BUILDING MATERIAL SUPPLY

CONTENTS

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I. SUMMARY

Building material shortages were the primary limiting factors in the volume of housing construction immediately after the end of the war; and at the present time more than two years after V-J Day, the inadequacy of the supply of some key materials, and the high level of building material costs continue to be problems of major importance in the housing and construction situation.

The war construction program had been largely completed by the end of 1943, and, because of wartime restrictions on non-essential building operations, in 1944 and early 1945, the actual physical volume of new construction had fallen back to levels well below those of the late thirties, and about as low as the bottom years of the depression. The production of building materials as such had been cut back accordingly, and those parts of the industry that had not been converted to war production, for the most part were reduced to very low levels of operation, with many plants closed down entirely. Inventories in general were seriously depleted and in some cases appeared to be practically non-existent.

As the first step in improving this situation, the government began to relax controls gradually at the end of May 1945. However, the industry as a whole was in no way prepared to meet the avalanche of demand that followed the loosening of restrictions on construction after V-E Day, and their complete removal shortly after V-J Day. It soon became clear that the size of the potential demand would be unprecedented. Except for a limited amount of construction for the war housing program, housing and other normal construction needs had been deferred over a period of four and a half years, and the pent-up demand for consumer goods resulted in a rush to build new industrial plants and commercial structures. The total demand for residential and non-residential building would have required far more materials production than the highest levels of output that had been previously reached under much more favorable conditions.

An indication of the speed and the force of the impact of construction demand may be seen in the available data on construction contract awards, which are incomplete, but may be taken as representative of the general trend of the effective demand that was translated into finalized plans for building. (Appendix B, Table 2). Between May 1945, when the first relaxations of wartime restrictions were allowed, and October, two months after V-J Day, the reported monthly rate

of contract awards for residential and non-residential buildings nearly doubled. The trend continued sharply upward through the winter months that are normally low for seasonal reasons, and by March 1946 had reached levels about 4 times higher than the previous May. Restrictive controls on both housing and non-residential building were reestablished at the end of March, but despite this fact, the monthly contract rates for buildings, and for other types of construction work as well, in the second quarter of 1946 were virtually as high as in the top months at the peak of the wartime construction program.

The reestablishment of plant operations and restoration of material production even to normal levels would have been a difficult and time-consuming process at best. However, the problems of labor recruitment, procurement of new equipment, and reconditioning of existing plant were greatly complicated by the rapidity with which the reconversion of the rest of the economy proceeded in the months following the close of the war. The predicted period of stagnation and unemployment during the readjustment to peacetime production did not occur, and the general level of industrial activity stayed well above prewar levels despite the cancellation of war contracts. While there was a brief decline in employment, it was to a considerable extent offset by withdrawals from the labor force, and labor recruitment soon became a general problem.

A more fundamental and longer range problem was the enormous competing demand for non-construction uses of the basic raw materials that were needed by a very large part of the building materials industry. Although scarcity of raw materials was not a primary source of difficulty in clay and masonry products, it was a major obstacle to full production of the whole range of building materials fabricated from lumber, iron, and steel, which, in terms of dollar value, represent about two-thirds of all the materials that go into housing construction. The non-construction demand for these basic raw materials accounts for most of the building material shortages that exist at the present time, and that may very well become more serious during 1948.

Despite these obstacles, production of building materials, under the combined intensive efforts of industry and government, was expanded steadily throughout 1946, reaching war peak levels within a year after V-J Day. On the demand side, the government on March 26, 1946 also took action to defer non-veteran demand for housing and for other types of construction that were not essential to full employment and the reconversion of the economy as a whole.

Nevertheless, the impact of the initial imbalance between demand and supply was so strong that unprecedented and almost universal shortages of building materials continued to dominate the construction picture for more than a year and a half after the end of the war, and shortages of a considerable number of indispensable materials have persisted down to the present time.

The shortages not only held down the volume of construction, but have also been responsible to a considerable extent for the extraordinary increases that have occurred particularly in the prices of lumber, which is the most important housing construction material. Despite the fact that the increases in most other building material prices since the end of the war have been less than the average increase in the general price level, the importance of lumber in housing construction is so great that the wholesale price index for all building materials, reflecting the total materials bill in building costs, has increased more than the all commodities index since V-J Day. Past experience shows that a substantial part of the abnormal increases that occurred in nearly all building material prices in the period of shortages immediately after the first World War were retained during the twenties and the thirties, and that there has been a long range upward trend in the average of all building material prices as compared with the general price level.

The current trend of housing starts and non-residential construction activity is indicative of a still higher volume of planned construction in 1948. Unless building material production can be further expanded, and a larger proportion of the basic raw materials becomes available for housing, the result will be further price rises, and a further intensification of the supply problems that are now delaying construction in many parts of the country.

II. THE NEED FOR MORE ADEQUATE INFORMATION ON MATERIAL SUPPLY

Before proceeding to a review of the background of present supply problems and the outlook for the future, it must be pointed out that the factual, quantitative data available on material supply, demand, and distribution are far from adequate. The lack of statistical information in fact precludes any exact or precise measurement of material supply deficits in numerical terms.

The available current statistical reports are limited for the most part to data on production (or on producers' sales or shipments) of most of the broad categories of materials used in building construction. However, even these production reports do not in all cases measure the potential supply available for housing or other construction. Some of the most important raw materials, such as lumber and many of the metal products, also have important non-construction uses that account for a substantial but unknown part of production and distribution.

Except for reports from trade association members in the lumber industry (which do not segregate construction from other lumber), no current data whatever are available on the flow of these materials through the distribution system. Adequate reports on distribution would provide information as to inventory levels; backlogs of unmet demand; the channeling of materials into housing, other construction, or other uses; and as to geographic distribution or maldistribution of available supplies.

With respect to demand or requirements, it is not feasible to attempt to collect direct statistical reports on actual consumption. This would not be practicable partly because of the difficulty and cost of collecting reports from the scores of thousands of contractors who consume the materials in hundreds of thousands of individual projects. Furthermore, any results that could be obtained through such a costly procedure would be of dubious value in projecting future requirements, because of the extreme diversity in types of structures, in construction methods, and in materials usage which could result in substantial shifts in consumption patterns from time to time.

Information on requirements of course was indispensable to the operation of the Veterans' Emergency Housing Program, and within the framework of the controls that were then in effect, it was possible to develop techniques for estimating broad categories of housing and other construction requirements. For non-residential building construction, for example, it was possible through

sample surveys to construct reasonably accurate estimates of average requirements for the principal materials used in the various types of structures that were specifically and individually authorized under the construction limitation order. Housing requirements also could be determined by the use of statistical information on the types of residential buildings authorized under the Federal housing permit system, together with engineering estimates of the materials required to construct representative types of houses. The available data on other sources of demand, such as construction projects other than buildings, maintenance and repair work of all types, and non-construction uses, was less adequate and reliable, and further basic research is needed in those areas.

No comprehensive, detailed information, even on the types of new structures scheduled to be undertaken, has been available since the emergency program went into liquidation. It would be technically possible to develop the required basic information by sampling research methods. However, the curtailment of funds available to the agencies responsible for housing and construction statistics has drastically reduced and restricted all phases of their research and statistical programs, so that there is no adequate basis for up-to-date estimates of requirements of the degree of precision and in the detail needed.

Both industry and government are in need of reliable quantitative data on the demand-supply situation, to determine current and potential requirements, and to define supply problems in concrete terms that can guide industrial and government efforts to solve them. Provision for periodic surveys to produce such data on an adequate basis would put the government and industry in a much better position to evaluate current construction operations, the outlook for this important segment of the economy, and the need for further expansion of productive capacity. In the absence of such data, it has become necessary to rely on rather broad gauge estimating, based on general trends of construction activity and past patterns of apparent material consumption, and on generalized, spot reports of shortages of individual materials in particular localities, which can carry with them no indication of the causes, extent, or probable duration of the problems that have arisen.

III. THE EFFECTS OF MATERIAL SHORTAGES

A. Effects on Construction Volume

The general shortage of materials in 1945 and 1946 had an obvious and drastic effect in limiting the volume of housing and other construction that could be undertaken and completed. The shortages were widespread, virtually no major building material being in adequate supply, and the extent of the deficits was severe, delaying or forestalling construction in every part of the country.

It is of course a fact that the total volume of construction undertaken increased enormously. The number of housing units started in 1946 was three times greater than starts in 1945 and 40 percent more than in 1939; the estimated value of work actually incorporated in housing projects increased more than four times over 1945. The value of work in place on non-residential buildings, which had been at a relatively higher level in 1945, was more than doubled in 1946; the physical volume of work, allowing for price changes was about one-third greater than it had been in 1939.

But while the increases in construction activity were remarkable, they were substantially less than the increases that would have occurred if more materials had been available. After March 1946, the VEHP limited housing c.. construction to homes for veterans, excluding virtually all of the accumulated demand for non-veterans housing that had not yet been started. As to non-residential buildings, while the physical volume of work was the highest for any peacetime year since the depression, it probably would have been twice as high if materials and labor had been available. The value of non-residential applications that were denied under the controlling limitation order after March was almost as great as the volume authorized for construction. Furthermore, the existence of the controls is known to have prevented an additional large volume of ineligible projects from reaching the application stage.

B. Effects on Construction Time

A second important and immediate consequence of the imbalance between demand and material supply was the stretching out of the length of time required to complete construction projects. This not only delayed the availability of housing accommodations, but also brought about substantial increases in the direct costs of housing and other construction.

When it becomes impossible to maintain a steady and certain flow of supplies at the building site, increases in virtually all cost factors in the actual construction operation result. Material costs themselves are increased

by the time and expense involved in locating supply sources, by extra transportation costs, by the necessity of piecemeal buying, and the failure to obtain specifications that fit into the original building plan. The costs of idle or partly idle labor and equipment mount rapidly, and financing costs increase proportionately with the stretchout in construction time.

The significance of this factor is indicated by surveys conducted by the Bureau of Labor Statistics. Available information for periods before the war, when the flow of materials was adequate, indicates that the time required to complete residential building units of all types averaged from three and a half to four months. In the early part of 1946, when materials shortages were most severe, average completion time had stretched out to more than seven months, and in some areas was reported to be as long as eight or nine months. There has of course been substantial improvement since that time, but the length of the building period has not yet been brought back to the pre-war norm, having averaged probably in the neighborhood of $4\frac{1}{2}$ months since last July.

C. Effects on Prices

The longer range effects of an extended period of shortages on material prices, construction costs, and hence on the general level of housing prices, are perhaps less generally recognized. This may be partly because the effects of shortages as such on prices are not so easily isolated. The building material price increases that have occurred since the war are certainly to a considerable extent a reflection of the inflationary trend in the economy as a whole. The basic costs of building materials production to be sure have increased greatly along with the general increase in prices, living costs, wage rates, and costs of equipment, transportation, and other factors.

