



# MONTHLY REVIEW

TWELFTH FEDERAL RESERVE DISTRICT

JULY 1954

FEDERAL RESERVE BANK OF SAN FRANCISCO

## REVIEW OF BUSINESS CONDITIONS

**T**HE rate of business activity in the nation and in the Twelfth District showed some further signs of moderate improvement during June. While the added strength in the general economic situation consisted in part of a further slackening in the rate of decline in some measures, the reversal of downward trends in a few indicators was of particular interest. The recent lengthening in the average work-week in manufacturing industries and the reversal of a year-long downtrend in personal income are the most substantial evidences of added strength in the underlying economic situation. Retail sales in June also showed some renewed vigor, particularly in sales of automobiles where considerable weakness has been in evidence and where new car stocks have been unusually burdensome. Continued strength was evident in new construction activity which was close to the May record after seasonal adjustment.

Further improvement is also evident in the over-all employment situation as the rate of decline in the seasonally adjusted number of nonfarm jobs slackened substantially from earlier periods. Nonagricultural employment in the nation declined by only 32 thousand workers from May to June compared with losses of 112 thousand and 167 thousand in the two preceding months. Much of the smaller drop is accounted for by expanded employment in nonmanufacturing lines, especially construction and retail trade, and a substantial lessening in the loss of jobs in the durable manufacturing industries.

The District appears to have fared somewhat better than the country as a whole. The nonfarm employment trend in the District showed a slightly better than seasonal rise in May with some indication of a continuation in June in contrast to a less than seasonal increase nationally. Increased activity in the areas where the greatest weakness in the District economic situation has been concentrated—manufacturing, construction, and mining—is largely responsible for the pickup in industrial jobs in May and probably in June. A sharp rise in building permit volume in June and the very recent approval by

Congress of added funds for defense construction may presage a further rise in construction activity in the months ahead. The major strike by some 80 thousand lumber workers in the Douglas fir region of Oregon and Washington, where this industry constitutes a large portion of manufacturing activity and of total income payments, may have a rather severe impact upon the level of over-all economic activity in that area of the District for as long as the work stoppage continues. The effects of the strike may also tend to cloud the total District employment situation for the next several months as the readjustment following a major strike of this magnitude is always extended over a considerable period.

### *Indexes of man-hour input reveal sharper fluctuations in District manufacturing activity*

Recently developed indexes of manufacturing production worker man-hours on a seasonally adjusted basis permit a more precise evaluation of trends within manufacturing—until recently a major source of weakness. The indexes have been developed for only the three Pacific Coast states where the great bulk of District manufacturing is concentrated. It should be emphasized that these man-hour indexes reflect only fluctuations in the use of labor time and do not precisely measure changes in the rate of physical output of manufacturing industries.

The movement in the indexes of man-hours worked<sup>1</sup> reveals that the decline in manufacturing activity was somewhat sharper than changes in employment alone would indicate. The index of total man-hours compiled by the use of value added weights was more than 4 percent lower this May than in May a year ago, compared with a decline in total manufacturing employment of 2½ percent. Also the recent upswing in the level of produc-

<sup>1</sup>"Man-hours worked" is not a precise title. The data upon which the index is based reflects man-hours paid for rather than actual hours worked, the two differing through paid holidays, sick leave, and vacation periods.

**NOTICE:** The supplement to the May 1951 issue of the MONTHLY REVIEW entitled "Waterborne Trade of California Ports" has been reprinted. Copies of it are now available without charge upon request to this bank.

### Also in This Issue

<b>Residential Construction . . . . .</b>	<b>99</b>
<b>Rubber and the Twelfth District . . . . .</b>	<b>102</b>

tive activity appears more pronounced when measured by the changes in man-hours rather than by employment. Substantially larger improvement from the lows reached earlier this year is apparent in the man-hour indexes where gains in some industries, after seasonal adjustment, are significantly larger than the increases in employment.

A brief discussion of trends in man-hours worked in the major manufacturing industries on a seasonally adjusted basis from their 1953 peaks to the latest month for which data are available may aid in placing in perspective current developments.

#### ***Durable goods dominated the decline in manufacturing activity***

The general business recession that has been confronting the nation as well as the District during much or all of the past year was reflected in a downturn, on a seasonally adjusted basis, of total District nonagricultural employment in September of last year. The peak in District manufacturing employment, however, occurred two months earlier. In turn, the downtrend in manufacturing jobs had been preceded by the reversal of a previously strong uptrend in man-hour utilization in some of the District's major durable goods producing industries as early as March and April of 1953. The durable goods industries at that time were beginning to face slackened demand both from the defense program as well as from declining new orders from nondefense sources.

These factors along with the subsequent fall in demand as inventories proved excessive resulted in a fairly sharp reversal in the use of man-hours in March and April of 1953 in machinery, furniture, and lumber and wood products. Aggregate man-hours employed in the metals industry turned down in June and by July other durable manufacturing as a group, except transportation equipment, passed its peak and started to decline. The unusually high rate of auto assembly that typified the first half of the year tapered off rather sharply following mid-year. Aircraft and parts production, however, continued to advance and it was not until October that these offsetting trends resulted in a turndown in total man-hours employed in transportation equipment as a whole.

The decline that followed the peaks in the various durable goods industries in the District was rather sharp although the duration of the reductions in the rate of operations varied considerably from one industry to another. In transportation equipment the decreased use of man-hours (about 9 percent) lasted only about a month as model change-overs introduced renewed activity in auto assembly plants, and aircraft continued to expand moderately, at least through the early months of this year. Use of man-hours in the metals industries—after an almost 14 percent decline—picked up in January and then slipped again for three months. A definite, although slight, improvement was noticeable in March and April in the machinery and other durable industries, which had lowered their utilization of man-hours by approximately

12 percent from their previous peaks. In lumber and furniture the decline in man-hours worked has continued through the latest month for which data are available with a total decline from their 1953 peaks of 14 and 21 percent, respectively. The rate of decline in furniture, however, has slackened considerably from earlier periods reflecting some firming in the demand for the products of the industry.

#### ***Weakness appeared later with subsequent declines smaller in nondurables***

Nondurable goods generally were less affected by the adverse developments in the economy and as a result have been able to maintain relatively higher levels of operation than have durables. Consumer expenditures for nondurables have been much better sustained than for durable items and in addition inventory problems have been less severe, and the direct impact of lowered defense spending has been only a modest influence. The total decline in District man-hour utilization from May last year to May of the current year has been just slightly more than 2 percent compared with the decline in durables man-hour use of 5½ percent.

Textiles and apparel manufacturers were the first to feel the impact of lowered levels of activity and experienced the most severe (nearly 15 percent) decline in the level of operations. Heavy stocks of canned products in the hands of processors have been largely responsible for smaller packs of fruits and vegetables and the fairly sharp (10 percent) reduction in man-hours utilization in the food industry after July 1953. Activity at paper and allied mills, despite some moderate weakness in the latter part of last year, has expanded to a new high level in recent months. This reflects in part the fact that the industry underwent an adjustment during 1952 and since then has had a fairly well sustained demand for its products. Aside from minor fluctuations, printing and publishing have remained almost totally unaffected by the slide-off in general economic activity.

#### ***Recovery from previous lows apparent in most manufacturing lines***

The increased strength in recent months in the manufacturing sector—a principal area of weakness in the decline in economic activity during the past year in the District as well as in the nation—is more readily apparent in the indexes of man-hours than in employment data alone. Seasonally adjusted manufacturing employment of wage and salary workers increased in May but the extent of the gain was very small—½ percent. However, gains registered in the use of man-hours by most of the major industries covered by the index indicate that improvement, after allowance for seasonal factors, may be somewhat more substantial. With the exception of lumber and furniture, where some decline was still evident in May (after allowance for seasonal influences), increased utilization of man-hours compared to earlier lows has

been fairly substantial in the other industries. Gains in excess of 5 percent have taken place in transportation equipment, textiles and apparel, and food and kindred products. In metals, machinery, and miscellaneous non-durables, the gains were smaller. They did exceed, however, the rise indicated by the change in wage and salary

worker employment. These increases combined with the continued advance in paper and stable conditions in printing and publishing make fairly clear that the improvement has been more than nominal and represents a gain in excess of the normal seasonal expansion for this time of year.

### RESIDENTIAL CONSTRUCTION

**T**HE volume of residential construction has been large in the nation as a whole during the first five months of 1954. Private nonfarm housing starts have been at an annual rate of more than a million dwelling units for the sixth successive year, with the May figure about equal to the May 1953 total (Chart 1). Expenditures on private residential building through May were well above expenditures from January through May of 1953, and nonfarm mortgage recordings of \$20,000 or less were greater in both number and value during the first four months of 1954 than during the same months of 1953.

