalarash 270/	Moldavian SSR	Fruit			
Kamenets-Podol'sk 271/	Kamenets-Podol'sk Oblast	Fruit			
Kerch' 272/	Crimea Oblast	Fish and Vegetables		22,500	1938
Khar'kov Cannery 273/	Khar'kov Oblast	Fruit and Vegetables			
Meat Combine 274/		Meat	150		
Kherson 8 March 275/	Kherson Oblast	Fish, Fruit, and Vegetables		28,300	1938
Stalin Gigant 276/		Fruit and Vegetables		75,000	1949

* Unless otherwise indicated, all information is postwar.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
Ukraine (III) (Continued)					
Kiev	Kiev Oblast				
Fish Cannery 277/		Fish	300		
Mikoyan 278/		Fruit and Vegetables		4,500	1946
Kishinev	Moldavian SSR				
Cannery 279/		Fruit and Vegetables	200	2,560	1949
Cannery No. 2 280/		Fruit and Vegetables			Planned 1956
Kolomyya 281/	Stanislav Oblast	Fruit			
Krasnograd 282/	Khar'kov Oblast	Fruit		1,725	1946
Lisichansk	Voroshilovgrad Oblast				
Meat Combine 283/		Meat			
Cannery 284/		Vegetables			
L'vov	L'vov Oblast				
Meat Combine 285/		Meat			
Cannery 286/		Milk			

* Unless otherwise indicated, all information is postwar.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
Ukraine (III) (Continued)					
Mariupol' (Zhdanov) 287/	Stalino Oblast	Fruit and Vegetables		7,500	1938
Melitopol' 288/	Zaporozh'ye Oblast	Fruit		3,000	1947
Molochansk 289/	Zaporozh'ye Oblast	Milk			
Mukachevo 290/	Transcarpathian Oblast	Fruit			
Nisporeny 291/	Moldavian SSR	Fruit and Vegetables			
Novaya Ushitsa 292/	Kamenets-Podol'sk Oblast	Fruit and Vegetables			
Novo-Mirgorod 293/	Kirovograd Oblast	Fruit and Vegetables			
Odessa	Odessa Oblast				
Lenin 294/		Meat, Fruit, and Vegetables		42,000	Prewar
Voroshilov 295/		Meat and Vegetables		33,000	Prewar
Meat Combine 296/		Meat			

* Unless otherwise indicated, all information is postwar.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
Ukraine (III) (Continued)					
Poltava 297/	Poltava Oblast	Fruit and Vegetables			
Posyolik 298/	Zaporozh'ye Oblast	Meat			Planned 1956
Romny 299/	Sumy Oblast	Fruit			
Rybnitsa 300/	Moldavian SSR	Fruit			
Salyn 301/	Crimea Oblast	Fish and Vegetables	50	360	
Sevastopol' 302/	Crimea Oblast	Fruit			
Simferopol' Kirov 303/	Crimea Oblast	Fruit and Vegetables	400	20,000	Prewar
Trudovoy Oktyabr 304/		Vegetables			
1 May 305/		Fruit			
Slobodzeya Glinnoye 306/	Moldavian SSR	Fruit and Vegetables		25,000	1938

* Unless otherwise indicated, all information is postwar.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
Ukraine (III) (Continued)					
Tiraspol'	Moldavian SSR				
1 May 307/		Fruit and Vegetables	400	20,000	1938
Tkachenko 308/		Meat, Fruit, and Vegetables	500	18,000	1951
Vinnitsa	Vinnitsa Oblast				
Meat Combine 309/		Meat	300		
Cannery 310/		Fruit and Vegetables			
Voroshilovgrad	Voroshilovgrad Oblast				
Meat Combine 311/		Meat	300		
Cannery 312/		Fish			
Voznesensk 313/	Nikolayev Oblast	Fruit and Vegetables		20,000	1938
Zhdanov (Mariupol') 314/	Stalino Oblast	Fish			
Zhitomir 315/	Zhitomir Oblast	Fruit and Vegetables			
Zolochev 316/	L'vov Oblast	Meat			

* Unless otherwise indicated, all information is postwar.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
Lower Don-North Caucasus (IV)					
Armavir	Krasnodar Kray				
Meat Combine 317/		Meat	250	2,500	1947
Cannery 318/		Fruit	200	5,000	1947
Ardon 319/	North Osetian ASSR	Fruit and Vegetables		5,900	1938
Assinskaya 320/	Groznyy Oblast	Fruit and Vegetables		19,000	1938
Bagayevskaya 321/	Rostov Oblast	Fruit and Vegetables			
Bazorkino 322/	North Osetian ASSR	Fruit and Vegetables	229		1938
Buynaksk 323/	Dagestan ASSR	Fruit and Vegetables		6,300	1938
Derbent 324/	Dagestan ASSR	Fruit		16,000	1938
Dzaudzhikau	North Osetian ASSR				
Cannery 325/		Fruit and Vegetables			
Meat Combine 326/		Meat			

* Unless otherwise indicated, all information is postwar.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
Lower Don-North Caucasus (IV) (Continued)					
El'khotovo 327/	North Osetian ASSR	Fruit			
Gergebil' 328/	Dagestan ASSR	Fruit			
Groznyy 329/	Groznyy Oblast	Fish, Meat, and Vegetables		22,300	1938
Kasumkent 330/	Dagestan ASSR	Fruit and Vegetables			
Khasavyurt 331/	Dagestan ASSR	Fruit		8,000	1938
Krasnodar 332/	Krasnodar Kray	Meat, Fish, Fruit, and Vegetables		21,000	Prewar
Kropotkin 333/	Krasnodar Kray	Milk		5,000	1938
Krymskaya 334/	Krasnodar Kray	Meat, Fish, Fruit, and Vegetables	2,000	87,600 15,000	1938 1946
Labinskaya 335/	Krasnodar Kray	Fruit			

* Unless otherwise indicated, all information is postwar.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
Lower Don-North Caucasus (IV) (Continued)					
Makhachkala 336/	Dagestan ASSR	Fish	500		1942
Maykop 337/	Adygey Autonomous Oblast	Fruit		12,900	1938
Novorossiysk 338/	Krasnodar Kray	Fish			
Primorsko-Akhtarskaya 339/	Krasnodar Kray	Fish			
Pyatigorsk Meat Combine 340/	Stavropol' Kray	Meat			
Rostov Area	Rostov Oblast				
Smychka 341/		Fruit and Vegetables		30,000	Prewar
Arik 342/		Fish and Vegetables		20,000	Prewar
Bazorkino 343/		Fruit and Vegetables		21,300	Prewar
Sadki 344/	Krasnodar Kray	Fish			
Slavyansk 345/	Krasnodar Kray	Fruit and Vegetables		20,000	Prewar
Sochi Meat Combine 346/	Krasnodar Kray	Meat			
Stavropol' Meat Combine 347/	Stavropol' Kray	Meat	350		

* Unless otherwise indicated, all information is postwar.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
Lower Don-North Caucasus (IV) (Continued)					
Tsymlyanskaya 348/	Rostov Oblast	Vegetables			
Tuapse 349/	Krasnodar Kray	Fish	80		
Vladimirovka 350/	Savropol' Kray	Fruit and Vegetables	800	20,000	1938
Yeysk	Krasnodar Kray				
Cannery 351/		Fish and Vegetables			
Dairy Products 352/		Milk			
Yessentuki 353/	Stavropol' Kray	Meat, Fruit, and Vegetables	300	3,000	
Transcaucasus (V)					
Ayrum 354/	Armenian SSR	Fruit			

* Unless otherwise indicated, all information is postwar.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
Transcaucasus (V) (Continued)					
Baku Cannery 355/	Azerbaydzhan SSR	Fruit and Vegetables			
Meat Combine 356/		Meat			
Batumi 357/	Adzhar ASSR	Fruit			
Gori 358/	Georgian SSR	Fruit and Vegetables		9,500	1942
Gurdzhaanni 359/	Georgian SSR	Fruit and Vegetables		14,000	Planned 1952
Kafan 360/	Armenian SSR	Fruit and Vegetables			
Karadag 361/	Azerbaydzhan SSR	Fish		600	1951
Khachmas 362/	Azerbaydzhan SSR	Meat, Fish, Fruit, and Vegetables		28,000	1951