Nevertheless, the aggregate cost of the building materials required to build the average house, which was already relatively high in 1939, has increased more since 1939 than the general rise in industrial prices; and in terms of the comparative levels that have prevailed in earlier years, the average of building material prices is well above the average for all commodities, including farm products.

There has in fact been a long range upward trend in the building materials average as compared with the general price level. This trend is a product of a series of movements in successive stages of the business cycles since 1918. Building material prices were far more sensitive to the upward pressures of demand that arose in 1919 and 1920, when supply was particularly short; they

held to far higher levels in the collapse of 1921, and in the prosperous years from 1922 to 1929, when consumption requirements were high, but not out of balance with available supply; they were more resistant than most other commodity prices to downward pressures in the deflation and depression years of 1930-1933, and, on the average rose higher during the recovery period up to the beginning of the war in Europe and the war production program in the United States. The gap between the building materials index and other prices was narrowed somewhat during the period of wartime price controls, but since decontrol in November 1946, the increase in the spread has been resumed.

The current upward trend of the building materials index since price decontrol has been due primarily to the unprecedented inflation of lumber prices, which are now 50 percent higher than their inflated peak in 1920, three times as high as in 1926, and five times as high as in the years before the first World War. The prices of other building materials are at high levels, but have not increased as much as the general price level since 1939.

There are of course substantial differences in the production and price economics of the individual materials that make up the housing materials bill, and the several price series have not always followed similar trends, because of varying reactions to the influence of cyclical factors, or because of changing conditions in the producing industries themselves. It is nevertheless true for most of the major types of homebuilding materials for which data are available, that the long range trend of prices relative to the general price level has been upward over the past thirty years. Cement and structural steel are exceptions but the net result of the composite trend, as far as home-builders and home buyers or renters are concerned, has been a gradual increase in the relative cost of the materials that go into a house, in comparison with the average cost of other goods.

These trends are shown in the accompanying charts, based on the Bureau of Labor Statistics indexes of wholesale prices, which are presented in Appendix B, Tables 6 through 6E. The data in the charts are based at 1926 as 100, and the movements in building material prices in relation to the general price level are indicated by the ratio of the material price index to the index for all commodities in each year. Chart 1 for example, shows that, relative to their respective levels in 1913, the building materials price average in 1926 had increased 22 percent more than the all commodities index, the ratio having increased from .81 to 1.0; and that in 1947 the spread between the series is an additional 18 percent wider than it was in ~~the base year~~ 1926, the ratio on the 1926 base now being 1.18 for the first 11 months of 1947.

It will be seen from an examination of the charts, and of Table 6 which shows percentage changes from 1913 as 100, that the inflationary boom following the first World War resulted in very great increases in building material prices as compared with the general price level. This in part reflects the fact that certain major materials, including lumber, brick, and paint, reached peaks far above the general average in 1920. It is also true that none of the building materials prices, excepting steel prices, which are not strongly influenced by construction factors, fell as far as the general average in the deflation which followed in 1921 and 1922.

As the net result, when the average of all wholesale prices in the spring of 1920 reached a point 140 percent above the prewar level, the average for building materials had climbed much higher, to more than 200 percent above the levels of 1913, 1914 and 1915. In the collapse of 1921, when the general index fell off to about 40 percent above 1913, the building materials average also fell, but levelled off in 1921 and 1922 at a point about 70 percent above the prewar level.

In the year 1926, which is the base year currently used for the BLS series, and is generally typical of the prosperous building years of the twenties, the all commodities index was 43 percent above 1913; the comparable increases in building material prices were for brick and tile, 157 percent; for lumber, 85 percent; for paint, 97 percent; for cement, 68 percent; and for miscellaneous materials, 58 percent. Only steel, with a 30 percent increase, showed a smaller than average rise.

As shown in the charts, these relative differentials were maintained in the next three years through 1929, and were substantially increased in the depression which followed. In other words, wholesale price quotations for all types of building materials with the single exception of lumber, fell less than the relative decline in the average price level. Lumber prices, being the most sensitive to supply-demand pressures, fell about 10 percent more than the average for all commodities from 1926 to 1932.

This general resistance of most material prices to deflation is particularly significant, in view of the fact that construction activity in the depression had fallen earlier, faster, and much lower than the general level of industrial activity. Led by a rapid increase in lumber prices, all building material prices began to increase in 1933. The rate was slower than the general price rise in the first years of the recovery, but the gap again began to widen in 1937, and the volume of construction remained at very low levels throughout the thirties, down to the beginning of the war construction program. In

1939, which is frequently cited as the basis for prewar comparisons, the spread between the average indexes was 17 percent greater than it had been in 1926, and 44 percent greater than it had been in 1913.

The prices of all types of building materials have increased year by year at steady, but varying rates since the beginning of the war. During the price control period the percentage increases from their relatively high levels in 1939, 1940 and 1941 was somewhat less than the percentage increase in all commodity prices. There was therefore a downward trend in the ratio for all materials excepting lumber prices, which have swept steadily upward since the bottom years of depression. And in the past year the rise in lumber and paint prices has been so great that the general index of building material costs has again taken an upward trend in relation to the general price level.

In November, 1947, the building materials index reached the highest point on record, about 87 percent above 1926, and 3 1/3 times the 1913 average. The average of all commodity prices was less than 60 percent above 1926, and about 2 1/3 times as high as in 1913.

In summary, the point to be made here is that a substantial part of the abnormal price increases after the last war were retained during and after the depressions of 1921 and 1930; that material costs for homebuilding since the end of price control have again increased abnormally in relation to the general price level; and that if history is allowed to repeat, an important result of the post-war shortage of housing and housing materials may be a relatively permanent increase in the materials bill in housing construction.

A deflation and adjustment of the present high material prices may very well occur, once the most urgent construction needs have been met. The important role of lumber prices in the recent increases in the disparity in the materials index strengthens that probability. A recession in housing construction, in fact, may have been narrowly averted last spring, by a brief slowing down in the rate of increase in lumber prices and therefore in average housing material costs. However, even if high costs lead to a sharp decline in construction volume and prices, as they did in 1920 and 1921, the unprecedented volume of accumulated demand and the present record levels of employment, wage rates, consumer income, and consumer savings are factors making for subsequent stabilization at a higher level than before the war.

It should be noted again that the available data relate to price quotations at the wholesale level. They do not reflect black market prices

during the price control period, or grey market premiums for delivery priority since the end of price control. Nearly all major building materials, excepting possibly masonry products, flow through a more or less complex distribution system of wholesalers or jobbers, retail dealers, and subcontractors, prior to incorporation in the building project. Since the dealers' mark-up is usually determined in percentage terms, an increase in the manufacturer's wholesale price tends to be pyramided at each level of distribution. Conversely, during periods of depression, actual costs to builders at the retail level undoubtedly may decline more than wholesale quotations since dealers' margins permit considerable flexibility in discount and other price practices. NHA studies of representative distribution costs, based primarily on conditions before the war in 1940 and 1941, indicated that for building materials generally, distribution costs exclusive of transportation at that time averaged 50 percent of the manufacturer's f.o.b. price, or nearly one-third of the delivered price at the building site.

While building material cost is certainly not the only determinant of new housing costs and prices, it is the most important single factor. In National Housing Bulletin No. 2, the NHA published the results of its studies of the costs of typical houses in representative sections of the country in 1944. As shown in this report, building material costs at the site represented about 45 percent of the total cost of house and land, including contractors' overhead and profit, and more than 50 percent of the construction cost of the house itself. The cost of lumber and other wood products represented about half the total material cost.

The statistical results of the NHA surveys are summarized in part in Appendix B, Table 8. The specific percentages of total cost attributable to the several items in the period covered are not intended to be a measure of the relationships that exist under present conditions. However, they are indicative of the relative importance of the several cost factors, and make it clear that the increase of more than 100 percent in the average level of material prices since 1939 in itself would account for an increase of more than 40 percent in the selling price of the typical houses studied.

The long range and the recent trends in total residential construction costs have been very closely parallel to the trends in building material costs. This of course does not mean that material costs are entirely responsible for the present record levels of new housing prices, although they have directly caused a large part of the increase. The upward cost trend is rather a reflection of the basic fact that we have not yet learned how to put behind the process of assembling land and building houses anything like the efficiency and productivity that has so vastly expanded output in most other segments of our economy. It is not that we do not

have good materials or that we do not know how to build good structures, for we do. The point is that we must learn how to build them faster and in greater volume, and a great deal cheaper.

A growing body of evidence is at hand to show that productivity and efficiency have lagged in the production and distribution of building materials, in the development and application of efficient construction techniques and methods, and in labor operations in the assembly and erection of materials at the site. The failure of productivity to increase in building materials production and distribution is reflected in the upward trend of material prices; the failure of the efficiency of construction management and labor to increase is reflected in a similar trend in labor costs per house.

If the long-range upward trend in housing costs in comparison with other consumer costs were to continue, new housing might well become a luxury that an increasing number of consumers will not be able to afford.

As to material costs, the interest of many of the producing industries would seem to lie as close to cost reduction as does the interest of the home buyer. Aside from the present abnormal situation, the record of high prices and low volume in the thirties provides an illustration. Furthermore, producers cannot expect to hold their markets from cheaper materials if prices continue to rise. It seems clear that the long-range problem confronting the building materials industry goes beyond the elimination of any current over-pricing on the basis of market pressures. Ways must be found to bring down the general level of the housing materials bill, by increasing productivity, increasing the efficiency and reducing the costs of distribution, by improving material design in ways that will reduce erection costs, or by the development of new and cheaper materials.

IV. SUPPLY AND PRICE TRENDS SINCE V-J DAY

A. Production Levels at the End of the War

1. The general level of building material production for 1945, as measured by the composite index compiled by the Department of Commerce, had fallen about 30 percent from the high point reached in 1941, and in the months following V-J Day was nearly 40 percent lower than the war-time peak months. (Table 4, Appendix B)

It must be emphasized, however, that this average index of production does not by any means reflect the situation of most of the individual building materials industries at the end of the war. The reason for this is that while the index includes data on some ~~25~~ 20 representative materials, it is necessarily, and quite correctly, weighted heavily by the trend in lumber production. Lumber was an important war-use material, in particularly strong demand throughout the war, so that intense efforts were made to maintain its production at the highest practicable levels. Output of nearly all other building materials was intentionally restricted after 1942, as a necessary war measure. Accordingly, an index for materials other than lumber, or an index that reflected only the volume of lumber available for civilian construction would show vastly greater curtailment of the actual level of building materials output.

The real magnitude of the problem involved in expanding materials output to meet the new peak levels of demand, and the remarkably high rates of output that have been achieved, can best be seen by a review of the production trends of some of the most important individual construction materials, in comparison with the requirements indicated by the volume of housing and other construction in prospect for 1946, under the Veterans Emergency Housing Program. (Tables 5A through 5G, Appendix B)

Of all the building materials industries, only one or two came through the war at levels even approximating full production operations. One of these products was asphalt roofing and siding material, which was widely used in temporary and other war construction, and also was in heavy demand for necessary maintenance and repair work. Asphalt roofing and siding products at the end of the war were being produced at a rate about 40 percent above the pre-war level, and only 10 percent below the 1942 peak. The 1946 program accordingly required an increase in output of only ten or fifteen percent, which was achieved without much difficulty.

