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CONTENTS

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Steel for Civilian Use

THAT the tightness in finished steel supply since Korea is not attributable solely to direct military demand is illustrated once more by a recent analysis[1] of shipments of finished steel products during 1951.

Whereas the current international situation is commonly regarded as a condition somewhere between conventional peace and full scale war, actually, in terms of finished steel shipments, the civilian market has been scarcely disturbed.

At the peak of World War II, military requirements took nearly 20 million tons of finished steel, or approximately every third ton produced, and most of the remainder went into highly essential nonmilitary use. On the other hand, last year's direct rearmament requirements totaled only slightly over 2 million tons, or only one ton out of each 36 produced.[2]

STEEL SHIPMENTS
(000's of net tons)

	1943	1950	1951
Total steel shipments	59,900	72,200	78,900
Aircraft, ordnance, shipbuilding	19,900	600	2,200
Percentage of total	33.2%	0.8%	2.8%

Instead of producing a vast volume of finished armaments, as is necessary in a full scale war, national policy has concentrated on a considerable build-up of plant capacity over a wide range of industries, including, of course, all stages of iron and steel manufacture. The situation is regarded as one in which it is preferable to enlarge the *ability* to produce rather than to pour out a stream of finished war materials which might soon become obsolete.

Enlarging Industrial Capacity

Indicative of the emphasis which is being placed upon the increase in *capacity* to produce war goods rather than the present output of such products, is the rise in steel shipments to railroads and machinery manufacturers and to the construction industry. The railroad industry took nearly 6,000,000 tons of steel products in 1951, or 1,500,000 tons more than in 1950, and accounted for nearly 8 percent of the total supply, about the same proportion as during World War II.

Shipments to the construction industry increased 1,350,000 tons during 1951 to a record high level of 10,000,000 tons. This represented more than 16 percent of all shipments and marked construction as the second largest steel market. The contrast with the

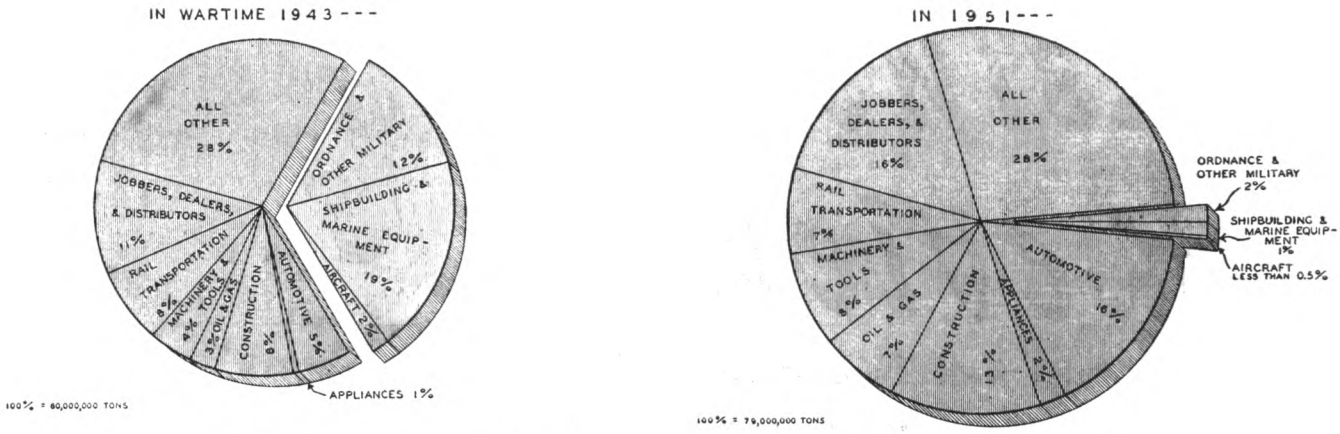
1 American Iron & Steel Institute.

2 The definition of defense steel consumption used by the A.I.S.I. obviously does not include all steel that is required for the defense effort. For example, steel shipped to an atomic energy project is classified by A.I.S.I. as "construction", and steel used for boilers and equipment is classified as "machinery". Steel used by automobile plants for military trucks is classed as "automotive". In the fourth quarter of 1951, the Department of Defense was given an allotment of about 1.9 million tons of steel for its diverse activities, and the Atomic Energy Commission was allotted 183,000 tons.