* Unless otherwise indicated, all information is postwar.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
Transcaucasus (V) (Continued)					
Kirovabad 363/	Azerbaydzhan SSR	Fruit		22,600	1938
Kuba 364/	Azerbaydzhan SSR	Fruit		300	1950
Kumbashinskaya 365/	Azerbaydzhan SSR	Fish			
Kutaisi	Georgian SSR				
Mikoyan Cannery 366/		Fruit and Vegetables	365	24,000	1948
Meat Combine 367/		Meat	100	8,800	1946
Leninakan	Armenian SSR				
Meat Combine 368/		Meat	130	250	1946
Cannery 369/		Fruit and Vegetables		2,800	1946
Lenkoran'	Azerbaydzhan SSR				
Talsha Cannery 370/		Fruit and Vegetables		5,000	1942
Martuni 371/	Armenian SSR	Fish and Vegetables		1,000	1947
Megri 372/	Armenian SSR	Fruit			

* Unless otherwise indicated, all information is postwar.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
Transcaucasus (V) (Continued)					
Nukha 373/	Azerbaydzhan SSR	Fruit			
Oktemberyan 374/	Armenian SSR	Fruit		16,000	1942
Ordubad 375/	Nakhichevan ASSR	Fruit		3,400	1938
Samtredia 376/	Georgian SSR	Fruit and Vegetables		3,000	1946
Sevan 377/	Armenian SSR	Fish		5,000	1951
Shusha 378/	Nagorno-Karabakh Autonomous Oblast	Meat and Vegetables		1,000	1944
Sukhumi 379/	Georgian SSR	Meat, Fruit, and Vegetables		800	1947
Sumgait 380/	Azerbaydzhan SSR	Meat		1,500	
Tbilisi	Georgian SSR				
Meat Combine 381/		Meat	400		
Cannery 382/		Fruit and Vegetables			
Milk Cannery 383/		Milk		43,000	1951

* Unless otherwise indicated, all information is postwar.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
Transcaucasus (V) (Continued)					
Yerevan 384/	Armenian SSR	Fruit and Vegetables		43,000	1951
Zakataly 385/	Azerbaydzhan SSR	Fruit			
Zugdidi 386/	Georgian SSR	Fruit		640	1947
Volga (VI)					
Alekseyevka 387/	Tatar ASSR	Milk			
Astrakhan'	Astrakhan' Oblast				
Budennyy 388/		Fish			
Glavkonserv 389/		Meat, Fish, Fruit, and Vegetables	200	19,000	1942
Prikaspiyskiy 390/	Astrakhan' Oblast	Fish		2,500	1952
Meat Combine 391/		Meat			

* Unless otherwise indicated, all information is postwar.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
Volga (VI) (Continued)					
Engel's Meat Combine 392/	Saratov Oblast	Meat	60		
Fedorovka 393/	Saratov Oblast	Fish			
Gorodische 394/	Stalingrad Oblast	Milk			
Kamyshin 395/	Stalingrad Oblast	Fruit and Vegetables	197	20,000	1938
Kharabali 396/	Astrakhan' Oblast	Fruit and Vegetables		20,000	1938
Kuybyshev Meat Combine 397/	Kuybyshev Oblast	Meat			
Medveditskoye (formerly Gussenbakh) 398/	Stalingrad Oblast	Fruit and Vegetables	167	20,000	1938
Mikhaylovka 399/	Stalingrad Oblast	Fruit and Vegetables	246	20,000	1938
Obraztsovo-Travino 400/	Astrakhan' Oblast	Fish			
Saratov 401/	Saratov Oblast	Fish	150		

* Unless otherwise indicated, all information is postwar.

~~S-E-C-R-E-T~~

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
Volga (VI) (Continued)					
Stalingrad	Stalingrad Oblast				
Novyy Konservyy 402/		Meat, Fruit, and Vegetables		33,600	1938
Meat Combine 403/		Meat			
Milk Cannery 404/		Milk			1948
Stavropol' 405/	Kuybyshev Oblast	Fruit	100		
Surovikino 406/	Stalingrad Oblast	Milk		2,500	1941
Syzran' 407/	Kuybyshev Oblast	Fruit and Vegetables			
Uryupinsk	Stalingrad Oblast				
Meat Combine 408/		Meat			
Cannery 409/		Fruit and Vegetables		17,700	1938
Yamnaya 410/	Astrakhan Oblast	Fish			
Yelabuga 411/	Tatar ASSR	Meat, Fruit, and Vegetables			

* Unless otherwise indicated, all information is postwar.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information
Central European USSR (VII)					
Belgorod 412/	Kursk Oblast	Fruit and Vegetables			
Borisoglebsk	Voronezh Oblast				
Meat Combine 413/		Meat			
Cannery 414/		Fruit and Vegetables		24,000	1938
Gor'kiy	Gor'kiy Oblast				
Cannery 415/		Fish		600	1946
Cannery 416/		Fruit and Vegetables		4,000	1945
Ivanovo	Ivanovo Oblast				
Meat Combine 417/		Meat	100		
Kalinin 418/	Kalinin Oblast	Fish			
Kaluga Meat Combine 419/	Kaluga Oblast	Meat			
Kardymovo 420/	Smolensk Oblast	Milk			

* Unless otherwise indicated, all information is postwar.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
Central European USSR (VII) (Continued)					
Kirov Meat Combine 421/	Kirov Oblast	Meat	50		
Kobra 422/	Kirov Oblast	Fruit and Vegetables			
Kolomna 423/	Moscow Oblast	Fish			
Lebedyan' 424/	Ryazan' Oblast	Fruit			
Lgov 425/	Kursk Oblast	Milk			
Moscow	Moscow Oblast				
Meat Combine 426/		Meat	500		
Red October Cannery 427/**		Fruit and Vegetables			
Mozhaysk 428/	Moscow Oblast	Fruit and Vegetables			
Mtsensk 429/	Orël Oblast	Fruit and Vegetables	20		
Nevel' 430/	Velikiye Luki Oblast	Milk			

* Unless otherwise indicated, all information is postwar.
** A confectionery plant which may have done some wartime canning.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
Central European USSR (VII) (Continued)					
Novoyerusalmskaya 431/	Moscow Oblast	Vegetables	12		1949
Oboyan' 432/	Kursk Oblast	Fruit and Vegetables			
Rudnya 433/	Smolensk Oblast	Milk		10,000	1938
Saransk 434/	Mordva ASSR	Meat, Milk, Fruit, and Vegetables			
Staryy Oskol 435/	Kursk Oblast	Fruit and Vegetables	150	20,000	1938
Tula 436/	Tula Oblast	Fish			
Volzhsk 437/	Mari ASSR	Fruit and Vegetables			
Voronezh Meat Combine 438/	Voronezh Oblast	Meat			
Vyshniy Volochek 439/	Kalinin Oblast	Fruit			

* Unless otherwise indicated, all information is postwar.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
Urals (VIII)					
Berezniki 440/	Molotov Oblast	Fruit and Vegetables			
Birsk 441/	Bashkir ASSR	Fish			
Chelyabinsk Meat Combine 442/	Chelyabinsk Oblast	Meat			
Chkalov Meat Combine 443/	Chkalov Oblast	Meat	150		
Koltubanovskiy 444/	Chkalov Oblast	Meat	500		
Magnitogorsk Meat Combine 445/	Chelyabinsk Oblast	Meat	100		1948
Meleuz 446/	Bashkir ASSR	Milk		3,500	1941
Miass Meat Combine 447/	Chelyabinsk Oblast	Meat			
Molotov	Molotov Oblast				
Meat Combine 448/		Meat	50		1949
Cannery 449/		Fish	200		1949
Nizhniy Tagil 450/	Sverdlovsk Oblast	Meat			
Orsk Meat Combine 451/	Chkalov Oblast.	Meat	300		
Severoural'sk 452/	Sverdlovsk Oblast	Meat and Fish			