Fabricated building boards of various types, including insulation board, hardboard, laminated fiber board, and gypsum board and lath also had been in very heavy demand throughout the latter part of the war, partly because of the scarcity

of lumber, and were being produced at fairly close to maximum rates -- gypsum board and lath at about 75 percent of peak output, and other boards at about 90 percent of existing capacity.

The production of gypsum board and lath had been expanded greatly in the early years of the war. Factory shipments in 1941 and 1942 were more than double the rates of 1937 and 1938, and while there had been some decline from the 1941 maximum level of 2.8 billion square feet, production in 1945 had fallen only to 2.1 billion square feet, which was a billion more than in ~~1947~~ 1937. (Table 5G, Appendix B)

However, because of the increasing use of gypsum products, it would have been necessary to nearly double 1945 output to have fully met the 1946 requirements of housing and other authorized construction, which would have meant expanding capacity to about 50 percent more than 1941 peak production. Some capacity expansion has in fact been undertaken, but in 1946 serious raw material shortages of crude gypsum and of the special paper liner used for surfacing the board and lath, were limiting factors.

A major part of the gypsum problem was to increase the availability of gypsum lath, which has come into general use in interior wall construction, replacing wooden lath as a plaster base. Before the war, lath had comprised about 70 percent of the industry's board and lath output. The wartime demand however was primarily for gypsum board, and lath production dropped to about one-fourth of the total. The objective in gypsum products accordingly was to greatly expand total production, and at the same time to step lath production back up to the prewar proportion of two-thirds or more of the total.

With respect to the other building boards, production had remained at the peak rate of about 2.6 billion square feet throughout the war, which was very close to capacity levels. This output however appeared to be at least 30 percent short of construction and other demand in 1946.

2. Lumber and wood products supply in general was relatively much farther short of demand. Lumber itself, the most important building material, of course had also been an important war material. But in spite of strenuous wartime efforts to maintain it, production had been declining year by year after the 1941 total of 36.5 billion board feet. In the year 1945, output had fallen back to about 28 billion feet, only 1 billion higher than the 1937-1939 average. Virtually all of this decline was in softwoods, which are the species making up the bulk of construction lumber. (Table 5A, Appendix B)

Cbsumption exceeded production in each of the war years from 1942 through 1945, the excess demand being met by drawing down the level of stocks held by mills, concentration yards and dealers. The stockpile at the beginning of the war had totalled 17.3 billion feet, but by the end of 1945 the total in the hands of producers and distributors had been depleted to only 4.6 billion feet.

Construction normally accounts for only fifty to sixty percent of lumber consumption. However, the requirements of building started in 1946, together with the abnormally high demand from other parts of the economy, added up to production needs as great as or even greater than the 36 billion foot totals of 1941 and 1942. The common problems of obtaining labor and equipment were particularly acute in the lumber industry. A dwindling labor supply, resulting from a steady loss of labor especially from logging operations to other occupations, had been an important factor in the decline in production in the last three years of the war. And while the industry had been kept under the fullest possible operation, this in itself had resulted in an abnormal depreciation of logging and mill equipment that needed immediate reconditioning or replacement. At the same time diminishing reserves of standing timber suitable for cutting presented not only an immediate supply problem but also a permanent conservation problem for the future, the depletion being most serious in the softwood species from which construction lumber is obtained. In terms of current production, softwood lumber output had dropped from nearly 30 billion feet in 1941 and 1942 to 25 billion in 1944, and 21 1/2 billion in 1945.

Aside from the general shortage of rough and finished lumber, the other major wood products -- millwork, flooring, and plywood -- all presented particular supply problems. (Tables 5A and 5B, Appendix B)

Millwork is made principally from only the very highest, or "shop lumber" grades, that can be cut from softwood species, and the declining output of softwoods therefore constituted an extremely serious raw materials shortage. Furthermore, other demands for these grades of lumber, for use primarily in boxing and crating, were abnormally high, partly because of military needs that continued beyond the end of the war, and partly because of the rapid increase in civilian production. In addition to the raw material problems, millwork, as a war production measure, had been reduced substantially from the high rates of output of 1941, 1942, 1943, and as a result a large part of its plant capacity was idle at the end of the war, and its working force of specially skilled labor was considerably depleted.

Softwood plywood, on the other hand, was a relatively new building material that had come into general use only in the late thirties. Total production reached 1 billion square feet a year for the first time in 1939, and continued to increase rapidly to 1.6 billion in 1941 and to a maximum of over 1.8 billion in 1942. During the last three years of the war, however, the industry was converted primarily to war production. Total production was cut, and the industry's facilities were concentrated on the manufacture of the heavier waterproof or "exterior" grades needed for military and naval use, and, later, in heavy demand for industrial uses in the reconversion period. Ceiling prices on civilian construction grades, particularly in housing thicknesses, were fixed at levels that would discourage production. Output in 1943 dropped below 1.5 billion, and the proportion manufactured in exterior or waterproof grades rose from 17 percent in 1942 to 28 percent in the first half of 1945.

At the end of the war the industry was physically adjusted to this larger production ratio of "exterior" and other grades not widely used in low-cost homebuilding, and felt that under existing price ceilings the manufacture of housing-construction grades was unprofitable. As a result, total production in 1945 dropped to 1.2 billion square feet, the lowest since 1940. Average monthly output, which had exceeded 116 million square feet during the first eight months of 1945, dropped to 72 million after V-J Day, and the proportion of "exterior" grades rose in the latter months to 36 percent. The plywood industry was also confronted with a serious raw material supply problem. The drop in total production was accelerated by the west coast lumber strike, which severely restricted the supply of the high quality "peeler" logs from which plywood veneer is made. Moreover, a general and more permanent log scarcity was developing. The industry's own timber holdings had never been extensive, and were declining. Timber stands supplying the open market also had been badly depleted to meet wartime demands for lumber, and price relations were such that owners of open-market timber in many cases found it more profitable to sell their peeler logs to sawmills for cutting into lumber, than to sort them out for sale to plywood manufacturers.

Against this supply situation at the beginning of 1946, the potential demand for homebuilding and other construction, in combination with foreseen industrial requirements, called for production exceeding the peak output of 1941.

Hardwood-flooring production had been stringently curtailed throughout the war, to free hardwood lumber for uses then regarded as more essential. The

proportion of graded oak lumber going into manufacture of flooring dropped from 30 percent in 1940 to 14 percent in 1945, and other hardwoods contributing to flooring manufacture showed similar declines. In August 1945 the flooring industry's operations were at less than one-third of capacity. The year closed with only moderate recovery, with a minimum stock of seasoned lumber on hand suitable for flooring manufacture, with green hardwood lumber poor in grade and cut in sizes and thicknesses not usable in the flooring mills; and with an inadequate labor force. In contrast, construction activity in 1946 could have absorbed more than the entire output of the industry at capacity levels of operation.

3. Products made from iron and steel (Tables 5C, 5D, and 5E) encountered raw material and other supply problems that in some cases were even more serious obstacles to full production than those that held down the production of lumber and wood products. Wartime requirements for steel were quickly supplanted by the enormous civilian demand for reconversion purposes and the unprecedented, quick market for consumers' durable goods. At the same time, the building products industries were faced with the very difficult problem of rehabilitating their plants and rebuilding their labor forces from very low wartime levels of operation. The position of the soil pipe and radiation industries illustrates the problem in perhaps its most severe form.

Foundry and malleable grades of pig iron had been 14 percent of total pig iron production in 1937-38, but dropped to 9 percent in 1939-41 and 8 percent in 1942-44, as steelmaking grades became more and more necessary for military purposes. Wartime building regulations discouraged production of cast iron soil pipe, prohibiting its use more than five feet beyond the foundation line of a building, and requiring the pipe produced to be in a "victory weight", lighter than the standard preferred by builders and requiring less iron for casting. Shipments dropped from 566,000 tons in 1941 to 182,000 in 1944. Foundries shut down. In 1941, 52 foundries had shipped nearly 47,000 tons a month. By 1944, shutdowns had reduced the number of operating plants to 32, with an output of about 15,000 tons a month. In the first half of 1945, only 28 plants were at work. The second half saw enough improvement to bring the total 1945 output above 200,000 tons, but the recruiting of labor for foundry work was particularly difficult, and the rate of output at the end of the year was less than half the rate at the industry's previous peak, and even farther below the potential demand.

The output of cast-iron radiation had increased rapidly in the late '30's and early '40's to a high point of 84 million square feet in 1941. There-

after, it gave way to war production and declined by 80 percent to a low of 17.4 million in 1944. Convector or extended-surface radiation, relatively small in the field, had averaged 7 million square feet in 1939-41 and 4.2 million in 1942-44. In 1945 both segments of the industry had produced 25.1 million square feet of radiation, 17.7 million in cast-iron and 7.4 million in convectors. For 1946 the two sources were looked to for a total about three times higher than the 1945 output.

The manufacture of plumbing fixtures, (Table 5-F) and particularly bath tubs and sinks, also depended to a considerable extent on availability of cast-iron or steel, although substantial production was obtained by increased use of vitreous materials. Production had been strictly controlled during the war, and severly cut back. Bathtubs, requiring more metal than other fixtures and being least needed in wartime construction, had fallen off most in output. Complete statistical data are not available, but it is apparent that bathtub production had risen in 1941 to 1.2 million from something under 850,000 in 1937-40. This had been cut to less than 10,000 in 1943 and less than 200,000 in 1944. About 260,000 tubs had been manufactured in 1945, nearly half of them after the Japanese armistice. A million lavatories and 1.4 million sanitary toilets were made in 1945, compared with 1941 peaks of 2.1 and 2.4 million respectively.

In the post V-J Day, fourth-quarter of 1945, output was 114,000 bathtubs, 220,000 sinks, 313,000 lavatories, and 408,000 toilets. By contrast, the housing program calling for 1.2 million new dwelling units in 1946, together with estimated demand for use for replacement and in construction outside of the new housing program, would have required trebling the output of bathtubs, raising the production of sinks from 40 percent below the industry's peak to 60 percent above it, and increasing production of lavatories and water-closet bowls by 70 percent and 37 percent, respecitvely.

4. Of the remaining building products industries, practically all were in varying degrees confronted with similar difficulties. The clay and masonry products industries of course encountered no serious raw material shortages, but with plants closed down or idle and labor forces scattered, considerable time and assistance was needed to get back to the abnormal levels of production required. The brick and clay tile industries particularly were further handicapped by the fact that not only were many plants depreciated but many were obsolescent, so that major new capital installations as well as repair and rehabilitation of production equipment were needed to bring output back to the previous peak levels that were necessary (Table 5-G, Appendix B)

B. VEHP Production Aids and Controls

While building material production in general had continued at low levels in 1945 down to V-J-Day, the expansion in construction activity had been gaining momentum since the spring of the year when the first relaxations in the Construction Limitation Order, L-41, had been permitted. On April 29, L-41 was amended to permit approval of projects that could be shown to be essential for industrial reconversion to peacetime production, and other changes prior to V-J Day successively loosened the restrictions on industrial building, community facilities essential to health and safety, and, to a very limited extent, on housing. On August 21, immediately after the end of hostilities, all industrial construction was freed from the necessity of obtaining WPB authorization, and on September 18 it was announced that all remaining limitations on construction would be removed effective October 15.