However, last year almost 13 million tons of steel were shipped to jobbers, dealers and distributors, who in turn resold it to thousands of small manufacturers. No estimate has been made of the proportion of this steel which ultimately went into direct military use.

On the other hand, it should be noted that the Institute does include in "ordnance and other military" sales of carbon and alloy material to be made into artillery, small arms, ammunition, combat tanks and other combat vehicles, sighting and fire control equipment, and ordnance accessories for any military service.

DISTRIBUTION OF STEEL SHIPMENTS



. . . shipment of finished steel products to ordnance, shipbuilding and aircraft during 1943 consumed one-third of the nation's steel. Last year, however, the "national defense" market took less than three percent of total output.

Source: American Iron and Steel Institute.

World War II period is sharp as consumption of steel in construction last year was more than double the average of the three years 1943-1945.

Machinery and tools absorbed an additional million tons during 1951 to reach a new high of over 6,000,000 tons, also more than double the industry's take during the War.

Shipments to jobbers, dealers and distributors and other miscellaneous groups expanded sharply during 1951 but these are the classifications through which filter the shipments for which the end-use cannot be determined at the time of sale. Suffice it to say that deliveries to these market classifications increased in roughly the same proportion as did the over-all supply.

Sources of Additional Steel The question now is, "Where did the steel come from, cutbacks in nonessential uses or expanded production?" The left side of the balance in the illustration shows that by far the greatest part of it came from increased production. Total shipments of steel products increased 6,700,000 tons during 1951 as the industry turned out steel at top speed throughout the year and as new furnaces and processing mills were brought into operation.

In addition, shipments to the automotive, appliance, and oil and gas industries were cut below 1950 by government regulations.

Autos and trucks suffered the largest cut, 1,500,000 tons, but at 13,000,000 tons still remained the largest individual steel market. Shipments during 1951 to the automobile industry were second only to the record year, 1950, and more than four times as large as during the second World War.

The appliance industry received 250,000 fewer tons of steel in 1951 but this represented a 12 percent cut from 1950 as compared with 10 percent in the case of automobiles. Shipments were, of course, well above World War II levels.

The oil and gas industry's take of steel during 1951 was 150,000 tons or 3 percent smaller than 1950. Included in this classification is steel for the drilling of wells and the laying of pipelines. The principal reason for the decline in steel shipments to the petroleum industry is found in the diversion of plates, used in the fabrication of line pipe, to defense-related uses such as construction of tanks, railroad cars, ships, and heavy machinery.

The amount of steel which was diverted from these civilian uses, although moderate, totaled substantially more than the increase in military demand as typified by shipments to ordnance, shipbuilding, and aircraft. The excess, of course, went to other essential users.

Shipments by Type of Product Changes in shipments by the various types of products last year were somewhat less striking than the shifts by markets. The reason, undoubtedly, is that there are comparatively few different steel forms, many of which have a wide variety of uses.

Steel plates experienced the largest increase of any product group as shipments at 7.9 million tons during 1951 exceeded 1950 by 2.2 million tons or 39 percent. Plates which represented about 8 percent of all products in 1950 increased to 10 percent in 1951. Part of this increased production of plates was achieved by converting some sheet and strip mills to light plates. Other large increases occurred in hot rolled bars, up 900,000 tons or 14 percent, tubular products up 840,000 tons or 16 percent, and structural shapes up 720,000 tons or 17 percent. The de-

creases occurred in galvanized sheets, tin and terne plate, down 12 and 5 percent, respectively, and line pipe which fell off 13 percent as plates which had been going into large diameter pipe were diverted to other uses. Shipments of most other products changed relatively little. The shift therefore was from the light to heavier steel products.