* Unless otherwise indicated, all information is postwar.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
Urals (VIII) (Continued)					
Sterlitamak 453/	Bashkir ASSR	Milk			
Sverdlovsk	Sverdlovsk Oblast				
Meat Combine 454/		Meat	100		1942
Fish Plant 455/		Fish	250		1949
Troitsk Meat Combine 456/	Chelyabinsk Oblast	Meat			
Verkhne Neyvinsk 457/	Sverdlovsk Obast	Meat			
Zlatoust Meat Combine 458/	Chelyabinsk Oblast	Meat			
West Siberia (IX)					
Anzhero-Sudzhensk 459/	Kemerovo Oblast	Meat			
Barnaul Meat Combine 460/	Altay Kray	Meat	30		1948
Karasuk 461/	Novosibirsk Oblast	Milk			Planned 1949
Kemerovo 462/	Kemerovo Oblast	Fish			
Khal'mer-Sede 463/	Tyumen' Oblast	Fish			
Kupino 464/	Novosibirsk	Milk			Planned 1949

* Unless otherwise indicated, all information is postwar.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
West Siberia (IX) (Continued)					
Kurgan	Kurgan Oblast				
Cannery 465/		Fruit and Vegetables			
Meat Combine 466/		Meat			
Leninsk-Kuznetskiy 467/	Kemerovo Oblast	Meat			
Lyubinskiy 468/	Omsk Oblast	Milk		10,000	1938
Mariinsk Meat Combine 469/	Kemerovo Oblast	Meat	25		Wartime
Novosibirsk	Novosibirsk Oblast				
Cannery 470/		Fish			
Meat Combine 471/		Meat	200		1949
Omsk	Omsk Oblast				
Cannery 472/		Fruit and Vegetables			
Meat Combine 473/		Meat	200		1949
Salekhard 474/	Tyumen' Oblast	Fish		8,000	1946
Sitnikovo 475/	Tyumen' Oblast	Milk		3,400	
Tobol'sk 476/	Tyumen' Oblast	Fish	100	2,000	

* Unless otherwise indicated, all information is postwar.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
West Siberia (IX) (Continued)					
Tyazhin 477/	Kemerovo Oblast	Milk			
Yalutorovsk 478/	Tyumen' Oblast	Milk	165		1938
Kazakh SSR (Xa)					
Akmolinsk Meat Combine 479/	Akmolinsk Oblast	Meat			
Aktyubinsk Meat Combine 480/	Aktyubinsk Oblast	Meat			
Alma-Ata	Alma-Ata Oblast				
Meat Combine 481/		Meat	250	2,000	
Cannery 482/		Fruit and Vegetables	225		1949
Aral'sk 483/	Kzyl Orda Oblast	Fish		3,000	1947
Balkhash 484/	Karaganda Oblast	Meat and Fish	150	3,000	1947
Bugun' 485/	Kzyl Orda Oblast	Fish			
Burlyu-Tyube 486/	Taldy-Kurgan Oblast	Fish			
Dzhambul 487/	Dzhambul Oblast	Vegetables			

* Unless otherwise indicated, all information is postwar.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
Kazakh SSR (Xa) (Continued)					
Fort Shevchenko 488/	Gur'yev Oblast	Fish			
Gur'yev	Gur'yev Oblast				
Kaganovich Cannery 489/		Fish	1,000	60,000	
Meat Combine 490/		Meat			
Kachiry 491/	Pavlodar Oblast	Milk			
Karaganda Meat Combine 492/	Karaganda Oblast	Meat			Planned 1952
Kokchetav 493/	Kokchetav Oblast	Fish			
Leninogorsk Meat Combine 494/	Vostochno-Kazakhstan Oblast	Meat			
Merke 495/	Dzhambul Oblast	Fruit and Vegetables			
Petropavlovsk Meat Combine 496/	Severo-Kazakhstan Oblast	Meat			
Semipalatinsk	Semipalatinsk Oblast				
Meat Combine 497/		Meat	500	14,000	1949
Cannery 498/		Milk			

* Unless otherwise indicated, all information is postwar.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
Kazakh SSR (Xa) (Continued)					
Turkestan 499/	Yuzhno-Kazakhstan Oblast	Meat			
Ural'sk Meat Combine 500/	Zapadno-Kazakhstan Oblast	Meat			
Zhilaya Kosa 501/	Gur'yev Oblast	Fish			
Central Asia (Xb)					
Andizhan 502/	Uzbek Oblast	Fruit and Vegetables	75	3,000	1947
Ashkhabad Meat Combine 503/	Turkmen SSR	Meat			
Cannery 504/		Fruit			
Bagir 505/	Turkmen SSR	Vegetables			
Cheptura 506/	Tadzhik SSR	Fruit and Vegetables			
Chkalov 507/	Tadzhik SSR				
Fergana 508/	Uzbek SSR	Meat and Fruit	250	1,800	1946

* Unless otherwise indicated, all information is postwar.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
Central Asia (Xb) (Continued)					
Frunze Meat Combine 509/	Kirgiz SSR	Meat	500		1946
Isfara 510/	Tadzhik SSR	Fruit and Vegetables			
Kanibadam 511/	Tadzhik SSR	Fruit		20,000	Prewar
Katta-Kurgan 512/	Uzbek SSR	Meat			
Kaunchi 513/	Uzbek SSR	Fruit and Vegetables		17,000	1938
Kitab 514/	Uzbek SSR	Fruit and Vegetables			
Krasnovodsk 515/	Turkmen SSR	Fish	100		1948
Kurgan-Tyube 516/	Tadzhik SSR	Fruit and Vegetables			
Leninabad 517/	Tadzhik SSR	Meat, Fruit, and Vegetables	750	16,000	1938

* Unless otherwise indicated, all information is postwar.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
Central Asia (Xb) (Continued)					
Mary	Turkmen SSR				
Cannery 518/		Meat and Vegetables			
Cannery 519/		Fish			
Muynak 520/	Uzbek SSR	Meat and Fish			
Namangan 521/	Uzbek SSR	Meat and Fruit	75	3,000	1947
Ogurchinskiy Island 522/	Turkmen SSR	Fish			
Sandy Kachi 523/	Turkmen SSR	Fruit and Vegetables			
Samarkand	Uzbek SSR				
Serp i Molot 524/		Meat, Fruit, and Vegetables	1,500	7,500	1947
Cannery 525/		Fruit			
Stalinabad Meat Combine 526/	Tadzhik SSR	Meat			
Talas 527/	Kirgiz SSR	Meat			
Tashkent 528/	Uzbek SSR	Fruit and Vegetables	75	4,000	1947

* Unless otherwise indicated, all information is postwar.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
Central Asia (Xb) (Continued)					
Tokmak 529/	Kirgiz SSR	Meat, Fish, Fruit, and Vegetables	200	5,700	1951
Ura-Tyube 530/	Tadzhik SSR	Fruit and Vegetables			
Yangi-Yul'	Uzbek SSR				
Meat Combine 531/		Meat	90		
Cannery 532/		Fruit and Vegetables	75	3,500	1947
East Siberia (XI)					
Allaykha 533/	Yakut ASSR	Fish			
Borzya Meat Combine 534/	Chita Oblast	Meat			
Bratsk 535/	Irkutsk Oblast	Fish			
Chita Meat Combine 536/	Chita Oblast	Meat	50		

* Unless otherwise indicated, all information is postwar.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
East Siberia (XI) (Continued)					
Dikson Island 537/	Krasnoyarsk Kray	Fish			
Irkutsk Meat Combine 538/	Irkutsk Oblast	Meat	60		
Kansk 539/	Krasnoyarsk Kray	Milk		10,000	1938
Khatanga 540/	Krasnoyarsk Kray	Fish			
Krasnoyarsk Cannery 541/	Krasnoyarsk Kray	Fruit and Vegetables			
Meat Combine 542/		Meat	200		1949
Minasuten 543/	Buryat Mongol ASSR	Meat			
Nazarovo 544/	Krasnoyarsk Kray	Milk			
Ulan-Ude Meat Combine 545/	Buryat Mongol ASSR	Meat	500	25,000	Prewar
Ust'-Barguzin 546/	Buryat Mongol ASSR	Fish	100		Prewar
Yakutsk 547/	Yakut ASSR	Fish	500		Wartime