The rapid expansion in the volume of building construction put under way as a result of these decontrol actions has been reviewed in Section I above. Following the final decontrol action, the rate of building construction contract awards in November, December and January was two and a quarter times higher than the rate in May and June 1945, and by March and April, the rate had doubled again, reaching the peak wartime rates of 1942 and 1943. (Table 2, Appendix B)

The impact of this demand, coming in the winter months, caught building materials production in the seasonal period when output normally is at its lowest, so that in terms of actual physical volume, there was virtually no increase in the level of available supplies of materials between V-J Day and March 1946. When seasonal factors are taken into account, the maintenance of production at summer rates throughout the winter theoretically constituted some step-up in the rate of productive activity. But, as measured by the Department of Commerce index of production of representative materials, even the seasonally adjusted rate of over-all output had increased less than 20 percent between the summer of 1945 and January and February 1946, the unadjusted rate of physical volume being well below the summer level.

Against this background, the Veterans Emergency Housing Program was inaugurated in January 1946 to maximize the construction of homes and, as a major means to that end, to assist industry in maximizing materials production. Steps were taken immediately to make fuller use of the priority powers, the machinery for providing production aids, and the price and export controls that existed under wartime legislative authority, and had been employed to some extent by CPA in the latter part of 1946 to assist material producers. However, it was not

until March 1946, that funds were made available for the re-establishment of limitation controls on residential and non-residential building, so that by the spring of 1946, the great backlog of construction projects under way or about to get under way was far in excess of the volume that could be supported by available or prospective material supplies.

Governmental assistance and production incentives were made available to materials producers through the VEHP in a variety of specific forms, depending on the nature of the problems of the respective industries.

1. Priority Assistance. A basic type of aid was priority assistance to building-materials producers for procurement of capital equipment and raw materials. Priorities issued by CPA, on the Housing Expediter's recommendation or its own initiative, enabled manufacturers of building materials to get scarce repair parts, maintenance equipment and supplies, new machinery, raw materials for manufacture, and in some cases materials for plant expansion, which otherwise would have been diverted to less essential uses.

Aid of this type was furnished not only to producers of virtually all types of building materials but to manufacturers of machinery and special equipment which building-materials producers needed for increasing their output.

Various forms of allocation control and production directives were used to equalize the impact of the general shortages of steel and timber, and to prevent an undue diversion of these raw materials from building products to other uses that were in a position to bid more successfully for the limited supplies.

In the cases of pig iron and steel, general priorities assistance as such proved to be inadequate, and controls were adopted which, in effect, were allocation orders, in that they provided manufacturers of specified building materials (and of other critical items such as farm machinery) with certified preference ratings calling for delivery of specified tonnages of pig iron and steel ahead of deliveries of similar items to other customers. In other words, a definite share of the pig iron and steel supply was allotted to housing and construction uses.

2. Production Directives. To meet the situation in lumber manufacture, where the way the logs are sawed often determines the end use, production orders and directives were used. Directives were issued to sawmills, millwork manufacturers and hardwood flooring manufacturers requiring that a specific proportion of the sawmill output of softwood lumber be produced in form of housing construction lumber; that all Western Pine and Fir "shop lumber" be sold and used only for manufacture of millwork; that all hardwood lumber suitable for manufacture of

flooring be cut into flooring-lumber thicknesses and sold and used only for manufacture of flooring; and that a specified percentage of the total output of softwood plywood be produced in the form of housing-construction and door-panel grades.

The same type of directives were also issued by the CPA to independent paper mills and boxboard manufacturers, requiring them to produce specified quantities of gypsum paper-liner and ship them to gypsum board and lath manufacturers; and to the soil pipe industry, requiring that a definite percentage of the total output of cast iron soil pipe be in sizes suitable for residence sewer connections.

In the later phases of the program, after the general modification and relaxation of controls early in 1947, formal directive controls were discontinued, and, in the case of pig iron, steel, and phenolic resin molding materials, supplanted by voluntary allocation arrangements between the government and producers. These voluntary agreements of course were made while the priority and allocation powers were still in existence, and were specified to extend over limited periods of time.

3. Premium Payments. The expansion of production to levels approaching the volume of requirements in many instances could not be realized without resorting to extraordinary measures, such as bringing high-cost plants and equipment into operation, instituting overtime work, buying raw material at high prices against unusual competition, and similar steps involving abnormal production costs that could not ordinarily be undertaken by producers. Premium payments were a means authorized by the Veterans' Emergency Housing Act of 1946 to give producers a financial incentive to incur unusual costs in pushing output above the maximum which could otherwise be obtained within the price stabilization objectives of the program.

Eleven premium-payment plans were put into effect at dates between June 1 and October 1, 1946. They were applied to super-quota production of clay products, softwood plywood, merchant gypsum-liner, State-owned timber, convector radiation, hardwood flooring, cast-iron soil pipe, foundry and malleable pig iron, and-lime brick, and housing nails. Ten of the plans operated for periods of five to eleven months. The pig-iron program was kept in operation down to the end of 1947.

Quotas were established for each participant, based usually on his past production record, and representing, for purposes of the premium plan, the level of output he could or would attain without premium payments. On each unit of output in excess of quota, or of a stated percentage of quota, a premium was paid at a rate specified in the plan and designed to offset the unusual costs incurred in securing the super-quota output.

Premium payments were not used as a device for correcting basic maladjustments or inequities in the price ceilings that existed at that time. While the point is not particularly pertinent to the present situation, it should be noted in passing that the government's policy provided for increasing price ceilings in such cases, and between the end of the war and the end of price controls in November, 1946, several hundred building material price ceiling adjustments for particular products or areas were authorized. Such increases were necessary to cover rising wage, material, transportation, and other production costs; to remove price restrictions that had been imposed during the war as a control device for holding down production for civilian use, as in the case of gypsum lath and housing construction grades of plywood; and to bring profit margins on low-profit items sufficiently into balance with that on other products of the same industry to obtain necessary increases in output, as in the cases of nails, builders' hardware and electrical wiring devices.

4. Labor Recruiting. Similarly, wage ceiling adjustments were also authorized in the early part of the housing program when existing wage scales prevented the rebuilding of the depleted labor forces of several building material industries. In this connection, a more widely used form of assistance in recruiting labor was the priority given to the needs of building material producers in the placement operations of the U. S. Employment Service.

5. Special Programs for Lumber. In addition to these general types of action to assist in increasing production, it was also possible to take certain special measures to improve the supply situation. One was the expenditure of $15,000,000 to build roads into previously inaccessible timberstands on Federally-owned lands and on lands administered by Federal agencies, and rebuilding other forest-roads on those lands for winter and all weather use. This program of construction and rebuilding totalled nearly 2,500 miles. The mileage completed in 1946 added more than a quarter of a billion board feet to that year's lumber supply, and with the mileage finished in 1947 is estimated to have added a billion feet to the 1947 supply. A second action was the reinstitution by the Forest Service, from May through November 1946, of its wartime policy of permitting timber in the National forests to be cut beyond the limit of normal yield. As a result, timber sales from the National forests increased from the 1941-1945 average of 2.3 billion board feet to 3.6 billion board feet in 1946. A third step which increased the volume of supply available through imports was the suspension on October 25, 1946, of import duties on lumber, millwork and other specified forest-product building materials; when this waiver of duty was terminated on August 15, 1947, imports of millwork, plywood and other products declined sharply.

6. Aids for New Materials. Beside the range of actions designed to get the established industries back into full production, technical and financial assistance in the form of market guarantee contracts was available to producers of new types of construction materials. While a few guarantee agreements were concluded, the program probably was not in active operation for a sufficient length of time to test the real potentialities of this form of government assistance. The development of new shell construction materials particularly will become increasingly important as a long-range objective, in view of the declining reserves of high grade construction type timber. Furthermore, several of the products that have already been developed show promising possibilities of reduced construction costs, since they frequently make use of low grade or waste materials, and at the same time incorporate superior structural qualities and lend themselves to some simplification of the construction operation itself.

7. Informal Expediting Assistance. Finally, existence of the control system and of the staff of materials specialists in the Washington and field offices of the Housing Expediter also made it possible to extend informal assistance to materials producers in thousands of individual cases. Informal help of this kind was given in solving transportation problems, locating sources of raw materials, machinery, and equipment, and technical assistance was rendered in solving particular production problems.

C. The Supply Situation in 1946

1. Materials Output. There is of course no way to measure precisely the net effect of government assistance and controls in expanding materials production. It is obvious that the post-war demand in itself would have evoked a large increase in output, and it is equally obvious that far greater increases were realized, and in much shorter periods of time, as a direct result of government assistance.

The Department of Commerce composite index which had remained at about 90 (90 percent of the 1939 monthly average) in the six months from V-J Day to February 1946, jumped twenty percent to 109 in March, and climbed steadily, without a break, to 148 in August, duplicating the peak wartime month of August 1941. It reached a high point at 151 in October 1946, the last month before decontrol of building material prices and the general relaxation of the Emergency Housing Program controls. The average level of output thus had been increased by about 70 percent in the 10 months following the establishment of the government's emergency housing program.

The record for many individual materials was still more spectacular. Comparing production in the fourth quarter of 1946 with the same quarter of 1945, output of sinks and bathtubs had been more than tripled. Production of

cast iron radiation was 2.7 times higher than in 1945 and that of cast iron soil pipe had been nearly doubled. Clay brick and clay tile output were up 70 to 80 percent, gypsum board and lath, 65 to 70 percent, and cement, concrete block, and sewer pipe about 50 percent.

This quarterly comparison is not valid for lumber products because of the strike which occurred at the end of 1945. Total production for the 12 months of 1946 was increased by 25 percent over 1945, although softwoods increased only 18 percent. Production of hardwood lumber increased 51 percent, and output of end-matched flooring apparently rose about 30 percent above 1945.

Many previous production records were broken in 1946. The output of sinks topped the previous peak year (1939) by 52 percent. Gypsum paper-liner was 40 percent above the previous peak; asbestos-cement shingles, 26 percent; warm-air furances, 24 percent; gypsum board, 19 percent; floor and wall furnaces, 18 percent; water-closet tanks, 16 percent. Output of building boards and shipments of asphalt roofing materials bettered previous best records by narrower margins; and in building paper and building plaster earlier best records were equalled.