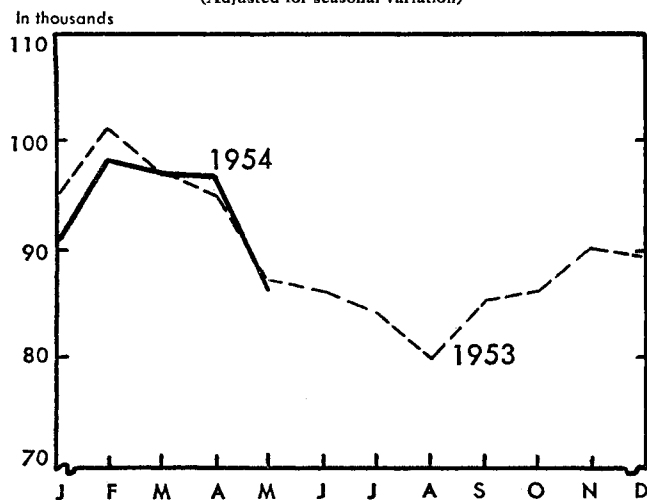
These figures conceal certain differences among the regions of the nation. In the Far Western states, construction employment and building permit figures indicate that the volume of residential building this year has been running slightly below the 1953 volume. One factor contributing to this regional departure from the national pattern appears to be the reduced flow of immigration to the Far West compared with that of the last several years. The large flow of immigration during the war and post-war years has supported a rate of construction activity in the Far West that has been much higher relative to income than the rate in the rest of the nation. Such a differential still prevails, even though the rate of immigration has declined.

The high level of national activity has come as a surprise to many observers. The second half of 1953 was a

period of weakness in the residential building industry, and estimates prepared jointly by the Departments of Commerce and Labor at the end of 1953 predicted a 4 percent decline from 1953 to 1954 in the value of private nonfarm housing expenditures. That prediction has recently been revised upward to a 2 percent increase in the light of the construction record to date and the loosening of the residential mortgage market. Nevertheless, there are still two facts which lead some observers to hold to a pessimistic outlook for housing during the next few years. The first is that the rate of family formation is declining at present, and is expected to continue declining until about 1960. The second is that the level of construction costs (relative to prices in general) is very high—considerably higher than it was at any time between the two world wars.

These two facts alone, however, do not provide sufficient grounds for reaching a conclusion about the housing outlook. It is necessary to examine the relationship of the volume of housing not only to costs and population changes, but also to other factors. A number of economists have made statistical studies in order to discover these relationships and have shown that during the years between World War I and World War II changes in the number of housing starts per year were associated very closely with sets of relationships involving changes in personal income, population, residential rents, construction costs (including the cost of real estate credit), and a few other variables.<sup>1</sup> Unfortunately, the relationships revealed by the studies cannot be applied successfully to the years since 1940. The housing situation in many of the years since 1940 has been dominated by building materials restrictions or shortages, real estate credit regulations, and other factors which disturb the usual peacetime functioning of the building industry and which are not easily incorporated into statistical investigations. Estimates of housing starts based on the relationships in one of the studies were computed for years since 1940 and yielded figures much too high in some of the war years and far too low in the years 1950 to 1952. It is

CHART 1  
NEW NONFARM HOUSING UNITS STARTED—UNITED STATES  
1953 and 1954  
(Adjusted for seasonal variation)



Source: United States Department of Labor, Bureau of Labor Statistics.

<sup>1</sup> The following are the studies: Chawner, Lowell J., *Residential Building*, prepared for the Industrial Committee of the National Resources Committee, U. S. Government Printing Office, Washington, D. C., 1939; Derksen, J. B. D., "Long Cycles in Residential Building," *Econometrica*, University of Chicago, April 1940; Roos, C. F., *Dynamic Economics*, Principia Press, 1934, pp. 69-110; Tinbergen, J., *Statistical Testing of Business Cycle Theories; A Method and Its Application to Investment Activity*, League of Nations, Geneva, 1939, pp. 90-114; and U. S. Congress, Joint Committee on Housing, *Statistics and Economics of Housing*, U. S. Government Printing Office, Washington, 1948. Some of the studies include a few years before the end of World War I or after the start of World War II, but in each study most of the data are drawn from the interwar years.

believed that estimates based on the other studies would fare no better if projected into the present.

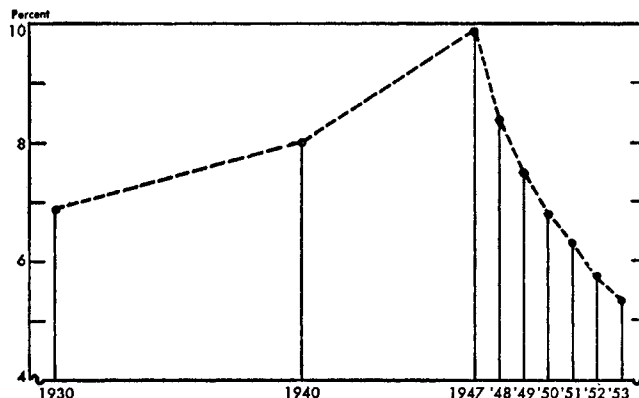
The best way to examine the current outlook for housing, therefore, seems to be to examine the general trends since the end of World War II of some of the factors which have been found to be closely associated with the number of housing starts. The factors to be examined are (1) housing "needs," as determined by a comparison of population changes and dwelling units built, (2) construction costs, including the cost and availability of mortgage credit, (3) residential rents, and (4) disposable real income per worker.

**Housing needs well below postwar peak**

In the immediate postwar years, a backlog of demand for housing which had accumulated during wartime, coupled with a high rate of family formation, produced a severe housing shortage. Residential builders responded to the shortage by building record numbers of new dwelling units; the number built in 1948 was about equal to the previous high of 937,000 units in 1925, and that number has been exceeded in every year since 1948.

After 1950, the annual net additions to the number of nonfarm families fell sharply because of the small number of children born during the depression years (Chart 2). Family formation is expected to continue low until the rise in the birthrate during the late 1930's and the war years begins to make itself felt in about 1960. The volume of residential building, on the other hand, has been maintained not far below the 1950 peak of 1,396,000 starts. Whether this high level of building is still under the stimulus of the housing shortage of the early postwar years is evidently a key question in analyzing the present housing situation. If the shortage is still having its effects, then the outlook for housing when the shortage ends may be dim. If the shortage produced by World War II conditions no longer exists, on the other hand, builders are evidently responding to forces other than the pressure of

CHART 3  
RATIO OF "DOUBLED UP" TO ALL FAMILIES—UNITED STATES  
Selected Years 1930 to 1953



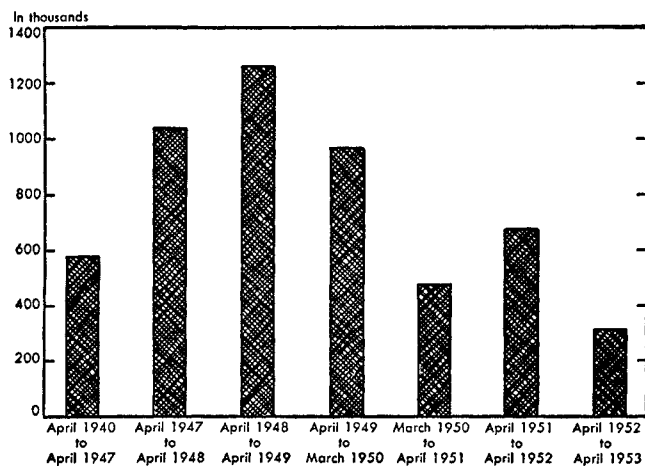
Source: United States Department of Commerce, Bureau of the Census.

population on the supply of dwelling units, and the outlook for housing depends on these other forces.

Available evidence suggests that the postwar housing shortage has ended. The measure of shortage is the extent of families "doubling up" with relatives or other individuals. The ratio of doubled-up to total families (Chart 3) rose slightly during the depression of the 1930's and rose quite sharply during World War II. After 1947, however, the ratio fell rapidly, reaching a figure lower than the 1930 ratio by 1950 and continuing to drop since then. The building industry, in other words, seems to have exhausted the backlog of housing demand from families forced to double up during World War II, though the national ratio shown in the chart may conceal some local shortages which still exist.

Builders have thus been responding to forces other than the pressure of population on the supply of dwelling units for at least the past three years. This conclusion may seem puzzling: Since each family needs one dwelling unit, why isn't the demand for dwelling units fairly rigidly determined by population changes? The answer to this question lies in two observations. The first is the existence of what might be termed "slack" in the relation between housing and population. Examples of such "slack" are: changes in the doubling-up ratio, which have been mentioned; fluctuations in the proportion of old people who give up their own households to live with relatives (this proportion has dropped in recent years); changes in the tendency of unmarried adults to live alone or to live with family or roommates; and variations in the average age of marriage. The second observation is that current building represents only a small proportion—seldom more than 3 percent in a year—of the total existing supply of housing. A decrease of 1 percentage point in the doubling-up ratio would involve more than one-third of the current number of dwelling units being built per year, but only about 1 percent of the total number of units standing. Therefore, even though the relation of the total number of families to the total number of dwelling units may be fairly stable, the relation between changes in the

CHART 2  
AVERAGE ANNUAL CHANGE IN NUMBER OF FAMILIES  
UNITED STATES, 1940-1953



Source: United States Department of Commerce, Bureau of the Census.

number of families and new dwelling units built may be—and in the past sometimes has been—highly variable.