* Unless otherwise indicated, all information is postwar.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
Far East (XII)					
Anadyr' 548/	Khabarovsk Kray	Fish			
Avacha Fish Combine 549/	Khabarovsk Kray	Fish			
Bikin 550/	Khabarovsk Kray	Fish		300	1949
Bildun 551/	Sakhalin Oblast	Fish			
Bolon' 552/	Khabarovsk Kray	Fish			
Chekhov 553/	Sakhalin Oblast	Fish and Crab			
Chernyshevka Floating Cannery 554/	Primorskiy Kray	Crab		100	1952
Datta 555/	Primorskiy Kray	Fish			
Dunay (Putyatin Island) 556/	Primorskiy Kray	Fish and Crab	400		1950
Gizhiga 557/	Khabarovsk Kray	Fish			
Gornozavodsk 558/	Sakhalin Oblast	Fish			
Icha 559/	Khabarovsk Kray	Crab			
Innokent'yevskiy 560/	Primorskiy Kray	Fish and Crab	75	3,500	
Ivanovka 561/	Primorskiy Kray	Vegetables			
Karaga 562/	Khabarovsk Kray	Fish			

* Unless otherwise indicated, all information is postwar.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
Far East (XII) (Continued)					
Kataoka 563/	Sakhalin Oblast	Fish			
Khabarovsk	Khabarovsk Kray				
Meat Combine 564/		Meat	60		
Mikoyan Fishing Combine 565/		Fish	75		1949
Kholmsk 566/	Sakhalin Oblast	Fish and Crab			
Kikhchik Fish Combine 567/	Khabarovsk Kray	Fish	1,200	8,500	1950
Kirov Fish Combine 568/	Khabarovsk Kray	Fish			
Komsomol'sk 569/	Khabarovsk Kray	Fish			
Korsakov 570/	Sakhalin Oblast	Fish			
Krasnogorsk 571/	Primorskiy Kray	Crab			
Kuril'sk 572/	Sakhalin Oblast	Fish			
Kuybyshevka-Vostochnaya 573/	Khabarovsk Kray	Meat			
Magadan 574/	Khabarovsk Kray	Vegetables			
Men'zhinskiy Floating Cannery 575/		Crab			

* Unless otherwise indicated, all information is postwar.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
Far East (XII) (Continued)					
Midoka 576/	Khabarovsk Kray	Fish	75		1951
Mikoyanovsk 577/	Sakhalin Oblast	Fish			
Moryak Floating Cannery 578/		Fish			
Nakhodka 579/	Primorskiy Kray	Fish			
Nel'ma 580/	Primorskiy Kray	Fish			
Nevel'sk 581/	Sakhalin Oblast	Fish			
Nikolayevsk-na-Amur 582/	Khabarovsk Kray	Fish			
Oblevo (Ushiro) Nichiro Crab Cannery 583/	Sakhalin Oblast	Crab	150		1948
Okhotsk 584/	Khabarovsk Kray	Fish		2,000	
Ozernoye 585/	Khabarovsk Kray	Fish		4,000	1949
Ozerpakh 586/	Khabarovsk Kray	Fish		5,000	1951
Petropavlovsk 587/	Khabarovsk Kray	Fish	350		1951
Plastun 588/	Primorskiy Kray	Fish			
Popova Island 589/	Primorskiy Kray	Fish			
Pos'yet 590/	Primorskiy Kray	Fish	75		1946

* Unless otherwise indicated, all information is postwar.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
Far East (XII) (Continued)					
Ptichiy Island 591/	Khabarovsk Kray	Crab			
Pympta 592/	Khabarovsk Kray	Crab			
Severo-Kuril'sk 593/	Sakhalin Oblast	Fish	200		
Shamambe 594/	Sakhalin Oblast	Fish			
Sopochnoye 595/	Khabarovsk Kray	Fish and Crab			
Sovetskaya Gavan' 596/	Primorskiy Kray	Fish	300	15,000	
Sredne-Beloye 597/	Khabarovsk Kray	Vegetables			
Tafuin 598/	Primorskiy Kray	Fish and Crab	700		
Ushiro (Oblevo) Nichiro Crab Cannery 599/	Sakhalin Oblast	Crab	150		1948
Ust'-Apuka 600/	Khabarovsk Kray	Fish			
Ust'-Bol'sheretsk 601/	Khabarovsk Kray	Fish			
Ust'-Kamchatsk Fish Combine 602/	Khabarovsk Kray	Fish and Crab		1,000	1950

* Unless otherwise indicated, all information is postwar.

Table 17
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Type of Product Canned	Estimated Labor Force per 8-Hour Shift	Estimated Annual Capacity (Thousand Standard 400-Gram Cans)	Most Recent Date of Information*
Far East (XII) (Continued)					
Vladivostok	Primorskiy Kray				
Fish Cannery 603/		Fish	150	1,000	1949
Crab Cannery 604/		Crab			
Whalemeat Cannery 605/		Whalemeat		2,500	1949
Vsevolod Sibirtsev Floating Cannery 606/	Khabarovsk Kray	Crab	300		
Vtoroy Krabolov Floating Cannery 607/	Primorskiy Kray	Crab			
Yablochnoye 608/	Sakhalin Oblast	Fish			
Yuzhno-Kuril'sk 609/	Sakhalin Oblast	Fish			

* Unless otherwise indicated, all information is postwar.

2. Enterprises Servicing the Food-Canning Industry.

Enterprises servicing the Soviet food-canning industry include plants manufacturing tin, glass, wooden, and cardboard containers (many canning plants manufacture their own tin cans), food-processing machinery and equipment, tools, and fixtures. Many of these auxiliary plants are owned and operated by the three ministries engaged in food canning -- Food Industry, Meat and Dairy Industry, and Fish Industry. When highly complex machinery or tools are required by these ministries but not produced by them, they may turn to other ministries such as the Ministry of Machine and Instrument Building, for their requirements. 610/

Table 18 is a partial listing of enterprises servicing the Soviet food-processing industry and its food-canning branch.

Table 18

Regional Distribution of
Enterprises Servicing the Food-Canning Industry in the USSR

Plants by Economic Region	Republic, Kray, or Oblast	Responsible Ministry
Northwest (Ia)		
Leningrad Krasnaya Vagranka Machine-Building Plant 611/	Leningrad Oblast	
Baltic (IIa)		
Riga Food-Machine-Building Plant 612/	Latvian SSR	Food Industry
Tallin Calibrating Instrument Plant a/* 613/	Estonian SSR	

* Footnotes to Table 18 follow on p. 110.

Table 18
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Responsible Ministry
Ukraine (III)		
Bar Food-Machine-Building Plant 614/	Vinnitsa Oblast	Food Industry
Kherson Glass Container Plant 615/	Kherson Oblast	Food Industry b/
Odessa Canning Equipment Plant a/ 616/	Odessa Oblast	Food Industry
Lower Don-North Caucasus (IV)		
Dzaudzhikau Glass Container Plant a/ 617/	North Osetian ASSR	Food Industry
Rostov Food-Machine-Building Plant a/ 618/	Rostov Oblast	Food Industry
Transcaucasus (V)		
Batumi Machine-Building Plant imeni Beriya a/ 619/	Adzhar ASSR	Meat and Dairy Industry
Kirovakan Machine-Building Plant 620/	Armenian SSR	
Kutaisi Glass Container Plant a/ 621/	Georgian SSR	Food Industry
Tbilisi Machine-Building Plant imeni Ordzhonikidze 622/	Georgian SSR	
Volga (VI)		
Kamyshin Glass Container Plant a/ 623/	Stalingrad Oblast	Food Industry

Table 18
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Responsible Ministry
Central European USSR (VII)		
Bol'shevo Machine-Building Plant a/ 624/	Moscow Oblast	Meat and Dairy Industry
Moscow Glass Container Machinery Plant a/ 625/	Moscow Oblast	
Moscow Cardboard Container Factory 626/	Moscow Oblast	Food Industry
Moscow Wood-Packaging Materials Combine 627/	Moscow Oblast	
Moscow Calibrating Instrument Plant 628/	Moscow Oblast	Food Industry
Moscow Ideal Machinery Plant 629/	Moscow Oblast	Meat and Dairy Industry
Moscow Machinery Plant imeni Yaroslavskiy 630/	Moscow Oblast	Food Industry
Podol'sk Machine-Building Plant 631/	Moscow Oblast	
Vladykinskiy Food-Machine-Building Plant 632/	Moscow Oblast	Meat and Dairy Industry
Urals (VIII)		
Nizhniy Tagil Food-Machine-Building Plant a/ 633/	Sverdlovsk Oblast	Food Industry
West Siberia (IX)		
Kurgan Food-Machine-Building Plant 634/	Kurgan Oblast	Food Industry

Table 18
(Continued)

Plants by Economic Region	Republic, Kray, or Oblast	Responsible Ministry
Central Asia (Xb)		
Leninabad Glass Container Plant a/ 635/	Tadzhik SSR	Food Industry
Far East (XII)		
Khabarovsk Packing Materials Combine 636/	Khabarovsk Kray	Fish Industry
Petropavlovsk Tin Can Factory a/ 637/	Khabarovsk Kray	Fish Industry b/
Ust'-Kamchatsk Tin Can Factory a/ 638/	Khabarovsk Kray	Fish Industry b/
Vladivostok Machine-Building Plant 639/	Primorskiy Kray	Fish Industry

a. Confirmed as doing work for the food-canning industry. The other plants listed may also be doing work for the food-canning industry, but as yet not enough is known about them to make any positive statements.
b. Probably the responsible ministry, although responsible ministry is not yet certainly known.