2. Construction Volume. These increases in materials production permitted a great expansion in construction activity. In August, September and October 1946, the Department of Commerce estimates of the total volume of construction work actually put in place reached the rate of a billion dollars per month. Building construction volume alone exceeded three-quarters of a billion per month, double the rate at the first of the year and nearly four times the volume in the summer and fall of 1945. (Tables 3-A and 3-B, Appendix B) Despite governmental measures to channel increased quantities of materials into housing, the supply of materials was still not sufficient to cover the entire demand, and shortages were preventing the volume of authorized work from reaching still higher levels. As the effective demand increased, the supply deficits in fact became more intense, local shortages spread and developed into nationwide competitive scrambles for supplies, black markets began to flourish, and construction operations were drastically slowed down in every part of the country.

Action had been taken to reduce the level of new construction authorizations, the quota for housing having been cut in June, and that for non-residential building, in June and again in August.

In the case of housing, however, such action proved to be unnecessary; with all of the non-veteran demand for housing held off the market, the economics of the material supply situation itself provided an automatic brake

on the volume of homebuilding for veterans. Quoted prices on building materials, up to and after the hiatus in OPA controls in July 1946, had increased gradually but steadily ever since V-J Day, and black market prices of course had gone much higher. But the stretch-out in construction time that resulted from material shortages undoubtedly had a still more important bearing on the steady rise in construction costs and the prices of new homes for veterans, and on the decline that occurred in new housing starts. An increasing volume of conversions, of temporary war housing and other types, kept the total rate of starts at about 100,000 per month through the summer of 1946. But the 1946 peak in new permanent housing starts was reached in April and May, when 67,000 units per month were put under construction. In the succeeding months, which should normally have brought a seasonal increase, the rate actually declined, except for a brief spurt to 65,000 in August, and by October, the last good building month, the total was down to 58,000. (Tables 1-A and 1-B, Appendix B)

In spite of this trend, the 1946 record for housing and other construction was of course an extraordinary achievement. The rate of expansion in materials production and in construction activity was unprecedented. A million new and converted dwelling units had been put under way and the physical volume of building construction actually put in place had been increased to 2 1/2 times that of 1945. But materials shortages had prevented still greater achievements, had set in motion extraordinary inflationary forces that would survive the shortages themselves, and had necessitated a curtailment of construction activity long before potential demand, or even the restricted housing "goals", had been met.

D. Supply Trends in the Decontrol Period.

1. Relaxation of Controls. The removal of building material price ceilings under the general decontrol policy in November 1946 necessarily resulted in the revocation of all of the material distribution priorities and controls, and most of the production aids and incentive programs of the VEHP.

On the demand side, the non-residential building limitation order was retained, with a 40 percent increase in the rate of authorixations. Export controls similarly were kept in effect on a liberalized basis. General authorization was extended for the first time to non-veterans to build homes for their own occupancy, and the market was opened to the construction of larger houses by substituting the 1500 square foot limitation for the previous $10,000 price ceiling on new construction.

On the supply side, the formal priority certification system for steel was discontinued at the end of the first quarter of 1947, and supplanted by a voluntary distribution agreement with the industry for the second and third quarters. Pig iron allocations also were dropped at the same time, except those for cast iron soil pipe which were continued through June. The directives channelling lumber and other items into housing construction materials were discontinued except for those relating to the use of shop-grade lumber for millwork manufacture, and the gypsum paper liner directives, which were continued through May. Premium payment programs were continued for cast iron soil pipe through June, and for pig iron, until the end of 1947.

Under the Housing and Rent Control Act of 1947, all controls and production aids were abandoned on June 30, 1947, except for a restriction on construction for recreational and amusement purposes, and the pig iron premium payments program.

2. Initial Effects on Production, Prices and Demand. The course of building material prices immediately after the removal of controls is by now as familiar as it was then spectacular. The BLS wholesale index for all building materials by October 1946, the last full month of price ceilings, had increased about 14 percent in the 14 months following V-J Day. From October 1946 to January 1947, the average index increased more than 25 percent, and by April was 33 percent higher than October, 50 percent higher than V-J Day and double the 1939 average. The lumber price index in April stood 50 percent higher than in October 1946, 75 percent higher than in August 1945, and three times as high as the 1939 average. The three month increases in other materials ranged upward from a moderate 5 to 7 percent in brick, tile and cement, which were in relatively good supply, to 47 percent in paint materials.

The removal of price controls however failed to bring out the production increases that were prophesied. The Commerce Department index of production of major materials, after having reached a peak at 151 percent of the 1939 average in October 1946, began its seasonal decline in November. But after the end of the downward seasonal influence of the winter months, the index remained at the low level of 138 in each of the months of April, May and June, 1947, most of the production aids having been removed. Lumber output according to the Commerce Department index, stayed well below the levels of the previous fall, as did output of gypsum products and most clay products. Production of iron and steel items such as soil pipe, radiation, and nails was maintained or increased while the steel controls were in effect; but began to decline in the third quarter, despite the voluntary distribution agreements and the pig iron premium payments program. By July, cast iron soil pipe production had fallen 25 per cent from the April peak, and it has not yet returned to the April level. Nail production dropped 13 per cent in the third quarter,

and radiation more than 7 per cent. Of the lumber and steel products, hardwood flooring, plywood, bathtubs, and lavatories were the only important exception to the general trend, increasing to some extent over the second quarter.

While the volume of non-residential building authorizations soon approached the increased quota level, decontrol did not stimulate any quick resurgence of home-building activity. The number of new permanent housing starts continued to decline through the winter, and, as material prices continued to skyrocket, did not get above the level of the comparable months of 1946 in the first 4 months of 1947. From reports of builders, real estate operators, local authorities, and federal government field offices, it was apparent that builders and buyers were becoming increasingly unwilling to proceed with building plans in the face of the steadily mounting costs. The declining volume of building activity had to a partial extent relieved the worst severity of some of the materials shortages (although average construction time still remained far above normal). Such gains as had been made on this front, however, were being rapidly offset by the increase in material prices as well as in wages. The government, in conferences with representatives of the lumber and other industries, pointed out the danger signs in the price and construction trends, and urged that immediate, voluntary price reductions be made to avoid a repitition of the type of collapse in building that had occurred in the parallel situation in 1921.

3. Current Trends and Outlook. As the result of a decline of about three percent in lumber prices, the average index declined slightly from April through July. This interruption of the rapid rise in prices apparently was sufficient to start construction back on an upward trend. By August, after the removal of practically all non residential construction controls, when it became clear that buyers were reconciled to the prevailing price level and that a collapse was not imminent, lumber and other prices again started to move upward but at a slower rate, this time with no apparent effect on construction volume.

In May and June, after the first softening of lumber prices, new permanent housing starts moved ahead of the comparable 1946 months for the first time, and, after revocation of virtually all restrictions on construction, continued steadily upward at far more than seasonal rates of increase, reaching 92,000 in September and in October 1947, which was very close to all-time record levels.

The back log of non residential building that had been deferred by the revoked limitation order began to move into the contract stage in the latter part of July and early August. The rate of non residential building awards increased 20 percent in July over the average for the second quarter, and in August was about 40 percent above the second quarter. The total for the third quarter was 35 percent higher than the average in the first half of 1947, and 15 percent above the

1946 annual average. In the fourth quarter, when a substantial seasonal decline would normally be expected, the rate was only 3 per cent below the third quarter.

The full effects of the upward trend in housing starts and contracts awards for other buildings will not be felt until early in 1948. However, the rate of actual physical volume of construction has already increased substantially. The value of all new construction put in place as estimated by the Departments of Commerce and Labor, having declined from $1 billion a month in August, September, and October 1946 to less than $850 million per month in the first quarter of 1947, had reached the billion rate again in June; in September, October, and November it was estimated at approximately $1,300 million, and in December, $1,215 million. Building construction did not return to the rate of three quarters of a billion a month until July, but since October it has remained above $900 million a month.

The Departments of Commerce and Labor in their joint forecast for 1948 have estimated that the dollar value of new non-residential building work put in place will increase from $3,878 million in 1947 to $4,100 million in 1948, and that the value of residential building work will jump from $5,384 million in 1947 to more than $6 billion in 1948. The forecast contemplates that, allowing for material and other cost increases, the physical volume of housing and of all other types of new construction activity during the coming year will be about 10 percent above 1947.

Building material production has again lagged behind the trend, and while production in 1947 has of course been greater than in 1946, only in October has the monthly rate of output been as high as the 1946 peak month. The Commerce Department index dropped back from the level of 151 in October 1946 to about 138 in April, May, June and July, 1947. It increased to 147 in August and 146 in September, and in October it jumped 10 points to 156, the highest point the monthly index has reached since 1939. This increase was due in part to an increase in pig iron production, and to action taken by the Office of the Housing Expediter to channel premium production of pig iron into housing materials, under the premium payment program that was then in effect. In November the index fell again to 137, two points below November 1946.

The total volume of output in 1947 was substantially higher than in 1946 -- possibly by 10 percent. At the same time, the backlog of unmet demand is lower than it was a year ago. But the shortages of many important materials have never been completely overcome, and the scarcity of eight or ten key commodities was reported month after month throughout 1947 to be serious enough to cause construction delays in many regions of the country.

In other words, the failure of production of many key items to increase above the rates achieved in the fall of 1946 is not due to lack of demand. And so long as national income, industrial activity, and the demand for high grade lumber and steel from other parts of the economy continue at current rates, the increasing demand for housing and other construction is almost certain to encounter aggravated supply difficulties and further price rises.

V. CURRENT AND FUTURE SUPPLY PROBLEMS

A good general indication of the particular trouble spots that may be expected to get worse, if the predicated 10 percent increase in the physical volume of construction occurs next year, may be found in the current reports of the district officials of the Federal Housing Administration as to the material shortages that are currently delaying construction in their respective districts. (Table 7, Appendix B) Throughout the year a list of 8 to 10 building products have been consistently reported to be causing trouble in a substantial proportion of the 65 reporting districts.

These products are gypsum board, gypsum lath, plumbing materials, millwork, nails, and wrought iron and steel pipe and fittings, which are delaying construction in 50 percent or more of the districts; and flooring, cast iron soil pipe, and sheet metal, which are currently reported by one-fourth of the districts. In addition, wood siding and finish lumber have consistently appeared on the critical list in scattered parts of the country. Increasing difficulty has been experienced with heating equipment in the early months of the winter.

The geographical distribution of the shortages of course varies from material to material, depending in some cases on proximity to basic raw materials. All available information, however, indicates that the difficulties arise primarily from general inadequacy of production, and not from temporary geographic maldistribution problems. Thus the shortages of gypsum products, plumbing fixtures, iron and steel pipe, and sheet metal apparently are general, being reported from each of the several regions of the country; millwork, flooring, and nails are reported from all regions except the west; the soil pipe shortage is particularly acute in the eastern and western states, although it is also reported to be short in a few districts of the midwest and south.

Plant expansions that are now under way, by the middle of 1948 will probably have solved the immediate problem in gypsum board and lath, which head the list and are in short supply in nearly all sections of the country.