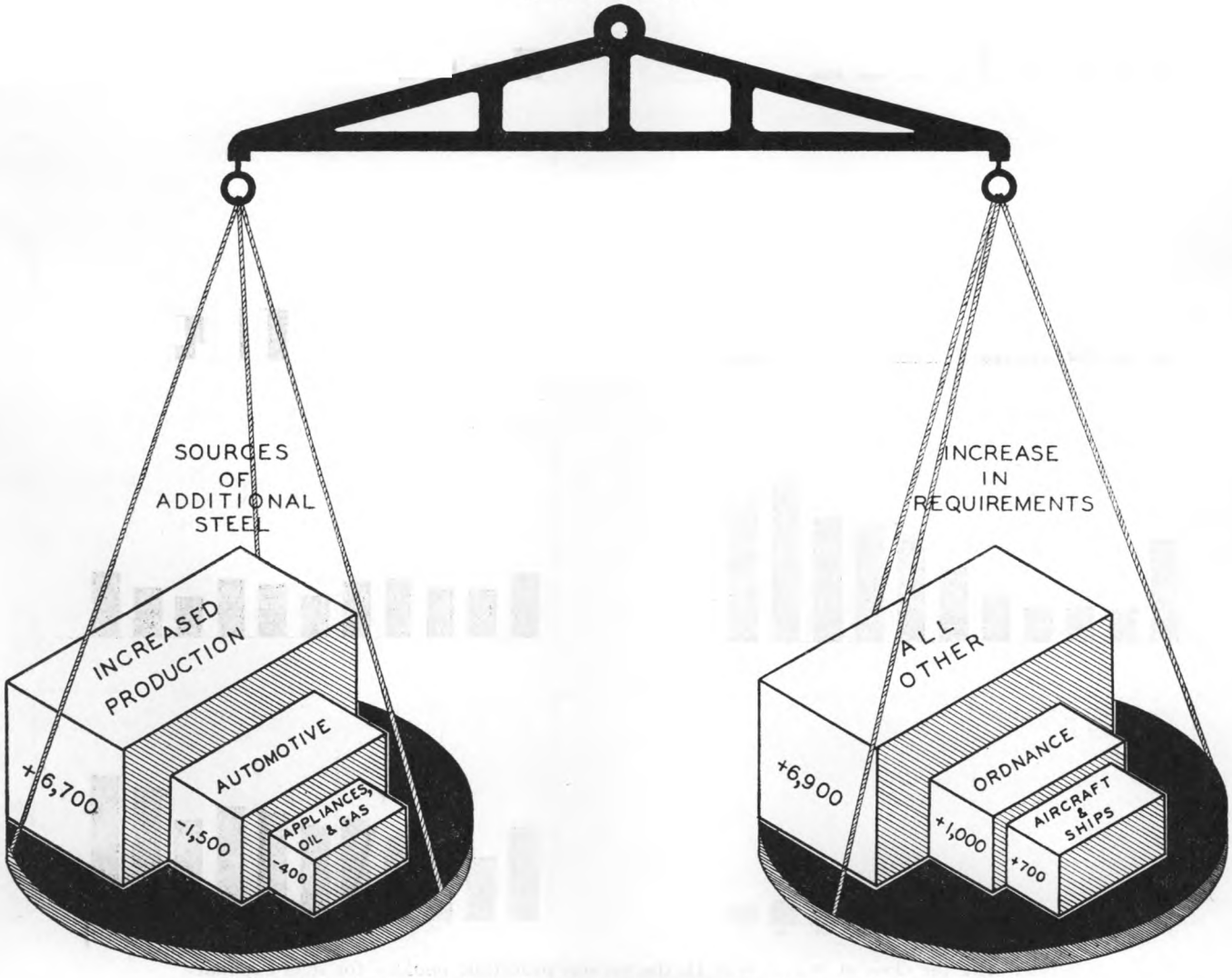
Outlook Evidence has been accumulating that the steel supply is approaching a closer balance with demand than existed during 1951. The Defense Production Administration pointed out that over-all requests for carbon steel allotments in the fourth quarter of 1951 exceeded supply by 47 percent. With respect to third quarter 1952 allocations it was noted that ". . . it has been possible to meet substantially 100 percent of many of the small users materials requirements."[3]

This approach to a steel demand-supply balance may be attributed to three main factors:

1. Increasing production as new capacity is installed.
2. A topping out, or actual decline, in demand for steel for some uses such as military, industrial building, and railroads.
3. A let-up in the demand for steel for inventory accumulation.

[3] *Defense Production Record,* March 27, 1952, p. 8.