APPENDIX F

VARIETIES, SIZES, AND MARKINGS OF SOVIET CANNED FOOD

1. Assortment of Canned Food.

a. By Varieties.

In 1912, 90 varieties of canned food were produced in Russia. By 1949, over 500 varieties were being produced, as shown in Table 19. 640/

Table 19

Varieties of Canned Food Produced in the USSR
1949

Canned Food	Number of Varieties
Meat	120
Fish	150
Vegetables	70
Fruit	150
Fruit or Vegetables Juice	22
Milk	5
Total	517

b. By Method of Production.

Canned food may be grouped according to the method of production as follows. 641/

(1) Natural -- in its own juice.
(2) Processed.

(a) In tomato sauce (meat, fish, vegetables).
(b) In bouillon (meat, meat and vegetables).

(c) In oil (fish).
(d) In sugar syrup (fruit).
(e) Marimated (meat, vegetables).

(3) Concentrated.

(a) Tomato products.
(b) Fruit sauces.
(c) Milk products.

(4) Pastes (meat, fish).
(5) Ground (meat, fish).
(6) Purée (vegetables, fruit).

c. For Civilian Consumption.

(1) Varieties of Canned Meat. 642/

(a) Tushonka (braised beef, pork, or mutton).
(b) Sboynyye (mixed offals).
(c) Fried meat.
(d) Sausages in pork fat.
(e) Sausages in tomato sauce.
(f) Kidneys in tomato sauce.
(g) Hearts in tomato sauce.
(h) Roast brains.
(i) Roast pork and rice.
(j) Pressed meat.
(k) Liver paste.
(l) Tongue in jelly.
(m) Macaroni, noodles, or vermicelli with beef, pork, or mutton.
(n) Beans, peas, and lentils with beef, pork, or mutton.
(o) Meat pies.
(p) Sweet and sour meat.
(q) Chicken.

(2) Varieties of Canned Fish. 643/

(a) In vegetable oil (sunflower, cottonseed, mustard).

1. Sardines.
2. Mackerel.
3. Red mullet.

(b) In tomato sauce.

1. Sturgeon.
2. Pike-perch.
3. Sheatfish.
4. Sardines.
5. Sprats.
6. Red mullet.
7. Mackerel.
8. Whitefish.
9. Carp.
10. Bream.
11. Goby.

(c) In the natural juice of the fish.

1. Sturgeon.
2. Salmon.
3. Caspian roach.

(d) In vinegar.

1. Anchovies.
2. Sprats.
3. Sardines.

(e) In fishcakes.
(f) Ground.
(g) Mixed with vegetables.

(3) Varieties of Canned Fruit. 644/

(a) In the natural juice of the fruit.

1. Sliced apricots.
2. Sliced apples.

(b) In sugar syrup (compote).

1. Apricots.
2. Quince.
3. Grapes.
4. Cherries.

5. Pears.
6. Raisins.
7. Tangerines.
8. Plums.
9. Peaches.
10. Apples.

(c) Purée.

1. Apricots.
2. Pears.
3. Peaches.
4. Plums.
5. Apples.

(4) Varieties of Canned Vegetables. 645/

(a) In the natural juice of the vegetable.

1. Green peas.
2. Whole tomatoes.
3. Beans.
4. Sweet corn.
5. Cauliflower.
6. Asparagus.
7. Beets.
8. Carrots.
9. Cucumbers.
10. Olives.

(b) In tomato sauce with vegetable oil.

1. Sliced eggplant.
2. Eggplant paste.
3. Pepper and tomato.
4. Eggplant and squash.
5. Vegetable marrow.
6. Sliced vegetables.

(c) Concentrated tomato products.

1. Tomato puree.
2. Tomato paste.
3. Tomato catsup.

(d) Puree.

1. Spinach.
2. Sorrel.
3. Red pepper.

(e) Children's food.

1. Green pea purée.
2. Beet purée.
3. Carrot purée.
4. Spinach purée.
5. Vegetable soup.

(f) Dietetic foods.

1. Vegetable marrow.
2. Vegetable marrow stuffed with rice.
3. Vegetable marrow in tomato sauce.

(5) Varieties of Canned Milk.

Condensed and dried milk constitute the most common canned milk products. 646/

d. For Military Consumption.

(1) Canned Meat.

The following types of canned meat are included in the ration of the Soviet Army. 647/

(a) Tushonka.
(b) Boiled meat.
(c) Fried meat.
(d) Corned meat.
(e) Brains.
(f) Chicken fillet.
(g) Chicken ragout.
(h) Tongue.

The difference in the contents of the army ration type of tushonka and the type distributed to the civilian economy is indicated in Table 20. It will be noted that the fat content of military tushonka is greater than that of its civilian counterpart. 648/ The caloric value of a 338-gram can of military tushonka is 545 net calories. 649/

Table 20

Comparison of the Contents of Military and Commercial Tushonka before Cooking

Grams

Item	Net Weight	
	Military Tushonka	Commercial Tushonka
Boneless Meat	288.3	304.0
Fat	41.7	26.0
Salt	3.5	3.5
Onions	4.5	4.5
Total Net Weight	338.0	338.0
Black Pepper	2.0 grains	2.0 grains
Bay Leaf	0.5 leaf	0.5 leaf

The contents of these two types of tushonka after sterilization and cooking are shown in Table 21.*

* Table 21 follows on p. 117.

Table 21

Comparison of the Contents of Military and Commercial Tushonka after Cooking 650/

Grams

Item	Net Weight	
	Military Tushonka	Commercial Tushonka
Pieces of Cooked Meat	175	180
Fat on Meat and Melted Fat	43	30
Meat Bouillon with Salt and Onions	120	128
Total Net Weight	338	338

Sboynyye konservy (canned offals), a popular commercial canned product, occasionally fed to the Soviet Army, has the following contents, 651/ as shown in Table 22.

Table 22

Contents of Sboynyye Konservy (Canned Offals)

Grams

Item	Net Weight
Head (Cheek), Tail, Ends, and Trimmings	114.0
Offals (Udder, Liver, Heart, Kidneys, and so forth)	198.0
Fat	18.0
Salt	3.5
Onions	4.5
Total Net Weight	338.0
Black Pepper	2.0 grains
Bay Leaf	0.25 leaf

(2) Canned Fish.

The following types of canned fish are included in the ration of the Soviet Army. 652/

(a) Sturgeon.
(b) Chastik* species (perch, pike, and carp).
(c) Far Eastern species (dog and humpback salmon).

Fish for the Soviet Army is not canned in tomato sauce, vegetable oil, or marinated sauce but is processed in its own juice. 653/

The net weight of the cans utilized for various types of canned fish and their caloric value are indicated in Table 23. 654/

Table 23

Net Weight of Cans and Caloric Value per Can
for Various Varieties of Fish
Packed in the USSR

Type of Fish	Net Weight of Cans (Grams)	Caloric Value per Can
Sturgeon	490	N.A.
Salmon	473	279
Chastik Varieties	450	189

* Chastik is the commercial name for a group of fish which have thick scales and are caught in close-mesh nets. This group is subdivided into (1) large chastik, which include sheatfish, perch-pike, pike, bream, carp, croaker, mackerel, mullet, burbot, barbel, rosefish, eel, and wachna cod; and (2) small chastik, which include minnow, ruff, gudgeon, crucian carp, perch, tench, smelt, and goby.

(3) Canned Vegetables.