The other reported construction material supply problems stem back primarily to the strong competing demand from other parts of the economy for the basic raw materials -- lumber and steel. The supply-demand position of these materials is of course better than it was a year ago. Nevertheless, it becomes increasingly clear that present levels of economic activity and effective demand will continue to exert abnormally strong pressures on the available supply and on prices for some time to come. Some relatively small increases in blast furnace and basic steel capacity are in prospect, and the supply of scrap may be expected to increase somewhat as time goes on and new production continues at high levels,

replacing obsolescent durable goods. But if we are to realize the fundamental economic objective of continuous full employment and maximum production, the general demand for steel will also increase. And, under the present distribution pattern, the supplies apportioned to housing may not be adequate even to support the present indicated volume of 970,000 units per year in 1948, let alone the potential demand for 1,250,000 to 1,500,000 homes per year.

Housing and construction requirements for pig iron and steel of course do not comprise a large proportion of the total steel picture. Nevertheless, the importance of the construction industry would seem to clearly indicate the necessity for a continuing consultation and cooperation between industry and government, in defining construction needs and in finding ways to meet them.

As to lumber, the astronomical level of prices apparently has been sufficiently high to bring out enough marginal production to maintain total output fairly close to current demand. But again, current output clearly is not sufficient under present distribution practice to permit the realization of the housing objective that is concomitant with the basic objective of full employment. The resumption of the upward sweep in lumber prices to new record levels from month to month since last July is strong evidence that there has been no real slackening of the pressure of demand against a supply that even now is not completely adequate. And, as the volume of construction increases in the coming months, the immediate danger of further price rises to a point that will again result in a sharp curtailment of building activity, foreshadowing a general collapse of economic activity as it did in 1920, should by no means be too far discounted or overlooked.

Furthermore, it is obvious that the lumber situation is not a short-range problem. There is widespread concern among forestry authorities and experts as to the proportion of available timber that has been cut, the current rate of drain on standing timber, and the resultant decline in the nation's timber resources. The problem happens to be most serious in the species which provide essential, high grade construction lumber. But it would seem to be essential to the general national interest that industry and government develop a long range problem for conservation in the use of lumber, and, as far as construction is concerned, that every effort be made to encourage the development of new materials that can contribute to conservation.

Exports of building products and raw materials historically have been relatively unimportant in the supply-demand situation. However, it must be remembered that the shortages of steel and of lumber as well are not merely domestic

but are world-wide. European needs for these basic materials are urgent in the extreme, and export demand for Latin American use will inevitably grow as world economic activity continues to expand. Even though total export demand should not, in percentage terms, bulk large in the total, the general impact of this marginal addition to demand is sufficient to justify a close examination of export requirements, and to increase production and conserve the use of the commodities, until means can be found to meet domestic needs more adequately.

In summary, the possibility that the construction industry in 1948 may be able to stretch out the national material supply to build 970,000 houses and $9 billion dollars worth of other construction will not mean that the material supply problem has been solved. If such an accomplishment is realized, it will have involved the highest material prices in history, and other abnormal costs resulting from delays in delivery and construction. Full operation of the construction industry, and an effective attack on the national problem of inadequate and insufficient housing supply will require still higher rates of new building, which will depend on an expanded supply of building materials, as well as on lower construction costs. Increasing the availability of construction materials is essential not only to an adequate volume of housing construction, but also to a reduction in material prices. A definite program for realizing these objectives will depend on the development of more complete and precise information on demand and requirements, and on close cooperation between industry and government in taking steps to meet them.

In order to point up more specifically the elements of the production and supply difficulties that now exist, and to record the specific types of action that have helped to improve the situation over the past two years, the production record and current outlook for several key commodities in short supply is reviewed in some detail in the series of commodity reports which follow in Appendix A. These reports on individual scarce materials were prepared initially by the Office of the Housing Expediter, on the basis of that agency's accumulated experience and knowledge of supply problems during the period of its responsibility for the operation of the post-war emergency housing program. The OHE reports, having been prepared last summer, have been revised to a very limited extent and brought closer to date, and are presented as statements reflecting the joint views of the OHE and the HHFA on the supply situation of these materials.

The inclusion of these rather complete reports of the kinds of remedial action taken in the past is not to be interpreted as a suggestion that all of these measures are appropriate to the present situation. The intent is rather to provide a background of factual information in the light of which future courses of action can be more effectively laid out.

January 30, 1948

Appendix A-7

PLYWOOD

Prior to 1945 the use of softwood plywood in building construction was little more than a novelty. From that time on, its acceptance as a construction material grew rapidly. By 1939 its output reached the billion-a-year mark and by 1942 came within range of two billion square feet. In that year production reached an alltime peak of 1.84 billion square feet (in terms of standard 3/8-inch panels or the converted equivalents of panels of other thicknesses). During the same year the industry adapted itself to the war effort. With its building-construction and civilian-industrial markets cut back to barest essentials, the total putput of plywood was reduced (to less than 1.5 billion feet a year in 1943 and 1944) manpower was released from the industry, and production facilities were concentrated on grades and thicknesses needed for military and naval purposes rather than civilian construction uses. These were primarily thicknesses of 5/8-inch and greater, rather than the 1/4- and 3/8-inch panels generally used in building construction. Also, war uses required a considerable percentage of output in waterproof rather than the more usual moisture-resistant grades. Strides were made in developing bonding agents and manufacturing methods for producing plywood capable of standing up under extreme climatic (heat and moisture) stresses.

To guard against diversion of manufacturing capacity to non-military products, ceiling prices on civilian construction grades of plywood were set at levels that made production unprofitable. No record is available for tracing accurately the resulting shift away from grades normally utilized in housing construction; but the proportion of total output manufactured in "exterior" (waterproof) grades rose from 11 per cent in the first quarter of 1942 to 28 per cent in the war months of 1945.

Total output, 20 per cent less in 1943-44 than in 1942, dropped still further in 1945. Production through August of that year averaged 117 million square feet a month, 25 per cent below the corresponding 1942 average.

The war ended with the industry geared to production of grades of output not primarily used in housing, and with a price-ceiling structure under which it was felt that the manufacture of housing construction grades was unprofitable. The industry very naturally set out to develop its industrial market, which lies with car builders, boat builders, furniture manufacturers, and other durable goods industries, and offers an attractive prospect of steady and profitable sales, less subject to fluctuation than has been the case with building construction in the past.

At the same time, difficulties were becoming acute with respect to the supply of Douglas fir peeler logs, the softwood plywood manufacturer's most essential raw material. At the beginning of the VEHP this raw material was in particularly short supply, primarily as a result of the Northwest loggers' strike in the fall of 1945, which cut deeply into Douglas fir production and reduced the log receipts of plywood mills to about 70 per cent of the normal expectation. This circumstance, together with a strike in the plywood industry itself, further reduced the rate of output, so that softwood plywood production, already low at the monthly rate of 117 million square feet averaged during the eight war-time months of 1945, fell to 72 million feet a month during the remainder of the year. In the first two months of 1946 the average rose, but only to 102 million feet. In March, production increases brought the average to 105 million.

Even more significant as an indication of future trends, however, was a general tightening of the log supply. In the war months of 1945, before the loggers' strike, the log intake at plywood mills had dropped below 49 million board feet per month, as against the average of 57 million a month in 1943 and 1944 and the 66 million realized in 1942. The cause lay in part in the progressive shrinkage of the general available timber supply, as accessible timber stands were cut; and in part in the growing demand for sawn lumber and for paper and pulp products. Ceiling-price changes, reflecting advancing cost of production of these commodities, made it no longer profitable for loggers to sort out the "peelers" from logs merchandized in the general timber market. Previously the prices paid by plywood manufacturers had represented a premium over the general log market. This made it profitable for the general logger to separate his peelers and sell them to the plywood industry. It also made it profitable for the pulp and paper companies to sort out the peeler logs cut from their extensive private timber stands and either sell them to the plywood mills or trade them for a larger footage of lower grade timber logged from the plywood mills' holdings. Under changed price structures the plywood manufacturers found that these sources were rapidly vanishing. Their own timber stands were not large. Many plywood companies owned no standing timber. None had large holdings. In the industry's earlier years such assets had not been necessary. This situation did not permit immediate correction. New timber stands available for private purchase are scarce and expensive, and often require months of road-building and other preparatory

work before they can be logged. Plywood mills are heavily mechanized, represent a considerable capital investment, and cannot be readily moved or quickly duplicated even if and when an appropriate new location has been found.

It was estimated at the beginning of 1946 that, of every five peeler-logs cut, three were being sawn into lumber or shredded into pulp for paper-making, and only two were going into plywood. Plywood production was down to an annual rate of not more than 1.25 billion square feet, and the overwhelming bulk of this was coming out in non-construction grades. Some manufacturers estimated that construction grades were running as low as 5 per cent of their total output. This probably was not true for the industry as a whole, but it certainly was true for a large part of it.

In this setting, the Veterans' Emergency Housing Program and the Nation's other construction and industrial requirements called for production exceeding 2 billion square feet in 1946 and approaching 3.25 billion in 1947. Worse, over 1.4 billion of the 1946 requirements and nearly 2.6 billion of those of 1947 were for construction grades. On the assumption that construction-grade output could be brought up to half of the total (which in itself would require a major production shift) this was tantamount to calling for a <u>total</u> output of nearly 3 billion square feet in 1946 and of more than 5 billion in the following year. Main cause of the very large estimated requirement for housing construction was the heavy reliance placed on prefabricated or "industrially built" homes in the VEHP as originally conceived. (Eight hundred and fifty thousand of the 2.35 million permanent homes comprehended in the program for construction in 1946 and 1947 -- that is, 36 of every 100 -- were to come from "prefab" factories; and while concrete and metals were relied on heavily the backbone of the "prefab" program was stressed-skin plywood.) It was estimated that prefabs would require an average of 4,500 square feet of plywood per house, with individual designs of various types running from 2,200 to 6,000 square feet. For conventionally built houses, on the other hand, the estimated allowance was 600 square feet , providing only for cabinets, door panels, and kitchen and bath subfloors.

Early in 1946, three specific actions were taken to improve the supply situation:

1. Appropriate price-ceiling adjustments. The ceiling prices on construction grades were increased approximately 20 per cent.

2. Placing of plywood on Schedule 1 of PR 28 and Schedule A of Pr 33. These actions enabled plywood manufacturers to exercise priorities in obtaining machinery, replacements, supplies and raw materials, and conserved their output for controlled distribution and channeling into veterans' housing.

3. Issue of Direction 1 A to PR 33. This direction required 45 per cent of the production of softwood plywood to be in construction grades, with 60 per cent of the construction-grade output set aside for filling certified and HH-rated orders; and 5 per cent of the production to be in door-panel grades, which were placed under a 100 per cent set-aside. Distributors of softwood plywood were required to set aside 75 per cent of their stocks and receipts of construction grades for filling HH and AAA orders.