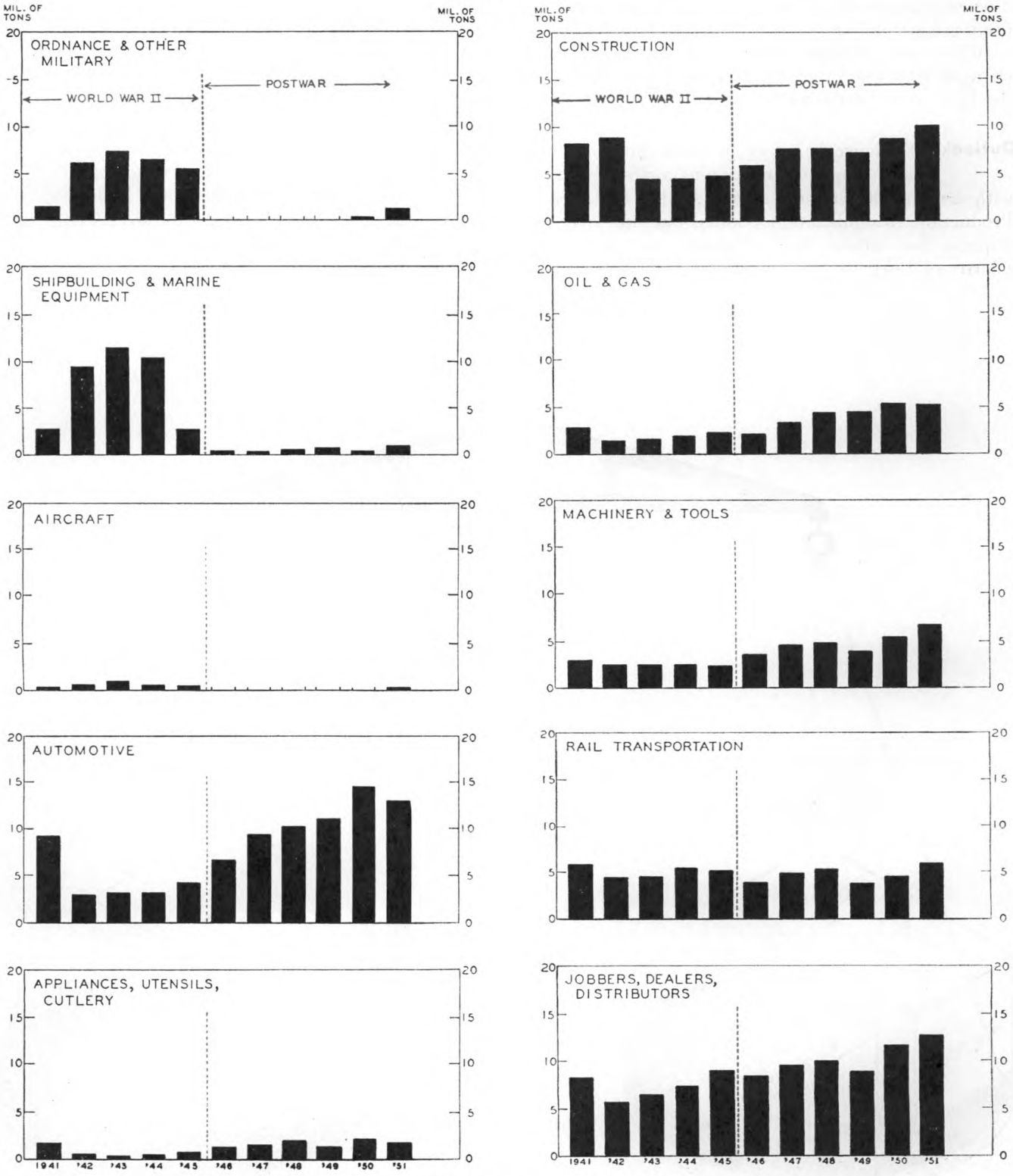
BALANCE OF STEEL SHIPMENTS
Changes by Market Classifications
1950-51
(000's of net tons)



. . . the increase in production of steel products during 1951 supplied most of the increased demand for steel and obviated the need for deep cuts in civilian steel use.

Source: American Iron and Steel Institute.