Canned vegetables for Soviet Army consumption include stuffed peppers, eggplant, and vegetable marrow. When available, they may be eaten cold or heated but are usually served as a component of one of the following soups: potato, macaroni, barley, sour cabbage; and millet. 655/

2. Customary Sizes of Cans Used for Food in the USSR.

Although admittedly incomplete, a considerable amount of information is available concerning 41 types of metal cans used in the food-canning industry of the USSR.

Table 24* gives all available information known about 41 types of cans that are used in the food-canning industry. Canning plants in the USSR use cans of varying sizes and shapes according to the kind of food they process. Table 24 indicates the type of can used, its number and description, volume in cubic centimeters, the kind of product for which it is used, and its relationship to a standard 400-gram can (No. 7 - cylindrical). Where information was available, the weight of certain cans filled with specific products has been given.

There is very little interchangeability between the types of cans used in plants directed by the three ministries engaged in food canning. Of the 41 types of cans identified as food containers in this report, 32 types are used by not more than 1 ministry, 3 types are used by 2 ministries, and only 2 types are used by all 3 ministries. No data were available, to indicate which ministries used the four remaining types. Table 25,** showing standard sizes of cans used for fruit and vegetables, and Table 26,*** showing standard sizes used for fish in the US, give a list nearly as long and equally as varied as that for the USSR. Whereas the USSR has 14 types of cans for fruit and vegetables, the US list has 32 types of such cans. The US list shows 8 types of cans used principally for fish products, whereas the USSR list includes 21 types used exclusively for fish or other sea food.

* Table 24 follows on p. 120.
** Table 25 follows on p. 123.
*** Table 26 follows on p. 125.

Table 24

Standard Sizes, Volumes, and Weights of Cans for Fruit, Vegetables, Meat, and Fish Used in the USSR 656/

Number and Description	Volume (Cubic Centimeters)	Volume (Cubic Inches)	Weight (Grams)	Weight (Ounces)	Product Canned	Relation to Standard Can
Food Industry						
1 Cylindrical	374.6	22.9	338	119.3	Meat	1.078
2 Cylindrical	594.9	36.3			Fruit and Vegetables	1.653
2½ Cylindrical	861.4	52.6	1,000	353.0	Fruit, Vegetables, Fish, and Meat	2.489
5 Cylindrical	261.7	16.0	250	88.3	Tomato Paste	0.784
6 Cylindrical	324.7	19.8			Milk	0.912
7 Cylindrical	337.9	20.6	400		Vegetables, Meat, and Fish	1.0
9 Cylindrical	515.0	31.4	500	176.5	Vegetables, Meat, and Fish	1.511
10 Cylindrical	3,045.8	185.9			Fruit, Vegetables, and Tomato Paste	8.48
11 Cylindrical	4,672.2	285.1			Fruit and Tomato	13.282
12 Cylindrical	6,298.6	384.4			Fruit and Tomato	17.92
17 Oval	189.4	11.6			Tomato	0.545
18 Oval	112.2	6.8			Tomato	0.326
19 Oval	165.9	10.1			Tomato	0.480
43 Small Oval (Malaya)	162.4	9.9			Tomato	

Table 24
(Continued)

Number and Description	Volume (Cubic Centimeters)	Volume (Cubic Inches)	Weight (Grams)	Weight (Ounces)	Product Canned	Relation to Standard Can
Meat and Dairy Industry						
1 Cylindrical	374.6	22.9	338	119.3	Meat, Meat and Vegetables	1.09
1a Cylindrical	365.4	22.3	338	119.3	Meat, Meat and Vegetables	1.09
2½ Cylindrical	861.4	52.6	1,000	353.0	Meat	2.49
5a Cylindrical	258.1	15.8			Meat	0.75
5b Cylindrical	255.0	15.6			Meat	0.75
6 Cylindrical	324.7	19.8			Milk	0.912
7a Cylindrical	353.4	21.6	370	130.6	Meat	1.07
9 Cylindrical	515.0	31.4	500	176.5	Meat	1.45
23 Pyramidal	348.1	21.2	340	120.0	Meat	1.09
Fish Industry						
2½ Cylindrical	861.4	52.6	1,000	353.0	Fish	2.489
4 Cylindrical	214.8	13.1			Fish	0.645
7 Cylindrical	337.9	20.6	400		Fish	1.0
9 Cylindrical	515.0	31.4	500	176.5	Fish	1.511
14 Rectangular	159.0	9.7			Fish	0.450
15 Rectangular	218.0	13.3			Fish	0.617
16 Oval	218.0	13.3			Fish	0.617
21 Rectangular	100.5	6.1			Fish	0.284

Table 24
(Continued)

Number and Description	Volume (Cubic Centimeters)	Volume (Cubic Inches)	Weight (Grams)	Weight (Ounces)	Product Canned	Relation to Standard Can
Fish Industry (Continued)						
22 Rectangular	54.0	3.3			Fish	0.153
30 Pyramidal	483.9	29.5			Salmon	1.345
31 Pyramidal	261.2	15.9			Salmon	0.763
32 Pyramidal	269.9	16.5			Crab	0.788
33 Pyramidal	122.4	7.5			Fish	0.355
34 Pyramidal	153.2	9.3			Fish	0.478
35 Pyramidal	176.3	10.8			Fish	0.533
36 Pyramidal	478.1	29.2			Salmon	1.399
37 Rectangular (Pendant)	200.0	12.2			Fish	0.566
38 Rectangular (Mayak)	235.0	14.3			Fish	0.655
39 Big Oval (Bolshaya)	430.0	26.2			Fish	1.217
40 Small Oval (Malaya)	230.0	14.0			Fish	0.651
42 Small Oval (Malaya)	496.5	30.3			Crab	
Not Specified						
8 Cylindrical	396.5	24.2				1.178
20 Rectangular	169.5	10.3				
24 Pyramidal	147.7	9.0				
41 Small Oval	168.6	10.3				

Table 25

Standard Sizes and Volumes of Cans for Fruit and Vegetables Used in the US 65/

Can Number and Name	Diameter and Height a/*	Minimum Volume Fill b/ (Cubic Inches c/)	Product
2Z Mushroom	202 by 204	5.45	Mushrooms
	202 by 214	7.63	Baby Food
6Z	202 by 308	9.42	Juices (except Pineapple Juice), Mushrooms, Tomato Paste
	202 by 314	10.62	Citrus and Grape Juice
4Z Pimiento	211 by 200	7.18	Olives, Pimientos
	211 by 210	10.38	Baby Food, Dry Beans, Spaghetti
4Z Mushroom	211 by 212	11.12	Mushrooms
8Z Short	211 by 300	12.34	Dry Beans, Tomato Sauce
8Z Tall	211 by 304	13.48	Fruit, Juices, Olives, Soups, Spaghetti, Vegetables
1 (Picnic)	211 by 400	17.05	Dry Beans, Kraut Juice, Mushrooms, Soups, Vegetables
211 Cylinder	211 by 414	21.28	Juices, Pineapple, Prunes (Dried)
Pint Olive	211 by 600	26.47	Olives
7Z Pimiento	300 by 206	11.37	Pimientos
	300 by 308	18.03	Dry Beans
8Z Mushroom	300 by 400	21.11	Mushrooms
300	300 by 407	23.71	Asparagus, Citrus Segments, Cranberries, Dry Beans, Juices (except Pineapple Juice), Pimientos, Spaghetti
1 Tall	301 by 411	25.99	Fruit (except Pineapple), Vegetables, Olives

* Footnotes to Table 25 follow on p. 124.

Table 25
(Continued)

Can Number and Name	Diameter and Height [a]	Minimum Volume Fill [b] (Cubic Inches [c])	Product
303	303 by 406	26.31	Dry Beans, Fruit (except Pineapple), Hominy, Soups, Vegetables
303 Cylinder	303 by 509	34.11	Soups
1 Flat	307 by 203	13.21	Pineapple
Kitchenette	307 by 214	19.17	Dry Beans
2 Vacuum	307 by 306	22.90	Vegetables (Vacuum Packed)
95	307 by 400	27.63	Dry Beans, Snap Beans (Asparagus Style)
2	307 by 409	32.00	Dry Beans, Fruit, Hominy, Juices, Vegetables
Jumbo	307 by 510	40.28	Asparagus, Dry Beans, Mushrooms
2 Cylinder	307 by 512	40.95	Juices (except Pineapple Juice), Soups
Quart Olive	307 by 704	52.62	Olives
$1\frac{1}{4}$	401 by 207.5	22.07	Pineapple
$2\frac{1}{2}$	401 by 411	46.45	Dry Beans, Fruit, Hominy, Kraut Juice, Olives, Pimientos, Soups, Vegetables
3 Vacuum	404 by 307	37.19	Sweet Potatoes
3 Cylinder	404 by 700	80.54	All Products (except Pineapple)
10	603 by 700	170.71	All Products

a. In the statement of each dimension, the first digit gives the number of whole inches, and the second and third give the fraction expressed in sixteenths of an inch. Thus 211 by 400 means that the can is 2 and 11/16 inches in diameter and 4 inches high. These dimensions apply only to regular type sanitary or open-top cans.
b. Minimum volume fill means the minimum volume of food in the can after processing and cooling.
c. Cubic inches may be converted to fluid ounces by multiplying by 0.554.