#### **Construction costs high, but credit terms easy**

The cost of residential building has risen more than other costs since the interwar years. The Bureau of Labor Statistics wholesale price index rose by 89 percent from the 1920-1940 average to 1953. Between the same periods, there was a rise of 161 percent in the index of residential construction costs compiled by E. H. Boeckh and Associates. The greater rise in construction costs is due principally to rises in construction wage rates and in lumber prices. Changes in the efficiency of the use of labor and materials in the construction industry (compared to the economy as a whole) appear not to have compensated for the greater rise in construction costs.

Since the middle of 1953, construction costs, like the general price level, have been stable. But the ratio of construction costs to the general price level remains much higher than it was before World War II, and the recent high volume of construction has been in spite of these high costs.

In contrast to the cost of labor and materials, the cost of financing residential building has reached a record low during postwar years. The average interest rates on mortgage loans in St. Louis and Manhattan are available over many years,<sup>1</sup> and they indicate that during the tight credit conditions of 1953, mortgage rates rose to levels scarcely higher than their lowest levels in the depression of the 1930's. Not only has the average interest rate been low, but there has also been a substantial rise in the use of the amortized mortgage loans, and the average maturity of these amortized mortgage loans has greatly increased. Finally, record amounts of mortgage debt outstanding indicate that real estate credit has been readily available in amount as well as under liberal terms in recent years.

Mortgage insurance by the Veterans' Administration and the Federal Housing Administration has played a large part in the changed credit situation. At the end of 1953, more than two-fifths of the value of all mortgage debt outstanding on one- to four-family nonfarm properties was underwritten by these two agencies. Their effect has been not only to lower the average interest rate, but also to lower the average down payment on mortgage loans and to contribute to the liberalization of credit terms in the other ways mentioned above. They have therefore offset to some extent the effect of high building and materials costs on the demand for housing.

#### **Rents have risen less than other consumer prices**

Several of the statistical studies of interwar residential building found a significant positive correlation between an index of rents and the number of housing starts. The correlation was explained by the theory that the higher

the level of rents, the more landlords are stimulated to build houses.

Since the interwar years, rents have not risen as much as other consumer prices. The Bureau of Labor Statistics consumer price index rose by 93 percent from 1939 to 1953, but the rent component of the index rose by only 43 percent. For a large part of the period, rents were under Government control. As rent controls were removed, rents rose faster than other prices but so far have fallen far short of catching up with them. Part of the explanation of relatively low rents seems to be the postwar trend toward home ownership. The recent rise in rental vacancies and the failure of rents to advance beyond end-of-1953 levels may also be a consequence of this trend. In any case, the continued high volume of building cannot be attributed to the level of rents.

#### **Real income per worker at record high**

Real disposable income<sup>1</sup> per household, the final factor to be considered in the demand for housing, has risen to a record high since the interwar years. The rise in income since the depression has not been so rapid as the rise in housing starts; but from the yearly average during the prosperous years of the 1920's to 1953, real disposable income per household and the number of housing starts both rose by about the same percentage.

Since 1948, the movements of the two series have been roughly similar, both dipping below their postwar trends in 1949 and rising above them in 1950. The timing of changes in the series has not been exactly the same. Housing starts preceded income per household in both the 1948 downturn and the 1949 recovery. Housing starts also turned down earlier than income in 1953, and since the middle of 1953 there has been a recovery in housing starts but not as yet in income per household. However, the broad picture of change in the two series since the interwar period has been the same.

The trend in home ownership provides further evidence of the relation of income to the postwar housing boom. In a housing boom stimulated primarily by high rents and low vacancies (rather than by high disposable income) the proportion of renter-occupied to total dwelling units would be expected to rise. In a housing boom stimulated by a rise in disposable income, on the other hand, most of the building would probably be done with prospective home-owners in mind, and the proportion of renter-occupied to total dwelling units would be expected to fall. In 1940, about 56 percent of all occupied dwelling units were renter-occupied, and the other 44 percent owner-occupied. By 1950, the owner-occupied proportion had risen to 55 percent, and since then it has continued to increase. The postwar housing boom has been a boom in building houses for sale to owner-occupants, not in building houses to rent.

<sup>1</sup> See Roy Wenzlick and Associates, *The Real Estate Analyst*.

<sup>1</sup> Real disposable income is personal income after taxes, expressed in constant prices.

### **Outlook for housing depends heavily on income and credit conditions**

Since the prewar years, to summarize, construction costs have risen more than other wholesale prices, and residential rents have risen less than other consumer prices. The annual increase in the number of families was high until 1951, but has dropped off sharply since then. The substantial backlog of demand for residential building accumulated from the war years was met by 1950. Real income per worker, in contrast, has been high throughout the war and postwar years, and interest rates and down payments on mortgage loans have been generally low since 1940.

In the early postwar years, then, high incomes and easy credit terms together with a high level of family formation and a backlog of demand accumulated during the war all supported a large volume of residential building. It is not possible during this period to separate the effects of one factor from those of the others in explaining the housing boom.

Since 1950, however, family formation has dropped sharply, and the backlog of demand from the war has been drawn down. It is suggested, then, that the housing boom of the last three years has been sustained by easy credit terms and high real incomes. More and more young adults, attracted by low down payments and liberal repayment terms, have used their high earnings to invest in their own homes. And at the same time, high incomes have made it possible for a high proportion of old people to keep their own households rather than to move in with younger relatives. In the last year, real income per worker has been falling slightly, but on the other hand, credit terms have been easing, and housing starts in 1954 have been maintained at only slightly below the early 1953 level.

The combination of a low level of family formation and a high level of housing starts, which has characterized the residential construction industry since 1950, may be a cause for concern in the long run. It is possible for this combination to exist for a while because of the "slack" in the relation between population and housing—that is, the variability in the number of families doubling up, the average age of marriage, the tendency of unmarried adults to live alone or with family or roommates, and the tendency of old people to move in with relatives rather than maintain their own households. After a few years of high construction activity and low family formation, this "slack" might become exhausted. The average age of marriage may settle at some lower limit, the doubling up ratio may fall nearly to zero, and so forth. In such a situation, it is hard to see how a high rate of housing starts could be maintained even with the aid of high incomes and easy credit terms.

There still appears to be sufficient "slack" in the relationship between population and housing so that income and credit terms are playing an important role in determining the volume of housing starts at present. Whether or not the "slack" will be sufficient over a longer period to permit rising income and easy credit to support a high rate of starts is, of course, a matter of conjecture. The longer the period of low or moderate family formation, the greater is the likelihood the "slack" may run out. After 1960, when the level of family formation is expected to rise again, income and credit terms may again be crucial variables in determining whether there is to be a high level of housing starts or not. Between now and 1960, however, whether high incomes and easy credit terms can sustain a high level of residential construction depends on how much "slack" still remains in the relation between population and housing.

---

### **RUBBER AND THE TWELFTH DISTRICT**

**N**ATURAL rubber was one of the most critical raw materials in short supply during World War II because of the dependence of the United States on imports of natural rubber from abroad. At the outbreak of war in the Pacific in 1941, the United States was filling 95 percent of her rubber requirements in Southeast Asia. When most of that area was overrun by the Japanese in 1942, the United States was cut off from her major source of rubber with less than one year's supply on hand even though she had already begun to accumulate a stockpile of natural rubber.

Since military and industrial demands called for substantial quantities of this strategic commodity, immediate efforts were made to assure an adequate supply for these purposes. Controls were imposed on civilian rubber consumption, nonessential uses were curtailed, and Government allocations rationed available supplies to industrial users. Rubber production was encouraged in areas unaffected by the war, and the United States Government

worked with private industry in the planning and construction of a synthetic rubber industry. The Government provided the financing and became the owner of the product and of the various properties, which were operated by private firms under contract with the Government.

Production of synthetic rubber in the United States began in 1943 but did not reach significant proportions until 1945. The end of the war in 1945, however, reduced the need for further expansion of production. Many plants were closed and placed in standby in 1946, and natural rubber imports were resumed shortly thereafter. The Government considered selling the plants to private industry in 1947, 1948, and 1950, but no legislation was passed. The outbreak of the Korean war in June 1950, meanwhile, necessitated the re-opening of the synthetic rubber plants under Government operation in anticipation of a shortage of rubber, and Government stockpiling of natural rubber was accelerated. At that time, output of the Government plants in operation was 465,000 long

tons on an annual basis, and the stock of new rubber, natural and synthetic, was adequate for only six weeks of production.

When the Korean war ended in 1953, a major part of the Government stockpiling program for natural rubber had been completed, and synthetic rubber production had been expanded. Attention, therefore, was turned again to the feasibility of selling the Government-owned synthetic rubber capacity to private operators. The Rubber Producing Facilities Disposal Act accordingly was passed by Congress in June 1953, providing for the disposal of the Government plants to private owners.