STEEL SHIPMENTS BY MAJOR MARKET CLASSIFICATIONS
1941-1951



. . . after the close of World War II, the various peacetime markets for steel expanded rapidly and absorbed all of the output which had been diverted to ordnance, etc. The impact of post-Korean rearmament has not altered that demand pattern appreciably.

Source: American Iron and Steel Institute.

Steel ingot capacity amounted to slightly less than 109 million tons on January 1, 1952. It has already passed the 110-million-ton mark and substantial amounts of new capacity are scheduled to be completed during the second half of this year.

Easing demand in the coming months was foretold when the D.P.A. reported that as of March 31, 1952, a little more than half of the industrial expansion covered by Certificates of Necessity was completed. By the end of this year an estimated 63 percent will be finished. This suggests that the peak in demand for structural steel has been or will soon be passed since the framework of the buildings must be put up first. The greatest demand for steel products by machinery manufacturers on the other hand will be attained somewhat later. The future scope of steel demand for construction depends greatly upon the volume of residential, commercial and recreational, and the various types of public building. Housing starts are expected nearly to match last year. Many commercial and public projects have received approval to commence construction in the third and fourth quarters of 1952 but there is a growing feeling that the increase in steel demand for such buildings will prove insufficient to fill the vacuum left by the anticipated decline in industrial plant expansion.

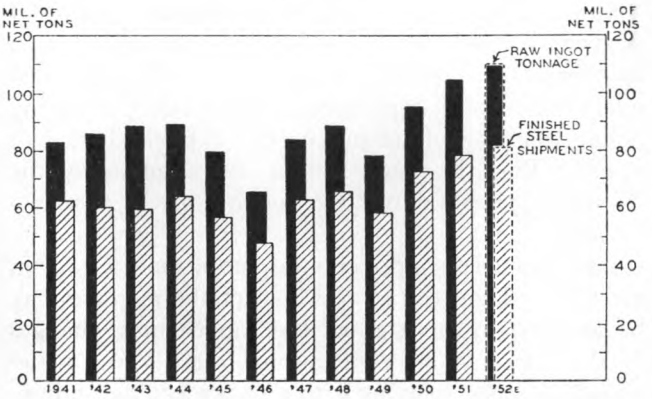
It has been estimated that at least 5 million tons of steel went into inventory in 1951, or more than twice last year's shipments to the military. Much of this increase consisted of so-called pipeline-filling in new or reactivated defense plants and was not out-and-out hoarding which would have been in violation of government orders.

Although allotments of steel to appliance manufacturers are being increased in the third and fourth quarters there is some evidence that they may not be using up all their second-quarter tickets. This is especially true of makers of heavy consumer durables such as refrigerators and ranges.

Automobile manufacturers will also be allowed additional quantities of steel during the second half of 1952. While they appear to be boosting production whenever permitted, there are serious doubts that they will continue to do so indefinitely.

According to the Annual Survey of Consumer Finances conducted by the Board of Governors of the Federal Reserve System, consumers planned to buy somewhat fewer new automobiles and major household goods in 1952 than in 1951. It will be recalled that 1951 purchases of such items numbered fewer than in 1950. Thus it seems unlikely that the consumption of steel by either the automotive or appliance industries will return to the peak 1950 rates, much less maintain that pace.

STEEL PRODUCTION AND SHIPMENTS
United States
1941-1952



. . . both steel ingot production and finished steel shipments rose to all-time highs last year and exceeded the World War II peaks by nearly one-fourth.

E Estimated by Research Department, Federal Reserve Bank of Cleveland.

Source: American Iron and Steel Institute.

Finished Steel

Shipments of finished steel products in the United States rose to an all-time high during 1951 of 79 million tons. This resulted from the higher steel ingot capacity, 104 million tons on January 1, 1951 as compared with 99 million tons a year earlier, and through more intensive utilization of that capacity. (Finished steel shipments total about three-fourths of ingot production because of the losses incurred when raw steel ingots are processed into the various shapes and forms.)

If production can be maintained throughout the rest of 1952, an estimated 110 million tons of ingots will be turned out which will yield approximately 82 million tons of finished steel products, an increase of about 3 million tons over 1951. Even if direct military requirements should rise to four or five million tons, or some other figure far short of the 20 million consumed in each of the war years, the quantity of steel available for other uses will still be nearly the largest on record.