Under the spur of this Direction and the incentive provided by the price-ceiling increase, plywood manufacturers made noteworthy achievements in changing from predominant production of non-construction grades to production of construction and door plywood. The latter accounted for 54 per cent of total output in the second quarter of 1946 and by the fourth quarter the percentage had risen to 60. The effect on availability of plywood was even greater than production figures indicate. Because they are stated in 3/8-inch equivalents, plywood production statistics are actually an index of the volume or "cubic contents" of the plywood output, rather than the actual surface area of panels produced. On these terms, second-quarter output in 1946 exceeded the first quarter's by 18 per cent; but because of the increase in proportion of construction and door panels, respectively, 3/8-inch and 1/4-inch thick, in contrast with 5/8-inch and 3/4-inch panels for industrial uses, the surface-area of panels produced in the second quarter exceeded the first quarter's output by 36 per cent.

Production continued upward, rising from 105 million square feet a month in the first quarter to 123 million in the second. There was a seasonal drop to 117 million feet a month in the third quarter; it is the practice in this industry to shut down production during the employees' vacation period and use the time for plant overhaul. Beginning in 1946 the resulting drop in third-quarter output was accentuated, because, under the terms of collective-bargaining agreements resulting from the strike in the closing months of 1945, the length of annual vacation was changed from one week to two weeks.

Meanwhile the bottleneck of log supply had been vigorously attacked. As a result of actions described elsewhere in this report, more sawtimber was being cut, resulting not only in a greater lumber supply but in some increases of log receipts at plywood mills. To accelerate this increase the Housing Expediter put into effect a premium-payment plan (described in detail in the Premium Payment section of this report), which restored the ability of the plywood industry to pay premiums for peeler logs.

By the end of the vacation and plant-overhaul period, the effect of the above measures was manifast. The industry's log stocks, which had dropped below 61 million board feet in March, had risen nearly to 154 million at the first of September. Plywood production went to an average of 134 million feet a month in the fourth quarter. October's output came close to reaching 150 million. These were production rates not previously achieved since 1942. Total plywood output in 1946 amounted to 1.44 billion square feet, of which it is estimated that between 45 and 50 per cent was in construction and door grades.

The requirements picture had changed as the year developed. With pre-fabricated houses taking a minor rather than a principal part in 1946 home construction, the year's plywood requirements for housing were cut back from the original figure of 1.3 billion square feet to 515 million in the September estimates and 433 million in those of November. In retrospect, it appears that a little less than 525 million square feet of plywood actually went into the year's housing construction.

In spite of the reduced requirements, plywood remained in exceedingly short supply throughout the year. Against a big backlog of orders, each month's output was shipped as fast as it was produced. During a part of the peak construction period it was necessary, in order to insure fair distribution, to amend the use limitation in Direction 1 A to PR 33 (subsequently reissued with minor changes as L-358) to restrict to 300 square feet the amount of plywood which could be used for conventional houses.

Production continued at a high rate in 1947, with first and second-quarter output averaging respectively 136 and 143 million square feet per month. With total 1947 requirements estimated at 1.6 billion square feet, finishing out the year with supply and requirements at least in balance appeared easy of accomplishment. A possibility of difficulty was present, however, in the high ratio of construction grade to total requirements. Housing alone, it was

estimated at the close of VEHP, would require a little over 900 million square feet, all of construction and door grades, in the twelve months of 1947, and other construction and industrial uses for those grades were expected to run the total demand for them to 1.36 billion. Production of that much construction and door plywood, even at the favorable ratios of late 1946 and early 1947, would necessitate a total output of approximately 2.5 billion square feet, a figure believed to be in excess of 1947 potential production capacity.

However, the industry produced 1.44 billion square feet of plywood in 1946. Its output in the last quarter of that year would support an annual rate of probably 1.54 billion; and in the first half of 1947 its output would support an annual rate of perhaps 1.65 billion. In summary, this represented a considerable achievement when compared with the outlook in early 1946. The groundwork was laid for this improvement by the cooperative efforts of the industry and Government agencies, which resulted in solving to a large degree the major problems of the industry. All of the tools provided by the Emergency Housing Act of 1946 and by other available legislation were used by the Housing Expediter to help remove or overcome the difficulties the industry faced. Discretionary price increases were used when price was an impediment to production. Premium payments for the procurement of peeler logs and for increasing the amount of State-owned timber contributed by the State of Washington to the available timber supply, were used to bring about additional production and effective channeling of the raw material most essential in plywood manufacture. Access roads were built to increase the availability of timber and peeler logs. Production and distribution channeling orders were used to increase the quantity of construction-grade output, to conserve the supply when it was produced, and to direct the flow of critically short supply so that it could best contribute to the building of homes. All of these measures resulted in meeting the essential requirements of 1946, in starting 1947 with unprecedented raw-material stockpiles, and in maintaining until the end of VEHP a high level of plywood production.

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GYPSUM BOARD AND LATH

The historical upward trend in total gypsum board and lath usage was interrupted by wartime restrictions on all types of civilian building construction. Shipments of board and lath declined from a 1941 peak of 2,777 million square feet to 2,428 million in 1942 and continued to fall off in the following years hitting a low of 2,104 million in 1945.

Despite the limitations on conventional building, the need for rapid construction of military buildings - both temporary and permanent - and of low cost defense housing intensified the demand for gypsum board. Wallboard could be nailed directly to studs to form an interior wall surface requiring only a paint or paper finish, and thus, saved the time, materials, and labor required for plaster finishes. With respect to exterior wall surfaces, gypsum sheathing could be used as a substitute for scarce lumber. Consequently, shipments of gypsum board products increased sharply from the 1941 record high of 933 million square feet to a wartime peak of 1,674 million in 1943. Moreover, in each of the other war years, board shipments were close to or above the 1,500 million level.

In contrast to the board experience, lath output dropped from the record 1941 output of 1,844 million square feet to 959 million in 1942 and after successive declines in the next two years hit a low of 599 million square feet in 1945. By the first quarter of 1945, lath comprised only 24 percent of total board and lath output, whereas in prewar years it had constituted more than 66 percent of the total.

Shipments of Gypsum Board and Lath
Selected Periods 1939 - 1947
(Quantities in Millions of Square Feet)

PERIOD	TOTAL BOARD AND LATH	LATH		BOARD
		Quantity	Percent of Total	
1939	1,548.3	1,137.4	73.5	410.9
1941	2,776.7	1,843.6	66.4	933.1
1942	2,427.8	959.3	39.5	1,468.5
1943	2,304.6	630.6	27.4	1,674.0
1944	2,116.0	625.6	29.6	1,490.4
1945	2,103.9	599.4	28.5	1,504.4
1946 - Total	3,147.2	1,148.8	36.5	1,998.4
1st Quarter	651.2	242.9	37.3	408.1
2nd Quarter	725.1	281.8	38.8	443.3
3rd Quarter	853.2	295.6	34.7	557.5
4th Quarter	917.9	328.5	35.8	589.4
1947 - Total 2/	3,751.1	1,683.2	44.8	2,067.9
1st Quarter	882.0	365.0	41.4	517.0
2nd Quarter	912.0	391.0	42.9	521.0
3rd Quarter	977.1	462.2	47.3	514.9
4th Quarter 2/	980.0	465.0	47.4	515.0

1/ Includes wallboard, laminated board and sheathing.
2/ Estimated by OHE.

Source: Bureau of Mines.

Fortunately, combined output of board and lath remained sufficiently high during the war years to maintain virtually all of the plant facilities that had produced the record output of 1941. Only two eastern seaboard plants had been shut down but these were reopened by March 1946. Thus, the entire machine capacity that had been available in 1941 was in operation early in 1946. It was estimated, however, that the 34 mills comprising the industry had a practical capacity of not more than 3,000 million square feet of board and lath combined, an amount considerably under the anticipated 1946 and 1947 requirements of 3,700 and 4,100 million feet, respectively, for all types of construction. The indicated deficits pointed up the need for immediate plant expansion and modernization in order to meet the goals of the Veterans' Emergency Housing Program.

In order to facilitate this expansion, producers of gypsum board and lath were made eligible under PR-28 to receive priorities (CC ratings) for capital equipment except specialized machinery, for construction, and for maintenance, repair, and operating supplies (MRO). In addition, the manufacturers of specialized board and lath machinery were made eligible to receive similar priorities for production materials and MRO. Further assistance was granted under HEPR-4 to both groups of producers in obtaining production and construction materials, capital equipment and MRO from surplus stocks of the War Assets Administration.

Capacity expansion, however, was not the only problem to which government aid was directed. Shortages of raw materials and labor difficulties were in varying degrees preventing the maximum utilization of the machine capacity available early in 1946. It was found that East coast plants were experiencing difficulty in obtaining ships to transport adequate supplies of gypsum rock from the mines in Nova Scotia. In this case, upon request of OHE the WSA made the necessary arrangements to secure the required shipping. Similarly, assistance in obtaining box cars was extended by ODT to a number of producers who otherwise would have been forced to shut down for lack of facilities to store their finished product. Throughout most of 1946, there were intermittent shortages of secondary raw materials - glue, starch, retarder and animal hair - and the informal assistance of CPA and OHE tended to minimize the production loss that resulted. On the labor front, referrals by USES were important in overcoming labor shortages due to high turnover at several large integrated plants.

Finally, there was the most serious obstacle to capacity production of board and lath - the shortage of gypsum paper liner. Two types of government assistance were used to break this bottleneck: production directives and

premium payments. Beginning in December 1945, directives were issued by CPA to an increasing number of independent boxboard mills to produce and ship specified amounts of paper liner. Of the mills to which directives were issued, 6 had regularly produced merchant liner and 9 had at some time produced paper liner for sale to board and lath producers. A considerable number of mills-- perhaps as high as 40 - conceivably had the machinery to produce liner but because of the rigid specifications for this product probably could not manufacture liner economically. It should be noted, moreover, that the primary business of these companies was the manufacture of boxboard for which there was, and still is, an intense demand. For these companies to divert their production from boxboard to paper liner would entail not only a financial loss but also the antagonism and potential loss of regular customers. It was well known, also, that the integrated board and lath producers were expanding their paper liner capacity and would need the c the output of the independent mills for only a limited time. A contributing factor in the reluctance of the independents to comply with CPA directives met with indifferent success between their inception in December 1945 and May 31, 1946. It was evident that some financial incentive was necessary to compensate the boxboard producers for such losses as they would sustain by diverting from their normal profitable business to the manufacture of liner. Therefore, a premium plan (EPPR-3) was issued effective on June 1, 1946 which provided for payments on all production above an assigned quota at a rate of $40.00 per ton. Quotas were initially set at 80 percent of the tonnage directed to be shipped by CPA in the case of mills that previously had produced liner and at 60 percent for other mills. Later in the plan all quotas were set at 60 percent.

During the life of the plan, which operated from June 1, 1946 through January 31, 1947, performance against CPA directives improved considerably. Tonnage directed increased from a monthly average of 7,900 tons in the 6 months before the plan to 10,900 tons in the 8 months while premiums were being paid, and actual shipments rose from 71 percent of directives to 83 percent in these two periods. Because of basic changes in the nature of controls under the VEHP, it was decided not to continue the plan beyond January 1947. Shipments in the first two months following the end of the plan dropped to 6,200 tons per month compared with an average of 9,000 tons during the life of the plan. CPA directives were discontinued after March 1947 but OHE undertook with some success to expedite individual instances of liner shortages on a voluntary basis.