The rubber situation is of great interest to the Twelfth District, both directly and indirectly. Natural rubber is one of the leading imports in the District, especially for California and, in particular, the Los Angeles customs district. Several Government synthetic rubber facilities are located in southern California and are among the plants for sale under the Government disposal plan. Furthermore, experiments were conducted in California during World War II for the purpose of developing a guayule industry as an alternative source of rubber. Finally, rubber fabricators and dealers in the District form an important segment of the United States rubber industry which consists of about 1,000 rubber products manufacturers.

#### *The rubber industry in the District*

In 1947,<sup>1</sup> the value of products shipped by the rubber industry in the District totaled \$178 million, about 7 percent of total shipments by the industry in the United States. California itself ranks second only to Ohio in the manufacture of tires and inner tubes.

Although California's share in the nation's rubber industry remained fairly constant from 1939 to 1947, the industry in California, the only state in the District in which it is important, has shown strong growth features. Value added by manufacture rose 215 percent from 1939 to 1947, compared with 221 percent for the United States as a whole. During the same period the number of establishments increased 72 percent, while the national increase was only 47 percent. More recent figures for California are not available, but the additional 34 percent increase in value added for the United States rubber industry from 1947 to 1952 indicates the general growth of the industry since 1947.

Employment figures also point up the growth of the industry in California. From 1939 to 1952, average monthly employment increased by 136 percent while total annual wages increased 499 percent. In 1953, monthly employment averaged 16.6 thousand workers, 5 percent above the 1952 average.

In California, the tire and inner tube industry accounted for 81 percent of the \$76 million of value added in 1947 by the rubber products industry, an increase of 231 percent over 1939 in the dollar volume of value added.

<sup>1</sup>1947 is the latest year in which the Census of Manufactures provides a complete breakdown of rubber products data by state.

In contrast, the tire and inner tube industry in the United States, including about 20 firms, accounted for only 50 percent of total value added by the rubber products industry although more than two-thirds of all rubber consumed in the United States goes into the production of tires, inner tubes, and tire repair materials.

Los Angeles is the center of rubber industry production in California. In 1947 more than 90 percent, or \$71 million, of the value added by the industry was accounted for by the Los Angeles metropolitan area. Of the approximately 86 rubber firms in the area, the five tire and inner tube firms contributed more than four-fifths of the value added and more than two-thirds of total annual wages and monthly employment.

#### *The synthetic rubber industry in the District*

In addition to the rubber fabricators in the District, there are several synthetic rubber facilities. They were built during World War II in southern California—partly for strategic considerations and partly because of ready accessibility to the necessary raw materials. Originally, this District had five out of the 51 facilities that were constructed in the nation as a whole for the purpose of producing either the various feedstocks for the synthetic rubber plants or the rubber itself. The District facilities included three petroleum butadiene plants, one styrene plant, and one facility (a copolymer plant) which produces a general-purpose rubber (GR-S) from the products of the butadiene and styrene plants.<sup>1</sup> One crude butadiene plant, originally constructed as part of the facilities of a southern California utility company, was dismantled in 1949, however.

The four remaining facilities in this District are among the 27 that are now up for sale by the United States Government. Pending final negotiations on the bids submitted on May 27 and approval of the disposal plan, the plants are being administered by the Treasury Department since the demise of the Reconstruction Finance Corporation on June 30, 1954.

The styrene plant in Los Angeles, the only remaining Government-owned styrene plant, supplies about one-third of the styrene used in the Government's rubber program. This facility, now operated by a major chemical firm, supplies the West Coast copolymer plant and also a portion of the needs of the Texas copolymer plants. Moreover, under special arrangements with private producers in other parts of the United States, the California plant supplies some private customers in its area under an exchange arrangement designed to minimize shipping costs. The butadiene plant, however, supplies only the Los Angeles copolymer facility, although it obtains some of its raw material from outside the District. The synthetic rubber plant supplies all of the major West Coast tire and rubber firms with their current synthetic rubber requirements.

<sup>1</sup>GR-S rubber is composed of butadiene, 77 percent, and styrene, 23 percent.

Altogether, these District plants cost the United States Government about \$65 million, excluding the cost of expanding petroleum facilities to refract butadiene. An additional \$4.5 million was spent subsequently for expansion and improvements. Since their construction, these plants have produced 450,000 long tons of GR-S rubber, 250,000 short tons of butadiene, and 300,000 short tons of

styrene, slightly less than 10 percent of total Government output and a percentage corresponding fairly closely to their share of total Government capacity.<sup>1</sup> The annual capacity of the copolymer plant is 89,000 long tons; that of the two butadiene plants, 61,000 short tons; and that of the styrene plant, 57,000 short tons.

<sup>1</sup> These figures do not include output of the Louisville, Kentucky plant and other plants sold earlier.

### Natural Rubber

The term "natural rubber" is most commonly associated with the product of the rubber tree, *Hevea brasiliensis*. The *Hevea* tree is a native of South America where it grows in wild form in the Amazon Valley region. But most of the world's rubber production is now centered in Southeast Asia where the British introduced the rubber tree at the turn of the century to replace disease-infested coffee plants. The rubber plants flourished in their new environment and cultivation subsequently spread over most of Southeast Asia.

#### *The United States is the largest consumer of natural rubber*

The United States is by far the largest consumer of natural rubber, accounting for 52 percent of total world consumption in 1935-39 and about one-third for the past three years. The only other country which consumes a substantial amount is the United Kingdom, which used 11 percent of the world total in 1935-39 and about 14 percent in 1952 and 1953. In 1951-52 Russia's consumption of natural rubber was estimated at about 10 percent of the world total, the third highest. Estimated consumption for 1953, however, had fallen to 6 percent.

In 1953 imports of natural rubber into the United States were 54 percent greater in volume than in 1938. But the peak had been reached in 1950 and 1952 when the volume of rubber imports was 92 percent above the 1938 level. Because of price increases, the value of rubber imports rose even more sharply, reaching a peak in 1952 of \$184 million, more than four times the 1938 value.

#### *Malaya and Indonesia are the principal suppliers of natural rubber imports*

More than 95 percent of United States natural rubber imports are shipped from the countries of Southeast Asia. British Malaya was the principal supplier in 1938, contributing 59 percent of United States rubber imports by

volume, followed by Indonesia (then the Netherlands East Indies) with 27 percent, and Ceylon with 6 percent. Since the end of World War II, however, the position of Malaya in United States rubber trade has declined. Indonesia increased her share in the rubber trade to 38 percent in 1952 and 43 percent in 1953, while Malaya supplied a declining share—38 percent in 1952 and 30 percent in 1953. Other Asian countries, Africa, and some Latin American nations supplied the remainder.

The shift in sources of supply for the United States has followed rather closely the shift in world rubber production. From 1935 to 1939 British Malaya was the leading producer of natural rubber and Indonesia was second. These two countries accounted for more than three-fourths of total world production in those years. Although there was some damage to the rubber plantings during World War II, the conclusion of hostilities found the rubber plantations in fairly good condition. But in the immediate postwar period, political and economic unrest in Southeast Asia prevented the early resumption of rubber production, particularly on the rubber estates in Indonesia.

Nevertheless, British Malaya's rubber production after the war exceeded prewar levels by 1948. Production in that year was almost 40 percent above the 1937 level. Production in Indonesia reached prewar volume in 1950 and for the past four years, 1950-53, has surpassed that of Malaya because of higher-yielding acreage. During 1953, however, Malaya maintained her current rate of production, while Indonesia's production declined slightly as native production, which accounts for more than half of her rubber production, fell as a result of low prices.<sup>1</sup>

<sup>1</sup> When prices are low, it is the native producers that retire from the market. In British Malaya, on the other hand, where estate production accounts for approximately 60 percent of total rubber production, production tends to be maintained even if prices are not remunerative. The fact that lower grades of rubber receive lower prices also affects Indonesian production to a greater extent because native producers supply the major proportion of the lower grades.

### WORLD NATURAL RUBBER PRODUCTION

(thousands of long tons)

Year	Ceylon	India	Indo-China	Indonesia	British Malaya	Sarawak	Other Asia	Africa	Brazil	Other Latin America	Oceania	Total
1935-39 Avg. ....	59	14	50	351	392	21	46	11	14	5	1	964
1940-44 Avg. ....	99	17	69	309	280	17	35	33	22	14	2	897
1945 .....	98	16	12	10	9	9	2	54	24	23	2	250
1946 .....	94	16	20	175	404	9	33	47	24	16	1	838
1947 .....	89	16	38	278	646	37	80	39	26	9	1	1,260
1948 .....	95	15	44	432	698	40	128	42	20	9	1	1,525
1949 .....	90	16	43	432	672	39	125	45	21	6	1	1,490
1950 .....	114	16	48	696	694	42	152	55	19	8	2	1,860
1951 .....	105	17	52	814	605	42	144	72	21	9	3	1,885
1952 .....	97	20	63	749	585	32	134	73	26	9	2	1,790
1953 <sup>p</sup> .....	94	21	68	702	574	24	121	76	25	9	3	1,720

<sup>p</sup> Preliminary.