Is Agriculture A Growth Industry?

IT MAY NOT BE widely realized that the volume of food consumed every day in this country has been increasing much more rapidly than can be explained solely in terms of population growth. After adjusting dollar volume of food purchases for price changes it appears that the rate of food consumption by the American people may have doubled in the past two decades.

The expansion represents far more than a gain in mere poundage; in fact the bulk of the increase may be ascribed to the gradual but far-reaching changes in the character of the national diet. Those widespread changes, together with a 28 percent rise in population, are providing a market for farm products which, in a sense, is twice as large as that of the prosperous year of 1929. Neither the automobile industry, nor the home building industry—nor probably many others—have experienced a unit volume gain equal to that which has occurred in agriculture. And this performance raises the question: how much more will farm output increase in the next twenty years, in response to population growth, dietary standards, and other factors affecting the demand for food?

High Level Employment

The ability of the nation as a whole to buy more, and especially better, food than ever, is largely a result of almost continuous high-level employment for the past decade or longer. Simultaneously, by a combination of good weather, increasing mechanization, and a constant advance in technology, agriculture was able to bring about a tremendous increase in output, not only in weight, but also in quality of product. Only the newest industries can match that increase in "capacity" over the past twenty years. Parenthetically, it may be observed that but for this prodigious expansion in output, per capita consumption of food could not have risen so substantially, and the cost of eating would probably be much higher today.

During the period from 1932 to date, not all types of food products shared in the very substantial increase in demand. The lower-priced bulky and starchy foods lost ground, at least relatively, to the more desirable foods such as meats, eggs, milk, fresh fruits and vegetables. Any subsequent recession in aggregate demand would probably reverse the sequence.

Moreover, a goodly share of the expanding demand can be attributed to the ability of the lower income groups to enlarge their food purchases, qualitatively as well as quantitatively. Perhaps the lowest third of incomes will continue to grow more rapidly (after taxes) than the highest third. Conversely, if the nation's real disposable income should shrink, either through industrial unemployment, or through less effective and less efficient employment, the urban population will have to be content with less food, and of poorer quality, and the market for farm products will shrink.

Future Dietary Standards

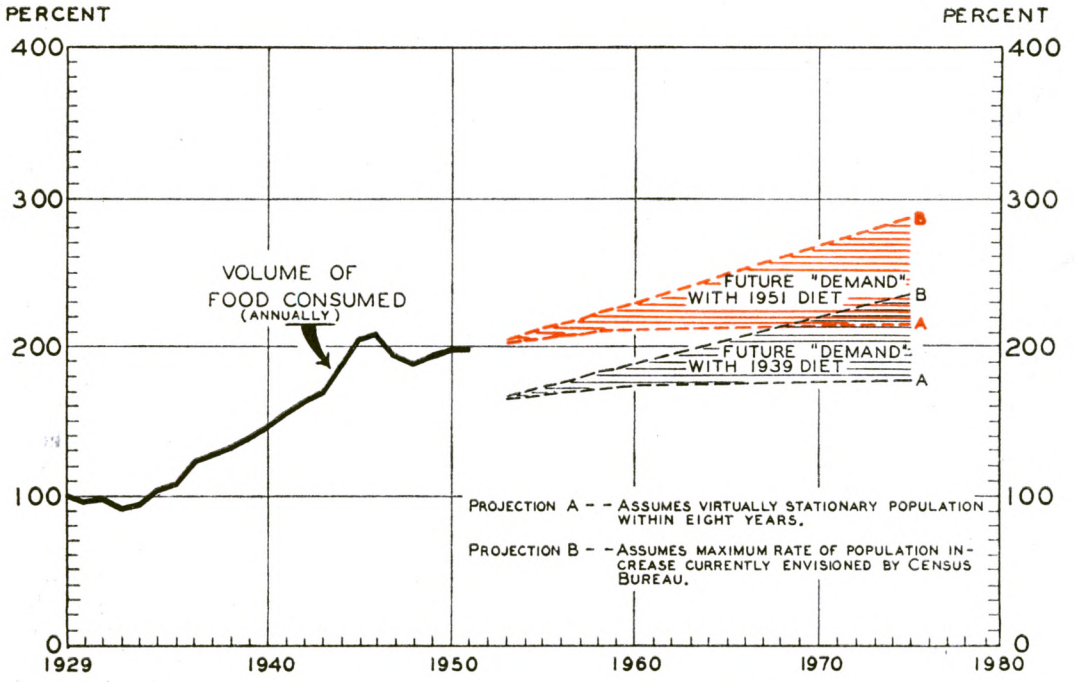
It may be taken for granted that the population will not voluntarily revert to lower consumption standards. It is true that from 1946 to 1948, for example, the volume of "grocery" purchases declined even more sharply than it did during the years of depression, 1929 to 1932. But the more recent shrinkage was due to special circumstances. After one year of the best diet in history, some of the money formerly spent for "marginal" foods began to be diverted to the attractive and needed consumer durables becoming available in growing quantities. Since 1948, the meat, milk, and grocery bills have been competing more successfully again with nonfood purchases.