Table 26

Standard Sizes of Cans for Fish Products
Used in the US 658/

Item	Ounces Weight
Sardine	$3\frac{1}{4}$
Tuna	8
Flat	8
Sardine	10
Tuna	16
Oval	16
Flat	16
N.A.	64

3. Box and Can Markings.

Cans are packed in wooden boxes made of dry wood with a water content of not over 18 percent. Every box of canned food bears the following marking 659/:

a. Name of plant.
b. Name of canned food.
c. Number of cans in the box.
d. Net weight of can.
e. Gross weight of box.
f. Year of manufacture of canned product.

The following information is written on each can 660/:

a. Name of ministry, main administration, and plant.
b. Mark of the main administration.
c. Location of the plant
d. Name of the product.
e. Grade (superior, first class, second class).
f. Net weight.

In addition to the above, the following information is stamped on the body of the can 661/:

a. Ministry code letter.

(1) M -- Ministry of Meat and Dairy Industry.
(2) R -- Ministry of Fish Industry.
(3) K -- Ministry of Food Industry.

b. Plant number.
c. Year of output, designated by the last number of the year.

The lid of the can is stamped as follows 662/:

a. Number of the shift -- one digit.
b. Day of month of manufacture -- two digits.
c. Month -- one of the following letters:

(1)	A -- January	(5)	D -- May	(9)	I -- September
(2)	B -- February	(6)	E -- June	(10)	K -- October
(3)	V -- March	(7)	Zh -- July	(11)	L -- November
(4)	G -- April	(8)	Z -- August	(12)	M -- December

d. Lot number -- three digits.

APPENDIX G

ESTIMATED UTILIZATION PATTERN FOR CANNED FOOD IN THE USSR

1. Outlets.

Canned food produced in the USSR is consumed by the military or the civilian population, exported, or stockpiled. It is difficult to determine accurately the quantity of canned food going into each of the above channels, but the military takes priority as a consumer, either for immediate use or for future use of stockpiled canned food.

a. Civilian Consumption.

Based on evidence in Section VI, B, 1,* it is assumed that most of the Soviet canned-food output going into civilian channels is preserved in glass jars. In 1951, perhaps as much as 90 percent of the food preserved in glass jars, or about 608 million glass jars, could have been made available for Soviet civilian consumption. A small number of tin cans, rejects for military consumption or stockpiling needs, could have reached the civilian market. An allowance of 5 percent of the food preserved in tin cans, or about 48 million tin cans, might be added to the glass jars noted above for a total of 656 million standard 400-gram cans distributed through commercial channels. This figure compares with the 1951 US figure for civilian consumption of canned goods of 18 billion to 20 billion standard US No. 2 cans (weight: about 583 grams). 663/ The estimated civilian consumption of canned food according to type of container is shown in Table 27.**

b. Military Consumption.

In 1949 a report estimated a 1-year peacetime divisional reserve of canned food at 25 metric tons of canned meat and 25 metric tons of canned fish, which, when converted, would total about 125,000 standard 400-gram cans. 664/ At the rate of 125,000 cans of meat or fish for 1 year's peacetime divisional reserve, 25 million cans of meat and fish (12.5 million cans of meat and 12.5 million cans of fish), which would meet the

* P.17, above.

** Table 27 follows on p. 128.

Table 27

Estimated Civilian Consumption of Canned Food in the USSR
According to Type of Container
1951

Million Units

Ministry	Commodity	Tin Can Pack		Glass Jar Pack		Combined Tin Can and Glass Jar Pack	
		Total Production	Estimated Civilian Consumption	Total Production	Estimated Civilian Consumption	Total Production	Total Estimated Civilian Consumption
Food Industry	Fruit and Vegetables	196	10	590	532	786	542
	Meat Products	132	7	15	14	147	21
	Fish and Dairy Products	45	2	5	4	50	6
	Total	373	19	610	550	983	569
Meat and Dairy Industry	Meat Products	236	12	26	23	262	35
	Dairy Products	94	4	10	9	104	13
	Total	330	16	36	32	366	48
Fish Industry	Fish Products	259	13	29	26	288	39
	Total	962	48	675	608	1,637	656
Civilian Consumption as a Percentage of Total Production			5		90		40

peacetime reserve requirements on the assumption of 200 divisions, or 4 million soldiers, seems an adequate amount to allocate to military consumption for 1951.

Under normal peacetime garrison conditions in East Germany or the USSR, the Soviet Army apparently does not consume very much canned food. Each division's annual needs is met through consumption of the previous year's divisional reserves, with little or no canned food being consigned for immediate consumption. 665/

c. Exports.

Detailed information on exports of canned fish is found in Section VI, B, 3.* If a small tonnage of canned fish from other areas such as the Baltic or Volga regions are added to Far Eastern exports, an estimate of about 100 million cans of fish is obtained as the export total for 1951.

d. Stockpiling.

Stockpiling is a major factor in Soviet wartime supply potential. Soviet defectors have indicated that considerable quantities of canned food are currently going into stockpiles. 666/ Accurate figures on the number of cans of food stockpiled are not obtainable, but by adding the hypothetical consumption patterns for civilians, the military, and exports, and subtracting the result of this addition from total production, a remainder which might indicate theoretical stockpiling availabilities is obtained. Table 28** breaks down the utilization pattern of canned goods for civilian, military, and export consumption. These 3 consumer categories are estimated to have consumed 781 million cans of food in 1951. Subtracted from 1951 estimated total production of 1,637 million cans of food, the above consumption figure leaves a remainder of an estimated 856 million cans available for stockpiling. Of this total, an estimated 340.5 million cans are meat products and an estimated 152.5 million cans are fish products. The estimated total of 856 million cans of food thus made available for stockpiling represents over 50 percent of estimated 1951 production of 1,637 million cans.

* P.18, above.
** Table 28 follows on p. 130.

Table 28

Estimated Consumption of Canned Food in the USSR by Commodity and Consumer
1951

Million Standard 400-Gram Cans

Commodity	Civilian Consumption by Ministry			Total Civilian Consumption	Military Consumption	Exports	Total Utilization Excluding Stockpiles	Total Production	Available for Stockpiles
	Ministry of Food Industry	Ministry of Meat and Dairy Industry	Ministry of Fish Industry						
Fruit and Vegetables	542	0	0	542	0	0	542.0	786	244.0
Meat Products	21	35	0	56	12.5	0	68.5	409	340.5
Fish Products a/	4	0	39	43	12.5	100	155.5	308	152.5
Dairy Products a/	2	13	0	15	0	0	15.0	134	119.0
Total	569	48	39	656	25.0	100	781.0	1,637	856.0

a. Estimated breakdown of 6 million cans of fish and dairy products.

APPENDIX H

ESTIMATED PRODUCTION OF CANNED FOOD IN THE USSR BY ECONOMIC REGION 1951

As a first step in determining Soviet canned food production by economic region, the production of canned food by ministry given in Table 1 was regrouped by type of product canned, fruit and vegetables, meat, fish, and milk, without regard to ministry.