Source: *Commodity Yearbook*, 1952.

IMPORTS OF CRUDE RUBBER AND ALLIED GUMS  
TWELFTH DISTRICT AND UNITED STATES—1950-53

		Shipping weight in millions of pounds				Value in millions of dollars			
		Los Angeles	San Francisco	Twelfth District <sup>1</sup>	United States	Los Angeles	San Francisco	Twelfth District <sup>1</sup>	United States
British Malaya .....	1950	148.7	6.9	155.8	816.8	35.9	1.0	36.9	209.6
	1951	176.9	76.1	256.1	803.3	77.6	35.5	114.4	392.6
	1952	63.4	20.7	113.8	685.0	20.5	8.4	41.9	251.5
	1953 <sup>p</sup>	50.5	0.7	51.2	429.8	10.4	0.2	10.5	102.7
Ceylon .....	1950	5.9	0.7	6.7	141.8	1.6	0.1	1.7	41.4
	1951	1.3	*	1.4	57.4	0.6	*	0.6	30.6
	1952	0.2	0.1	0.3	50.5	*	*	0.1	19.1
	1953 <sup>p</sup>	1.1	...	1.1	20.0	0.2	...	0.2	5.7
Indonesia .....	1950	37.8	1.4	39.2	480.5	9.7	0.3	10.0	112.0
	1951	31.0	2.2	33.2	424.4	14.9	1.0	15.9	199.6
	1952	26.0	1.0	27.5	691.8	6.3	0.2	6.7	219.7
	1953 <sup>p</sup>	48.3	2.8	51.4	631.1	9.2	0.6	9.8	136.3
Thailand .....	1950	2.9	0.2	3.1	237.7	0.5	*	0.6	62.1
	1951	5.2	0.5	5.7	238.8	2.9	0.2	3.1	119.2
	1952	...	...	...	232.7	...	...	...	76.8
	1953 <sup>p</sup>	0.2	0.2	0.4	205.8	**	**	0.1	45.7
Other Asia .....	1950	3.4	0.3	3.7	49.7	1.0	0.1	1.1	11.7
	1951	2.0	0.4	2.4	28.7	1.0	0.1	1.1	15.1
	1952	2.1	0.1	2.2	39.3	0.6	0.1	0.7	14.1
	1953 <sup>p</sup>	1.9	0.1	2.0	65.6	0.5	*	0.5	15.5
All other .....	1950	...	*	*	85.2	...	*	*	25.8
	1951	0.1	*	0.2	102.7	...	*	*	56.8
	1952	0.1	...	0.1	112.6	*	...	*	41.2
	1953 <sup>p</sup>	...	...	*	104.1	...	...	*	27.8
Total .....	1950	198.6	9.5	208.4	1,811.7	48.7	1.5	50.3	462.6
	1951	216.7	79.2	299.0	1,655.3	97.0	36.8	135.1	813.8
	1952	91.8	22.0	143.9	1,811.9	27.6	8.8	49.4	622.3
	1953 <sup>p</sup>	102.0	3.8	106.1	1,456.4	20.3	0.8	21.1	333.6

\*Less than \$50,000 or 0.05 million pounds.

<sup>p</sup>Preliminary.

<sup>1</sup>Includes imports through the San Diego, Oregon, and Washington customs districts.

Source: United States Department of Commerce, Bureau of the Census.

The trend of rubber production in the immediate future is rather unpredictable because of the reappearance of unsettled political and economic conditions in the principal producing areas of Southeast Asia.

#### **Rubber is an important source of foreign exchange for producing countries**

The rubber producing countries are dependent upon this one product for much of their foreign exchange. In this dependence on a single raw material they are similar to many other countries of Asia, Africa, and South America. Rubber was the top-ranking dollar earner for the Sterling Area countries in the prewar period and again in 1952 and 1953. In 1952, Malaya derived 48 percent of her export proceeds from rubber; Ceylon, 25 percent; Thailand, 27 percent; and Indonesia, 44 percent. Rubber exports have also been instrumental in maintaining a favorable trade balance for Malaya and Indonesia during most of the prewar and postwar years.

#### **Price fluctuations a major problem for rubber producers**

This heavy dependence upon rubber as a source of foreign exchange has created problems for the producing countries because of the frequent and unpredictable fluctuations in rubber prices and the inflexibility of the rubber supply. The chart on page 106 shows the rapid and substantial changes in natural rubber prices in the prewar and postwar periods.

The inauguration of the Stevenson Plan<sup>1</sup> by the British in 1922 pushed up prices from an average of 17.5 cents

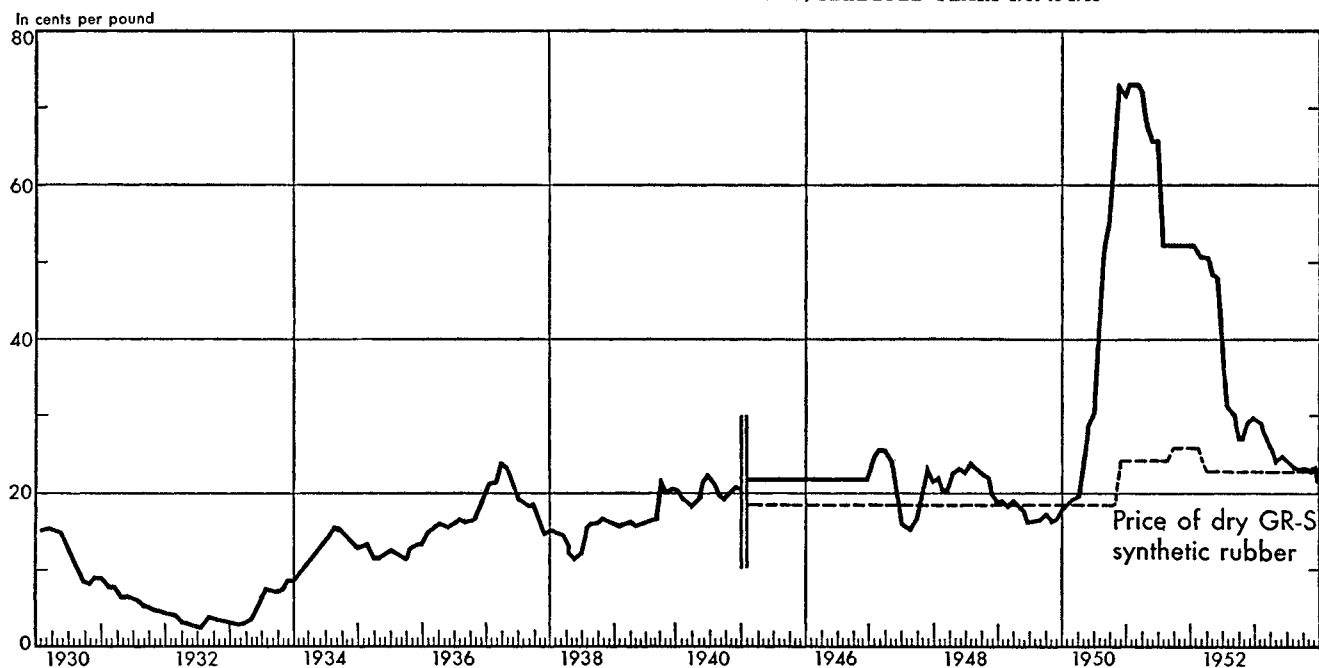
<sup>1</sup>The Stevenson Plan, which included the rubber producing areas of the British territories, was one of the first attempts after World War I at governmental control of raw materials. The price of rubber was to be maintained through the restriction of exports. Each individual grower restricted his rubber exports to a certain percentage of a "standard production" figure based on production for the year ending October 31, 1920. If the price rose above, or fell below, certain limits, exports were adjusted by 5 or 10 percent, respectively.

per pound to a temporary high of \$1.25 in 1925. But the price dropped by 1928 to an average of 22.5 cents as areas outside the scheme increased their production. Prices fell even further with the onset of the depression, reaching a low of 2.7 cents in 1932. The formation of the International Rubber Regulation Agreement<sup>1</sup> in 1934 was a new effort designed to increase prices through export quotas. The Agreement succeeded in reducing burdensome stocks but only dampened the price swings. The threat of war in the Pacific area and its actual outbreak in 1941, however, removed the need for further regulation of output because rubber demand rapidly exceeded available supplies. Prices remained relatively stable during the war and immediate postwar periods because of price controls and rationing in the United States, the principal market for rubber. But this price stability was abruptly terminated by the outbreak of the Korean war in 1950. The price of No. 1 ribbed smoked sheets soared from 30.9 cents per pound in June 1950 to a peak of 73.5 cents per pound by January 1951. It began to decline by the end of 1951, however, as global defense and rearmament needs tapered off, and had fallen to 23.4 cents per pound by the end of June 1954.