On the other hand, a noticeable contraction in industrial activity and employment would impose economies in the family food budget. If economic depression should materialize during the next five to ten years, it would not take much of a curtailment in quality of diet to create a considerable excess of food supply. In fact, even if the population should continue to expand at the prevailing rate, readoption of the 1939 diet on a national scale would mean a stationary agriculture until the mid-1960's at best (see chart). And if population growth should slow down, it would take much longer for the country to "grow up" to its present capacity to produce food.

Conversely, if it can be assumed that the present relatively high consumption standards are here to stay — or possibly will be raised still further — the existing volume of food production will hardly be adequate for a static population. And if, as appears more likely, there will be twenty million more mouths to feed by the time another decade has elapsed, a further substantial expansion of agricultural output

Note: The Bureau of Agricultural Economics' two indices, Per Capita Food Consumption, and Farm Output For Sale and For Farm Home Consumption, would indicate a considerably smaller increase in aggregate consumption since 1929. Those indices, however, are inclined to place greater emphasis on purely quantitative changes in volume, without giving full effect to the widespread dietary changes and the improved quality of many foods. A precise and sure-footed method of measuring such relatively intangible factors still remains to be devised.

POTENTIAL DEMAND FOR FOOD BY 1975
(Under Two Consumption Standards and a Range of Population Growth)
1929 = 100



. . . the domestic market for food would be sharply smaller if 1939 dietary standards were to prevail again during the next decade. Conversely, given continuation of current birth and death rates, and current consumption standards in 1975 the national food requirements will be double the pre-Pearl Harbor figure.

Source: Data for 1929-51 from Department of Commerce food expenditure series deflated by Bureau of Labor Statistic Retail Food Price index. Projections are derived from Census Bureau population projections multiplied by the adjusted per capita rate of expenditure during 1939 and 1951.

is warranted. Not two, but three ears of corn will have to be grown where only one was harvested before.

In short, whether agriculture can be classified as an economic activity destined to expand for years to come, depends in minor part upon the future rate of population growth, and in major part upon the kind of diet American consumers will be able to purchase, out of the proceeds of their urban industrial production.

ANNOUNCEMENTS

Regulation W, establishing minimum down payments and maximum maturities for consumer instalment credit, was suspended on May 7, 1952, by the Board of Governors of the Federal Reserve System.

* * *

On May 2, 1952, the Board of Governors of the Federal Reserve System issued the following statement regarding the Program for Voluntary Credit Restraint:

> The Board of Governors of the Federal Reserve System has concurred unanimously in the recommendation of the National Voluntary Credit Restraint Committee that the screening of applications for financing, in accordance with the principles established by the Voluntary Credit Restraint organization, be suspended in the light of current circumstances. The Voluntary Credit Restraint organization will continue on a standby basis so that the Voluntary Program may be reinstated should subsequent developments require.

Resources of the Ocean

by CLYDE WILLIAMS, *Director, Battelle Memorial Institute*

Until recently, man's thinking on natural resources has been primarily concerned with the land. The existence of animal, vegetable, and mineral wealth in, around, and beneath the ocean has been known for centuries, but the cost of recovering this wealth — except for fish, common salt, iodine, and potash—has been prohibitive when compared with recovering the same wealth from the land. Recent commercial successes in extracting bromine and magnesium from sea water, however, have inspired more extensive development of the ocean's fabulous resources. Improved recovery techniques are opening the way.