The tables on plant capacity (see Appendix E) served as a rough guide for comparing regional productive possibilities and determining regional production. An approximation was made of plant sizes under 4 categories -- extra-large, large, medium, and small. A rough ratio of 5 or more for extra-large plants, 4 for large plants, 2 for medium plants, and 1 for small plants was worked out. The totals for each region were added, and percentages were computed to establish the relative position of each region to the over-all total. The actual total figures for each of the commodities of fruit and vegetables, meat, and dairy products, were then fractionated according to the percentages already computed to obtain regional production figures as shown in Table 29.*

A different procedure was followed for the computation of canned fish production. The breakdown of fish canning by fishing areas on a percentage basis is indicated in Table 30.**

These fishing areas were next redefined on a regional basis and the relative position of each region within a fishing area was estimated from the plant list. The percentage of the total fish canned for each fishing area was multiplied by percentages representing each region's relative position within the area to obtain the weighted percentages of regional production. The actual canned fish production for each region was computed by multiplying the actual total by each regional weighted percentage. Table 31*** indicates the various stages in this process.

* Table 29 follows on p. 132.
** Table 30 follows on p. 133.
*** Table 31 follows on p. 134.

Table 29

Estimated Production of Canned Food in the USSR by Economic Region a/
1951

Region	Fruit and Vegetables		Meat		Fish		Milk		All Canned Food	
	Percent of Total	Million Standard 400-Gram Cans	Percent of Total	Million Standard 400-Gram Cans	Percent of Total	Million Standard 400-Gram Cans	Percent of Total	Million Standard 400-Gram Cans	Percent of Total	Million Standard 400-Gram Cans
Northwest (Ia)	2	16	1.4	6	6.2	19	0.7+	1.0	2.6	42.0
Northern European USSR (Ib)	0	0	0	0	1.5	5	19.8	26.5	1.9	31.5
Baltic (IIa)	0	0	2.8	11	6.3	20	0.7+	1.0	2.0	32.0
Belorussia (IIb)	2	16	2.1	9	0	0	10.1	13.5	2.3	38.5
Ukraine (III)	25	196	6.3	26	1.8	6	2.2	3.0	14.1	231.0
Lower Don-North Caucasus (IV)	25	196	8.2	33	10.5	32	2.6	3.5	16.2	264.5
Transcaucasus (V)	15	118	6.3	26	0	0	0.7+	1.0	8.9	145.0
Volga (VI)	10	79	8.5	35	9.9	30	17.5	23.5	10.2	167.5
Central European USSR (VII)	4	31	9.3	38	0	0	12.7	17.0	5.2	86.0
Urals (VIII)	0	0	10.0	41	0	0	4.1	5.5	2.8	46.5
West Siberia (IX)	0	0	8.2	33	2.0	6	19.8	26.5	4.0	65.5
Kazakh SSR (Xa)	2	16	14.0	57	8.8	27	2.2	3.0	6.3	103.0
Central Asia (Xb)	15	118	9.3	38	0	0	0	0	9.6	156.0
East Siberia (XI)	0	0	12.2	50	3.0	9	6.7	9.0	4.1	68.0
Far East (XII)	0	0	1.4	6	50.0	154	0	0	9.8	160.0
Total	100	786	100.0	409	100.0	308	100.0	134.0	100.0	1,637.0

a. Zero stands for negligible in every case.

Table 30

Location of Fish Canneries and
Types of Fish Canned in the USSR 667/

Location of Fish Canneries	Type of Fish Canned	Percent of Total Fish Canned
Pacific Area - Khabarovsk Kray Coast, especially Southeastern and Southwestern Coasts of Kamchatka; Primorskiy Kray Coast centered at Vladivostok; and Sakhalin Island, especially the South	Salmon, Crab, Sardines, Plaice	50
Northern Caspian Sea Coast	Sturgeon, Caviar, Caspian Roach	22
Coasts of Barents Sea, White Sea, and Arctic Ocean	Cod, Herring, Whitefish	10
East Coasts of Black Sea and Sea of Azov	Red Mullet, Sheatfish, Pike-Perch, Mackerel	9
Southeast Coast of Baltic Sea and Gulf of Finland	Sprats	7
North and East Coasts of Lake Baykal	Sturgeon	2
Total		100

Table 31

Estimated Production of Canned Fish in the USSR by Economic Region
1951

Fishing Area	Percent of Total Fish Canned	Regions in Area	Percent of Total Fish Canned by Region Within Fishing Area	Weighted Percent of Total by Region a/
Pacific	50	Far East (XII)	100	50.0
Total			100	
Northern Caspian	22	Lower Don-North Caucasus (IV) b/	15	3.3
		Volga (VI)	45	9.9
		Kazakh SSR (Xa)	40	8.8
Total			100	
Barents Sea, White Sea, Arctic Ocean	10	Northwest (Ia) c/	55	5.5
		Northern European USSR (Ib)	15	1.5
		West Siberia (IX)	20	2.0
		East Siberia (XI) d/	10	1.0
Total			100	
East Coast, Black Sea and Sea of Azov	9	Ukraine (III)	20	1.8
		Lower Don-North Caucasus (IV) b/	80	7.2
Total			100	
Southeast Coasts of Baltic Sea and Gulf of Finland	7	Northwest (Ia) c/	10	0.7
		Baltic (IIa)	90	6.3
Total			100	
Lake Baykal	2	East Siberia (XI) d/	100	2.0
Grand Total	100		100	100.0

a. Percent of total fish canned times percent of total fish canned by region within fishing area.
b. Region IV total is 3.3+ 7.2 = 10.5.
c. Region Ia total is 5.5 + 0.7 = 6.2.
d. Region XI total is 1.0 + 2.0 = 3.0.

APPENDIX I

METHODOLOGY

Methods for estimating figures for canned food production are explained in the text of the various appendixes.

APPENDIX J

GAPS IN INTELLIGENCE

The principal gap in information on the Soviet food-canning industry is in regard to consumption of canned food by both military and civilian consumers. Consumption data are lacking on a current basis and even on a historical basis, although future research might help to clarify the historical picture.

Information on all phases of stockpiling of canned food is largely lacking and is generally conjectural in this report.

A further point awaiting future clarification is the organizational and functional relationship of various organizations canning food: that is, the relationship between All-Union and Union-Repbulic ministries, between main administrations within a ministry, and between ministries, as well as other similar relationships.

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APPENDIX K

SOURCES AND EVALUATION OF SOURCES

1. Evaluation of Sources.

Overt Soviet sources including books, journals, and newspapers have furnished the basis for most of the material contained in this report. Of these Soviet sources, the most valuable for statistical data were publications of the USSR State Planning Commission, including the various Plans as well as details of actual accomplishments announced in the Socialist Construction series or in reports of Plan fulfillments. Statistical and nonstatistical information dealing with the food-processing industries in the USSR (and including food-canning) were obtained from handbooks on food processing by Gryuner, Smirnov, Skrobanskiy, and others and from semiofficial statements by Mikoyan, former Commissar of the People's Commissariat of Food Industry and Zotov and Sivolap, former ministers of the Ministry of Food Industry. Publications of the prewar USSR Chamber of Commerce, along with the Soviet Agricultural Encyclopedia, also supplied useful materials. The Soviet journals Myasnaya Industriya SSSR (Meat Industry of the USSR), Rybnoye Khozyaystvo (Fish Economy), and Molochnaya Promyshlennost' (Dairy Industry) furnished information on their respective subjects. Stepanov and Fetisov added data on the organization and functions of the meat-packing industry in the USSR, and Poroshin threw some light on the tin can industry. An official Soviet Army publication provided materials on the organization, nutrition, and preparation of food for the Soviet Army. Foreign Broadcast Information Division and Foreign Documents Division (FBID and FDD, OO) provided supplementary data from Soviet sources.

Studies by the US Department of State.

, and by the were valuable sources of information, and published and unpublished materials of the US Departments of Interior, Commerce, and Agriculture were utilized. The National Canning Institute made available data on the US food-canning industry, and covert CIA sources supplied necessary and useful data.

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The reliability of Soviet statistics and all foreign sources, official and unofficial, which depend primarily on published Soviet material, is suspect as a consequence of the official Soviet state policy restricting the dissemination of information about all phases of Soviet activity. Statistics, when published by the Russians, frequently take the form of vague percentages set up on unknown bases and are often misleading.

Secondary Western European sources can be no more reliable than the Soviet sources quoted. The background, knowledge, intellectual integrity, and political bias of these secondary sources, however, tend to qualify the reliability of these official and unofficial studies.

The data on the various plant names, locations, capacities, and labor force were obtained from information contained in the Industrial Register (CCD) files; in FBID and FDD and other OO reports; in Department of State and Department of the Army publications; and in primary Soviet sources, including the lists of plants given in the Second and Third Five Year Plans (1933-37 and 1938-42).

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