#### **The effects of Government programs on natural rubber**

Since 1941, United States Government rubber stockpile programs have contributed to the pressure on natural rubber prices. Government purchases helped to push up rubber prices in the early months of the Korean war to

<sup>1</sup>The International Rubber Regulation Agreement members were the United Kingdom, India, France, the Netherlands, and Thailand, and areas under their control. Altogether they accounted for 98 percent of world productive capacity. Under this scheme, each producing country was assigned a basic quota, which could be varied from year to year, taking into account new plantings, replacements, etc. Exports were then based on changing percentages of the basic quotas.

AVERAGE SPOT CRUDE RUBBER PRICES<sup>1</sup> IN NEW YORK, SELECTED YEARS 1930 to 1953

<sup>1</sup> Ribbed smoked sheets, plantation rubber.

Sources: International Commodity Yearbook and United States Department of Labor, Bureau of Labor Statistics.

such high levels that the United States temporarily suspended its purchases in October 1950. When rubber prices began to decline, the Government resumed its purchases. At the present time, the rubber stockpiling program is almost completed and the rate of stockpiling has declined.

Imposition of mandatory consumption orders and controls on the importation of rubber, on the other hand, relieved some of the pressure on rubber prices during World War II and the postwar period. Orders were issued requiring a certain percentage of synthetic rubber in rubber products. Exclusive Government importation of rubber—from February 7, 1942 to May 1, 1947 and from April 2, 1951 to March 3, 1952—further affected trade in natural rubber. Controls over the importation and sale of natural rubber were removed by April 1952, but were replaced by a directive setting minimum consumption levels for the two principal types of Government-produced synthetic rubber. Consumption of these two types of synthetic rubber, however, was well above these minima. The order was canceled in November 1953.

#### **Supply of natural rubber not responsive to changes in demand**

The problem of marked price fluctuations of natural rubber is affected not only by changes in the demand situation but also by the characteristics of its supply. The supply of natural rubber is not responsive to changes in demand because output cannot be significantly increased within a short period of time to meet increased demand. It takes a rubber plant seven years to mature, and it reaches its greatest productivity around the age of 12 or 13 years. Some increase in output can be achieved tempo-

rarily by over-tapping, but with a consequent reduction in productivity in the long run. As a result, if new plantings are made in anticipation of a continued high level of demand, there is no assurance that market conditions will not have changed when the trees are ready for tapping seven years later.

Some reduction in supply may occur when the price falls so low that the native producers, who are the marginal producers, withdraw from the market. Additional reduction may also result by not tapping the trees for a few years. The estate producers, however, usually continue to produce even with low prices because of large, fixed investments. Because of this inability to adjust supplies to meet demand, natural rubber producers must contend with the effects of drastically lower prices in the face of a sudden drop in demand or the windfall profits of a rapid rise in demand such as that occasioned by war-time emergencies.

#### **Buffer stock scheme**

As a cushion against the pronounced price instability of natural rubber, attributable largely to inelasticity of supply, a buffer stock program has frequently been suggested. Under such a program, a stockpile of rubber would be maintained in the principal consumer countries to minimize price fluctuations by purchases for the stockpile during periods of surplus and by sales in times of shortages. This proposal was discussed in October 1953 at a management committee meeting of the International Rubber Study Group<sup>1</sup> of which the United States is a

<sup>1</sup> A voluntary consultative study group composed of the principal rubber-producing and consuming countries.

IMPORTS OF NATURAL RUBBER—TWELFTH DISTRICT AND UNITED STATES  
1938 and 1950-53

	Shipping weight in thousands of pounds					Value in thousands of dollars				
	1938	1950	1951	1952	1953	1938	1950	1951	1952	1953
San Diego .....	.....	.....	3,091	30,083	.....	.....	.....	1,315	13,062	.....
Los Angeles .....	55,595	198,613	216,675	91,825	102,006	7,798	48,702	96,972	27,582	20,284
San Francisco .....	6,752	9,483	79,194	21,979	3,794	925	1,534	36,797	8,786	782
Oregon .....	181	239	.....	27	26	26	50	.....	6	51
Washington .....	11	34	.....	.....	66	2	8	.....	.....	14
Twelfth District .....	62,539	208,369	298,960	143,914	106,112	8,750	50,294	135,084	49,437	21,131
United States .....	945,668	1,811,662	1,655,269	1,811,943	1,456,403	133,501	462,617	813,793	622,345	333,632

Source: United States Department of Commerce, Bureau of the Census.

member. No progress was made, however, because of United States opposition to the plan.<sup>1</sup>

### Natural Rubber Imports Into The Twelfth District

The Los Angeles customs district is the principal importer of natural rubber in the Twelfth District since much of the rubber fabricating industry in the District is located in southern California. In 1938, rubber imports accounted for 18 percent of total import value into the Los Angeles customs district. In 1950 and 1951, the percentages were even higher—24 and 36 percent, respectively—because the Korean war stimulated natural rubber imports. As these defense needs were gradually satisfied, imports declined, falling to 13 percent of import value in 1952 and 8 percent by 1953. The volume of natural rubber imported through the Los Angeles customs district was 83 percent higher in 1953 than in 1938. But the increases in volume from 1938 to 1950 and 1951 were even greater—257 and 290 percent, respectively, as shown in the above table.

<sup>1</sup>In general, the United States is opposed to participation in international commodity agreements. The Randall Commission report to the President also incorporates this view: "The Commission does not believe that extensive resort to commodity agreements will solve the problem of price instability; and it believes that such agreements introduce rigidities and restraints that impair the elasticity of economic adjustment and the freedom of individual initiative, which are fundamental to economic progress. Moreover, the types . . . thus far tried or proposed . . . involve commitments which could lead, if extensively employed, to very great outlays of United States Government funds in certain contingencies, of indeterminable amounts."

The San Francisco customs district is the only other customs district on the Pacific Coast which imports a large quantity of natural rubber. In 1938 and again in 1950 and 1952, natural rubber imports accounted for approximately 2 percent of that district's total import value. The peak was reached in 1951 when rubber imports accounted for 9 percent of San Francisco's import value. Imports of rubber by weight also increased greatly over prewar levels. Imports in 1953, however, declined sharply in both volume and value.

San Diego imported 30 million pounds of rubber, valued at \$13.1 million, in 1952. As a rule, however, the Oregon, Washington, and San Diego customs districts import only small quantities of natural rubber.

The Twelfth District obtained about three-fourths of its natural rubber from British Malaya in 1938 and 1950-52. Malaya's share rose to a peak of 86 percent in 1951. In contrast, the United States obtained less of its supply in 1938 from Malaya, and postwar imports from that country have fallen sharply. Indonesia was the District's second largest supplier, providing about one-fifth of the Pacific Coast's imports of rubber in 1938 and 1950-52. This relationship was altered drastically in 1953, however, as Malaya and Indonesia shared the Pacific Coast market almost equally.

### Synthetic Rubber

Synthetic rubber comprises any of those man-made rubbers produced through chemical polymerization of hydrocarbons. Several types of synthetic rubbers are produced in the United States: GR-S, a general purpose rubber substitutable for natural rubber in bulk uses such as passenger car tires; butyl rubber, known for its excellent air retention qualities which make it suitable for inner tubes; and neoprene and the N-type rubbers, for special uses. Only the GR-S and butyl rubbers are being produced in Government facilities, with GR-S production comprising the major proportion of total output.

Synthetic rubber production in the United States was essentially a wartime development, although the first synthetic rubber plant in this country came into operation in 1934. In 1941-44 the United States Government invested \$700 million for the construction of facilities to produce the necessary raw materials and the finished synthetic rubber. Synthetic rubber production reached its wartime peak in 1945. By the end of World War II, the

industry was supplying about 85 percent of the United States' wartime rubber requirements.

At the present time, the United States accounts for 91 percent of world synthetic rubber production and consumption. Government-owned capacity of 950,000 long tons annually accounts for 91 percent of total United States synthetic rubber capacity.<sup>1</sup>

### The Rubber Producing Facilities Disposal Act

Under the terms of the Disposal Act, the Rubber Producing Facilities Disposal Commission, consisting of three persons selected from the field of private business, was set up to consider the proposals submitted by firms interested in acquiring the Government facilities and to negotiate with the bidders. By the deadline date of May 27 of this year, thirty-six companies had submitted 75 bids (including first- and second-choice bids).

<sup>1</sup>Because the different types of rubber now being produced under the Government program do not permit full utilization of existing facilities, the effective capacity is only about 910,000 long tons.

In acting on these bids and in formulating the disposal plan, the Commission must comply with certain provisions set forth in the Act. It must not violate existing anti-trust legislation, and it should assure a fair share of synthetic rubber output for small fabricators and manufacturers. It must take into consideration national security. It must make provision for an adequate supply of synthetic rubber in case of emergencies; the Act specifies the maintenance of private capacity to produce a minimum of 500,000 tons of GR-S and 43,000 tons of butyl annually. It must also be able to realize the full, fair value of the facilities to the Government, currently estimated at about \$518 million. Final sale, however, will not take place earlier than April 31, 1955, under the schedule set forth in the legislation. If the various conditions are not met, the disposal plan may be canceled.