There are approximately 300 million cubic miles of sea water covering 71 per cent of the earth's surface. This vast storehouse can supply unlimited amounts of fish, plants, and fresh water. It also contains an estimated fifty million billion tons of dissolved materials or salts that have important applications in our everyday life.

Around the borders of the ocean are extensive sea beaches that contain minerals such as ilmenite (the most common titanium ore), magnetite, monazite, rutile, garnet, diamond, zircon, and quartz. The sea bottom has large deposits of iron, manganese and tin minerals, and phosphate rock, to mention only a few. Petroleum resources beneath the ocean bottom have been tapped only partially.

Fish and common salt have been taken from the sea for hundreds of years. Iodine and potash were extracted from seaweed until more economical sources became available. Only a beginning, however, has been made in the recovery of other resources from the ocean.

Interest in recovering minerals from sea water began to surge upward in 1934, when the development of antiknock gasoline was bringing about a sharp increase in the demand for ethylene dibromide. The demand could not be met with the output of bromine plants using subterranean brines. A new technique was developed by one of the large chemical companies which permitted removal of bromine directly from sea water, without the prior concentration that had been necessary for earlier commercial recoveries.

Successes in bromine recovery led to a method for extracting magnesium from sea water in 1941. By this method, magnesium hydroxide is precipitated directly from sea water by treating the water with slaked lime or dolomite.

Because the recovery of bromine and magnesium from sea water proved profitable, production from this source has survived competition with land sources. A large percentage of present domestic output of virgin magnesium and bromine is extracted from sea water.

One of the most important new developments that may make sea water more valuable is known as ion exchange. In this process, a specific resinous material carrying hydrogen ions is exposed to sea water in a column. The hydrogen ions enter the sea water and the element to be extracted is chemically combined with the resin. After separating the water from the resin, the element is recovered from the resin, for example, by the use of an acid. Ion-exchange materials have already been developed for recovery of potassium, sodium, magnesium, and chlorine. Some are being applied commercially. More are in prospect.

Fresh water from sea water is no longer a sailor's dream. The recovery of fresh water by a new process known as vapor-compression distillation is economically promising. Use of the ion-exchange technique as part of a method for converting sea water to fresh water has been demonstrated. Eventually, these processes could greatly increase the nation's water supply, especially where natural fresh water is scarce or inadequate. In both techniques, the by-product recovery of minerals would be necessary to make fresh water from sea water economically worth while.

Scientists are studying techniques for removing greater quantities and varieties of plant and animal life from the sea. The Scottish Institute for Seaweed Research has reported the discovery of a starch-like material that is deposited on very dense growth of Laminaria seaweed. The same organization has demonstrated the possibilities of increasing both plant and fish production by using fertilizers. Flounders transplanted into a fertilized area grew about four times as fast in length and sixteen times as fast in weight as those not transplanted.

The seaweed industry has declined since World War I, primarily because technology did not advance enough to produce iodine and potash at costs competitive with land sources. To replace the old industry, however, a new one has grown up, based almost entirely on the manufacture of agar, carrageen, and alginic acid. These products are used principally in the pharmaceutical and food industries. The seaweed industry, including possibly iodine and potash recovery, should regain much of its lost ground in years to come if recent advances in technology are properly utilized.

Geophysical methods are well developed and may be used for more extensive exploration of mineral deposits on and beneath the ocean bottom. These deposits are known to include oil, manganese and iron oxides, phosphate rock, glauconite, and cassiterite, a tin mineral. Cassiterite is already being dredged from the shallow water off the coast of the Dutch East Indies. Offshore oil is a growing commercial development. Notable so far are substantial recoveries off the shores of Louisiana, Texas, and Southern California.

The ocean offers unlimited opportunity for increasing our supply of food, fresh mater, and minerals. Commercial successes in extracting bromine and magnesium have proven that it is possible for the ocean to compete favorably with the land, where the same types of resource are available from both. Continuing improvements in the technology of recovery promise that greater varieties and quantities of the ocean's resources will be brought within the range of man's benefit.

Editor's Note—While the views expressed on this page are not necessarily those of this bank, the *Monthly Business Review* is pleased to make this space available for the discussion of significant developments in industrial research.