### **Prospects for the disposal of the West Coast rubber plants**

In addition to the general problems pertaining to the disposal of the synthetic rubber industry as a whole, there are some special problems for the facilities in this District. One is the problem of the availability of butylene, which is also a component of aviation gasoline. Another concerns the need for making a decision as to the desirability of maintaining synthetic rubber production on the West Coast at all. The Steelman report to the President<sup>1</sup> in 1950 on the disposal of the synthetic rubber plants declared that "in view of the geographical location of the plants, the relatively high taxes and utilities, and the limited demand for GR-S on the West Coast, the operation of the butadiene and copolymer facilities under present circumstances does not appear attractive." The closely integrated operations of the Los Angeles facilities may also make the disposal of these plants difficult in view of the anti-monopoly provisions of the Disposal Act.

### **The Outlook for Natural and Synthetic Rubber**

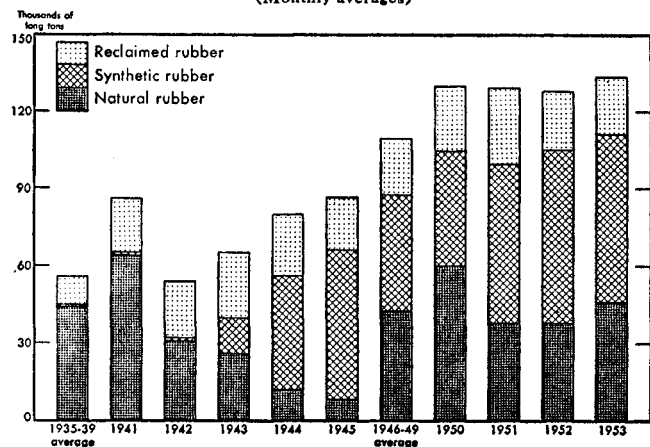
#### **Consumption of synthetic rubber has risen since the Korean war**

Since 1946, there has been a significant change in the outlook for synthetic rubber. In the immediate postwar years, competition from natural rubber was expected to reduce production of synthetic rubber. But the failure of natural rubber production to increase as anticipated and the high level of natural rubber prices changed the outlook for synthetic rubber to expectations of increasing production and demand.

From 1935 to 1939, natural rubber accounted for almost 80 percent of total rubber consumption in the United States, and reclaimed rubber accounted for the remainder. Shortly after the outbreak of war in 1941, the share of natural rubber in total consumption fell rapidly, while reclaimed rubber was used to an increasing extent until the synthetic rubber facilities came into operation.

<sup>1</sup>Steelman, John R., *A Report to the President on the Maintenance of the Synthetic Rubber Industry in the United States and Disposal of the Government-Owned Synthetic Rubber Facilities* (January 1950).

**CONSUMPTION OF NATURAL, SYNTHETIC, AND RECLAIMED RUBBER—UNITED STATES, 1935-1953**  
(Monthly averages)



Source: United States Department of Commerce, Office of Business Economics, *Business Statistics*, 1953.

From 1946 to June 1950, natural rubber proceeded to regain its place as the leading rubber consumed. But the Korean war gave new impetus to synthetic rubber production. Since 1951 synthetic rubber has accounted for almost 50 percent of total rubber consumed in the United States.

#### **Demand for new rubber expected to rise sharply**

Recent surveys indicate that world demand for new rubber, natural and synthetic, will increase at a rapid rate. World consumption of new rubber totaled about 2.3 million long tons in 1952 and 2.4 million long tons in 1953, about two-thirds of which was natural rubber. By the end of 1975, new rubber demand may reach five million long tons per year.<sup>1</sup> According to a report of the Reconstruction Finance Corporation issued in March 1953, the deficiency of world natural rubber supplies is expected to reach 1.1 million long tons by 1958<sup>2</sup> and 2.5 million long tons in 1975, although there is currently a surplus of natural rubber. If these estimates are correct, the anticipated gap between world demand for new rubber and the natural rubber supply may have to be filled by the synthetic rubber industry. Even though natural rubber production has been increasing, with improved yields and improved methods of cultivation, it may not be able to increase at a rate sufficient to fulfill consumption needs. United States synthetic rubber capacity would then have to be expanded from its present rated capacity of about 1,050,000 long tons annually to help fill the gap.

#### **Natural rubber superior in certain uses**

Natural rubber is still found to be qualitatively superior to synthetic rubber in certain uses such as in large tires for busses, trucks, and aircraft. It is also considered better than synthetic rubber for surgical, industrial, and certain military uses and for purposes where extremes of

<sup>1</sup>Report of the President's Materials Policy Commission (Paley report).

<sup>2</sup>Rubber industry estimates.

temperature are encountered. These uses form but a small part of total demand, however.

On the other hand, butyl rubber has been found to be superior to natural rubber for inner tubes, while GR-S rubber is satisfactory for passenger car tires. The development of cold rubber<sup>1</sup> with its better wearing qualities and the continuing research program for new and improved types of synthetics will in all probability extend the uses for synthetic rubber in the near future.

#### **Higher prices for synthetic rubber under private ownership possible**

If natural and synthetic rubber become interchangeable in many uses, the prices of natural and synthetic rubber will determine the demand for each. Synthetic rubber prices were originally set at 18½ cents per pound in 1944 and were gradually increased to 26 cents per pound by September 1951. But the price was reduced in March 1952 to its present level of 23 cents per pound (for dry GR-S) because of lower costs.

The price of synthetic rubber may be somewhat higher under private ownership because of higher feedstock costs, capital costs, depreciation expenses, selling expenses, research and development costs, and income taxes. Higher costs may also arise from operation at less than optimum capacity, less integration in the industry, and greater diversification of synthetic products to meet customer demands. Because of its superiority for some purposes, synthetic rubber will probably be able to compete with natural rubber, particularly while demand for rubber continues strong, even if the price of natural rubber were slightly below that of synthetic.

#### **Alternative sources of rubber**

If Government-owned synthetic rubber production and natural rubber imports are unable to satisfy future consumption needs, there are two possible alternative sources of supply: reclaimed rubber and rubber from guayule. The United States reclaimed rubber industry now consists of about 20 firms, including several subsidiaries of the major rubber companies. It employs about 6,000 workers and has a capacity of 300,000 to 325,000

<sup>1</sup>Rubber produced at 41°F compared to 120°F for standard synthetic rubber.

long tons of reclaimed rubber per year. The industry, however, plans to expand its capacity about 30 percent. Production would then approximate 500,000 long tons per year, about 38 percent of estimated total new rubber consumption at the present rate.

Guayule, the other possible source, is a shrub-like plant which produces a satisfactory rubber, but this alternative is expensive and not too practical.

#### **Conclusion**

Imports of natural rubber into the United States are expected to continue around present levels, at least for the immediate future.<sup>1</sup> The tire and tube industry hopes to offset a decline this year in its sale of original equipment tires by increased replacement demand. Nontire uses will also help to maintain natural rubber imports. Consumption of foam rubber in particular has shown remarkable growth; by 1952 consumption was six times the 1947 level. The stretch-out or cancellation of some military contracts and a slowing down in the Government stockpiling program, however, are expected to reduce demand somewhat.

Because of the growth of the market in the West, the rubber situation in the District appears favorable. Several rubber companies are planning, or have planned, plant expansions for added capacity. Imports of natural rubber into the District are likely to remain around the 1952-1953 rate, or about 50 percent above prewar levels. Furthermore, if the synthetic rubber facilities in the Los Angeles area continue in operation, the nearness of a synthetic rubber supply will be a further locational advantage to rubber manufacturers in the District.

<sup>1</sup>Although in the longer run a rising world demand for rubber is forecast, a large share of the increased demand is expected to come from Europe and other areas outside the United States.

---

*Correction:* In the table at the top of page 95 in the June MONTHLY REVIEW, Twelfth District production of copper in the first quarter of 1954 should read 166 thousand short tons, not 165 thousand; and Twelfth District copper production as a percent of United States copper production in the first quarter of 1954 was 78.7 percent, not 78.2 percent.

In the text beneath the table, it is stated that production of copper, lead, and zinc in the seven western states dropped by 9, 16, and 27 percent from the first quarter of 1953 to the first quarter of 1954. These figures should read 9, 13, and 26 percent.

**BUSINESS INDEXES—TWELFTH DISTRICT<sup>1</sup>**  
(1947-49 average=100)

Year and month	Industrial production (physical volume) <sup>2</sup>								Total nonagricultural employment <sup>3</sup>	Total mfg employment <sup>4</sup>	Carloadings (number) <sup>5</sup>	Dep't store sales (value) <sup>6</sup>	Retail food prices <sup>7</sup>	Waterborne foreign trade <sup>8</sup>	
	Lumber	Petroleum <sup>9</sup>		Cement	Lead <sup>10</sup>	Copper <sup>11</sup>	Wheat flour <sup>12</sup>	Electric power						Exports	Imports
		Crude	Refined												
1929	97	87	78	54	165	105	90	29	....	....	102	30	64	190	124
1931	51	57	55	36	100	49	86	29	....	....	68	25	50	138	80
1933	41	52	50	27	72	17	75	26	....	....	52	18	42	110	72
1935	54	62	56	33	86	37	87	30	....	....	47	66	24	135	109
1937	74	71	65	56	114	88	84	38	....	....	60	81	30	170	119
1938	58	75	64	45	92	58	81	36	....	....	51	72	28	164	87
1939	72	67	63	56	93	80	91	40	....	....	55	77	31	163	95
1940	79	67	63	61	108	94	87	43	....	....	63	82	33	172	101
1941	93	69	68	81	109	107	87	49	....	....	83	95	40	182	114
1942	93	74	71	96	114	123	88	60	....	....	121	102	49	190	124
1943	90	85	83	79	100	125	98	76	100	164	99	59	69	170	119
1944	90	93	93	63	90	112	101	82	101	158	105	65	68	170	119
1945	72	97	98	65	78	90	112	78	96	122	100	72	70	170	119
1946	85	94	91	81	70	71	108	78	95	97	101	91	80	170	119
1947	97	100	98	96	94	106	113	90	99	100	106	99	96	129	81
1948	104	101	100	104	105	101	98	101	102	102	100	104	103	86	98
1949	99	99	103	100	101	93	88	108	99	97	94	98	100	85	121
1950	112	98	103	112	109	115	86	119	103	105	97	105	100	91	137
1951	114	106	112	128	89	115	95	136	111	122	100	109	113	186	157
1952	107	107	116	124	86	112	96	144	118	132	101	114	115	171	200
1953	111	109	123	130	74	111	96	161	122	139	100	116	113	140	308
1953															
May	114	109	127	142	75	115	91	167	122	140	102	124	113	118	384
June	110	110	121	134	77	105	99	179	122	141	103	121	113	114	372
July	112	110	125	140	64	106	96	172	121	142	98	117	113	123	356
August	108	109	124	134	69	110	92	168	122	139	99	114	113	127	337
September	100	109	126	133	73	111	101	166	124	140	98	110	114	129	368
October	106	109	125	137	69	112	99	163	123	141	95	111	114	133	316
November	106	110	121	128	69	112	98	157	121	137	97	112	113	139	287
December	108	109	125	120	67	104	96	158	121	138	102	109	113	141	256
1954															
January	116	109	121	114	60	107	99	163	121	138	93	108	114	108	210
February	114	109	120	117	79	102	97	160	121	137	90	107	114	156	271
March	115	108	118	116	76r	99r	98	171	120	136	94	111	113	154	233
April	117	107	119	134	71r	98	96	168	120	136	99	111	113	....	....
May	116	107	123	143	66p	103p	96	163	120p	136p	97	114	114	....	....

**BANKING AND CREDIT STATISTICS—TWELFTH DISTRICT**  
(amounts in millions of dollars)

Year and month	Condition Items of all member banks <sup>1</sup>				Bank rates on short-term business loans <sup>2</sup>	Member bank reserves and related items <sup>3</sup>					Bank debits index 31 cities <sup>4</sup> (1947-49=100) <sup>5</sup>
	Loans and discounts	U.S. Gov't securities	Demand deposits adjusted <sup>6</sup>	Total time deposits		Reserve bank credit <sup>7</sup>	Commercial operations <sup>8</sup>	Treasury operations <sup>9</sup>	Coin and currency in circulation <sup>10</sup>	Reserves	
1929	2,239	495	1,234	1,790	.....	- 34	0	+ 23	- 6	175	42
1931	1,898	547	984	1,727	.....	+ 21	- 154	+ 154	+ 48	147	28
1933	1,486	720	951	1,609	.....	- 2	- 110	+ 150	+ 18	185	18
1935	1,537	1,275	1,389	2,064	.....	+ 2	- 163	+ 219	+ 14	287	25
1937	1,871	1,270	1,740	2,187	.....	- 1	- 90	+ 157	- 3	549	32
1938	1,869	1,323	1,781	2,221	.....	- 3	- 240	+ 276	+ 20	565	29
1939	1,967	1,450	1,983	2,267	.....	+ 2	- 192	+ 245	+ 31	584	30
1940	2,130	1,482	2,390	2,360	.....	+ 2	- 148	+ 420	+ 96	754	32
1941	2,451	1,738	2,893	2,425	.....	+ 4	- 596	+1,000	+ 227	930	39
1942	2,170	3,630	4,356	2,609	.....	+ 107	-1,980	-2,826	+ 643	1,232	48
1943	2,106	6,235	5,998	3,226	.....	+ 214	-3,751	-4,486	+ 708	1,462	60
1944	2,254	8,263	6,950	4,144	.....	+ 98	-3,534	-4,483	+ 789	1,706	66
1945	2,663	10,450	8,203	5,211	.....	+ 76	-3,743	-4,682	+ 545	2,033	72
1946	4,068	8,426	8,821	5,797	.....	+ 9	-1,607	+1,329	+ 326	2,094	86
1947	5,358	7,247	8,922	6,006	.....	- 302	- 510	+ 698	- 206	2,202	95
1948	6,032	6,366	8,655	6,087	.....	+ 17	+ 472	+ 482	- 209	2,420	103
1949	5,925	7,016	8,536	6,255	3.20	+ 13	- 930	+ 378	- 65	1,924	102
1950	7,093	6,415	9,254	6,302	3.35	+ 39	-1,141	+1,198	- 14	2,026	115
1951	7,866	6,463	9,937	6,777	3.66	- 21	-1,582	+1,983	+ 189	2,269	132
1952	8,839	6,619	10,520	7,502	3.95	+ 7	-1,912	+2,265	+ 132	2,514	140
1953	9,220	6,639	10,515	7,997	4.14	- 14	-3,073	+3,158	+ 39	2,551	150
1953											
June	9,151	6,013	9,830	7,753	4.18	- 39	- 531	+ 435	+ 39	2,274	155
July	9,167	6,675	10,005	7,729	.....	+ 75	- 184	+ 275	+ 3	2,452	148
August	9,229	6,589	9,950	7,749	.....	- 100	- 98	+ 176	+ 36	2,397	142
September	9,241	6,481	10,018	7,794	4.17	+ 113	- 308	+ 217	- 4	2,425	149
October	9,255	6,556	10,248	7,854	.....	+ 19	- 391	+ 394	+ 7	2,449	142
November	9,248	6,693	10,255	7,815	.....	- 137	- 149	+ 330	+ 23	2,476	149
December	9,220	6,639	10,515	7,997	4.19	+ 50	- 432	+ 438	- 26	2,551	158
1954											
January	9,198	6,844	10,540	7,995	.....	+ 1	- 308	+ 125	- 86	2,468	146
February	9,176	6,667	10,138	8,071	.....	+ 98	- 245	+ 80	- 2	2,398	153
March	9,106	6,500	9,922	8,175	4.12	- 125	- 213	+ 315	- 29	2,413	158
April	9,045	6,903	10,190	8,234	.....	+ 5	- 324	+ 381	+ 7	2,477	150
May	9,001	6,991	10,045	8,306	.....	+ 9	- 148	+ 136	+ 36	2,432	143
June	9,049	6,981	10,087	8,428	4.14	- 21	- 254	+ 277	+ 15	2,413	157

<sup>1</sup> Adjusted for seasonal variation, except where indicated. Except for department store statistics, all indexes are based upon data from outside sources, as follows: lumber, various lumber trade associations; petroleum, cement, copper, and lead, U.S. Bureau of Mines; wheat flour, U.S. Bureau of the Census; electric power, Federal Power Commission; nonagricultural and manufacturing employment, U.S. Bureau of Labor Statistics and cooperating state agencies; retail food prices, U.S. Bureau of Labor Statistics; carloadings, various railroads and railroad associations; and foreign trade, U.S. Bureau of the Census.  
<sup>2</sup> Daily average. <sup>3</sup> Not adjusted for seasonal variation. <sup>4</sup> Excludes fish, fruit, and vegetable canning. <sup>5</sup> Los Angeles, San Francisco, and Seattle indexes combined. <sup>6</sup> Commercial cargo only, in physical volume, for Los Angeles, San Francisco, San Diego, Oregon, and Washington customs districts; starting with July 1950, "special category" exports are excluded because of security reasons. <sup>7</sup> Annual figures are as of end of year, monthly figures as of last Wednesday in month or, where applicable, as of call report date. <sup>8</sup> Demand deposits, excluding interbank and U.S. Gov't deposits, less cash items in process of collection. Monthly data partly estimated. <sup>9</sup> Average rates on loans made in five major cities during the first 15 days of the month. <sup>10</sup> End of year and end of month figures. <sup>11</sup> Changes from end of previous month or year. <sup>12</sup> Minus sign indicates flow of funds out of the District in the case of commercial operations, and excess of receipts over disbursements in the case of Treasury operations. <sup>13</sup> Debits to total deposits except interbank prior to 1942. Debits to demand deposits except Federal Government and interbank deposits from 1942. <sup>14</sup> Preliminary. <sup>15</sup> Revised.