Paralleling the improvement in the supply of gypsum paper liner, shipments of gypsum board and lath rose steadily in each quarter of 1946. First quarter output at 651 million square feet exceeded the previous quarter's shipments by 14 percent and was exceeded in the last quarter of 1946 by 41 percent. For the year 1946, shipments of board and lath totalled a record 3,147 million square feet - 50 percent more than in 1945 and 13 percent above the previous record year of 1941.

Shipments in each of the first two quarters of 1947 dropped slightly below the high rate established in the fourth quarter of 1946 but rose again to a new peak in the third quarter of 1947. It is now estimated that total 1947 output will reach an all-time high of 3,751 million square feet. Moreover, expansions under way and contemplated that are expected to come into operation by the summer of 1948 should boost board and lath capacity to approximately 4,500 million square feet. Liner capacity adequate to support this huge output will be available, it is anticipated, by the end of 1947.

The impressive achievements in combined board and lath production should not obscure the fact that output of lath has barely reached the level attained in 1941. In 1946 lath shipments were 38 percent below those in 1941 and in 1947 it is estimated they will be 9 percent less. Moreover, the proportion of lath to total output was still below 50 percent by the third quarter of 1947 whereas in pre-war years lath was considerably the more important of the two products, ranging between 65 and 73 percent.

Some producers claim that lath is relatively less profitable than board. To some extent this disadvantage may have been overcome in the last year as indicated by BLS reports of price movements for these two products. According to these reports, the wholesale price of board advanced only 10 percent since 1941, all of this advance occurring since prices were decontrolled. On the other hand lath prices were raised 23 percent under OPA and went up an additional 13 percent since decontrol. The wholesale price of lath is now 75 percent of the board price whereas in 1941 it sold for only 60 percent of the price of board.

In any event, it is evident that considerable further improvement in lath output is required in order to satisfy the large current demand. Recent reports of homebuilders to FHA continue to show that shortages of gypsum board and lath are the principal bottleneck in residential construction.

Government assistance to homebuilders in obtaining these materials from distributors was discontinued in December 1946. Prior to that time, dealers were required under PR-33, Direction 5 and later Schedule A, to set aside a portion of their stocks to fill rated orders (originally 66-2/3 percent and later 85 percent).

To assist in further directing the supply of these materials into construction, OIT placed board and lath under export control early in 1946 and shipments out of the country are still subject to control even though normally such exports have not been significantly large.

Nevertheless, the future outlook for gypsum board and lath appears to be good. Not only should the continuing high demand be satisfied but the additional capacity due to become available by June 1948 should also permit the building up of dealers stocks. Also, the placing of much of this additional capacity in the west and midwest should improve considerably the geographic balance of supply and support the tremendous increases in construction that are taking place in these areas.

APPENDIX B
STATISTICAL TABLES

1 - a. New Permanent, Privately Financed Dwelling Units Put Under Construction, by years, 1920 to Date.

1 - b. New Permanent, Privately and Publicly Financed Dwelling Units Put Under Construction, by months, 1946 and 1947.

2 Value of New Construction Contract Awards Reported in 37 States, 1937 to Date.

3 - a. Value of New Construction Put in Place in Continental U. S., by years, 1920 to Date.

3 - b. Estimated Value of New Construction Put in Place in Continental U. S., by months, 1945 to Date.

4. Composite Index of Production of Selected Building Materials, 1915 to Date.

5. Aggregate Production of Major Building Materials, 1939 to Date.

- 5-A Lumber, plywood, and flooring
- 5-B Millwork
- 5-C Iron and steel pipe
- 5-D Foundry pig iron, sheet and strip steel, and nails
- 5-E Heating equipment
- 5-F Plumbing fixtures
- 5-G Cement, gypsum, and clay products

6. Indexes of Wholesale Prices of Building Materials and Other Commodities, 1913 to Date; 1913 = 100.

- 6-A and 6-B - 1926 to date, by years; 1926 = 100
- 6-C and 6-D - 1945 to date, by months; 1926 = 100
- 6-L - Ratio of building materials to all commodities, 1926 = 100 .

7. Building Material Shortages Delaying Construction in 1947.

8. Percentage Distribution of Costs of House and Land.

APPENDIX B. TABLE 1-A

ESTIMATED NUMBER OF PRIVATELY FINANCED
NEW PERMANENT DWELLING UNITS STARTED, Annually:
1920 to Date

(In thoudands)

1920	247
1921	449
1922	716
1923	871
1924	893
1925	937
1926	849
1927	810
1928	753
1929	509
1930	330
1931	254
1932	134
1933	93
1934	126
1935	216
1936	304
1937	332
1938	399
1939	458
1940	530
1941	619
1942	301
1943	184
1944	139
1945	208
1946	1/663
1947 (estimated)	860

1/ Excludes 8,000 New York State low-cost permanent units started in 1946.

Sources: National Bureau of Economic Research, 1920-29;
and U. S. Bureau of Labor Statistics, 1930-1947.

December 10, 1947

APPENDIX B. TABLE 1-B

ESTIMATED NUMBER OF PRIVATELY AND PUBLICLY FINANCED NEW PERMANENT DWELLING UNITS STARTED, By Months/a
1946 and 1947

(In thousands)

Period	1946			1947		
	Total	Private	Public/b	Total	Private	Public/c
TOTAL	670.5	662.5	8.0	860.0 EST.	n.a.	n.a.
January	37.5	36.9	.6	40.1	39.0	1.1
February	42.4	42.4	0	44.1	44.1	0
March	62.0	62.0	0	58.4	58.4	0
April	67.0	67.0	0	68.7	68.7	0
May	67.1	67.1	0	72.5	72.5	0
June	64.1	62.8	1.3	77.2	77.0	.2
July	62.6	61.3	1.3	80.1	80.1	0
August	65.4	61.9	3.5	85.7	85.5	.2
September	57.6	57.6	0	92.0	91.7	.3
October	57.8	56.5	1.3	93.8	93.3	.5
November	47.7	47.7	0	82.0p	81.4p	.6p
December	39.3	39.3	0			

a/ Source: Bureau of Labor Statistics.
b/ Permanent units sponsored by New York State.
c/ Permanent units sponsored by New York State and New Jersey.
n.a. Not available.
p - Preliminary

January 30, 1948

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APPENDIX B. Table 2.

Value of new construction contract awards in 37 States
East of the Rocky Mountains, as reported by F. W. Dodge Corp.
1937 to date

(In millions of dollars)

	Total	Building construction			Other
		Total	Residential	Non-residential	
1937	2,913	2,061	905	1,156	852
1938	3,197	2,058	986	1,072	1,139
1939	3,551	2,300	1,334	966	1,251
1940	4,004	2,892	1,597	1,295	1,112
1941	6,007	4,269	1,954	2,316	1,738
1942	8,255	5,714	1,818	3,897	2,541
1943	3,274	2,292	868	1,424	982
1944	1,994	1,248	348	899	746
1945, Total	3,299	2,414	563	1,850	885
January	141	101	20	82	40
February	147	115	19	96	32
March	329	238	27	211	91
April	396	284	43	241	112
May	243	135	47	87	108
June	227	132	42	90	95
July	258	168	46	122	90
August	264	186	43	143	78
September	278	224	43	181	55
October	317	256	60	196	61
November	370	296	88	208	74
December	331	280	86	194	51
1946, Total	7,490	5,858	3,142	2,716	1,631
January	358	307	90	218	50
February	387	323	102	221	65
March	698	554	275	279	144
April	735	607	371	236	128
May	952	755	464	291	198
June	808	605	332	273	202
July	718	565	281	284	153
August	680	496	284	212	184
September	620	463	294	170	156
October	573	460	235	225	113
November	504	382	221	161	122
December	457	341	193	148	116
1947, Total	7,760	5,870	3,154	2,716	1,890
January	572	458	257	200	114
February	442	352	208	143	91
March	597	475	283	192	122
April	602	441	257	184	161
May	675	490	254	236	185
June	605	419	209	210	186
July	660	494	241	254	166
August	823	600	309	291	223
September	650	508	269	240	142
October	793	627	349	278	166
November	715	533	290	243	182
December	625	471	227	244	154

NOTE: Because of rounding monthly figures do not necessarily add to annual totals.

[redacted]

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APPENDIX B. Table 3-A

Value of New Construction Put in Place, Continental U. S. /a
1920 To Date

(In Millions of Dollars)

	Total	Building Construction			
		Total	Residential	Non Residential	Other
1920	6,119	4,291	1,811	2,480	1,828
1921	5,548	3,774	1,759	2,015	1,774
1922	7,042	5,071	2,853	2,218	1,971
1923	8,604	6,287	3,782	2,505	2,317
1924	9,577	6,843	4,328	2,515	2,734
1925	10,559	7,710	4,646	3,064	2,849
1926	11,179	8,228	4,633	3,595	2,951
1927	11,130	7,879	4,335	3,544	3,251
1928	10,801	7,579	4,025	3,554	3,222
1929	9,913	6,520	2,944	3,576	3,393
1930	8,059	4,361	1,553	2,808	3,698
1931	5,980	3,007	1,287	1,720	2,973
1932	3,260	1,392	488	904	1,868
1933	2,223	944	321	623	1,279
1934	2,756	1,166	416	750	1,590
1935	3,110	1,595	770	825	1,515
1936	4,714	2,690	1,296	1,394	2,024
1937	5,308	3,237	1,583	1,654	2,071
1938	5,018	3,062	1,650	1,412	1,956
1939	6,062	4,025	2,299	1,726	2,037
1940	6,807	4,338	2,682	1,656	2,469
1941	10,308	6,524	3,369	3,155	3,784
1942	13,353	6,400	2,004	4,396	6,953
1943	7,734	3,674	1,535	2,139	4,060
1944	4,073	1,926	861	1,065	2,147
1945	4,595	2,598	857	1,741	1,997
1946	9,890	7,663	3,782	3,881	2,227
1947/b	12,878	9,262	5,384	3,878	3,616
1948 EST	15,200	10,200	6,100	4,100	5,000

a/ Source: Departments of Commerce and Labor
b/ Preliminary

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APPENDIX B. Table 3-B

Value of new construction put in place, Continental U. S. /a
by months, 1945 to date

(In millions of dollars)

	Total	Building Construction			
		Total	Residential	Non-residential	Other
1945, Total	4,595	2,598	857	1,741	1,997
January	279	139	36	103	140
February	283	143	32	111	140
March	315	164	35	129	151
April	341	185	44	141	156
May	385	210	58	152	175
June	407	225	70	155	182
July	424	237	82	155	187
August	437	244	91	153	193
September	410	228	89	139	182
October	427	243	93	150	184
November	441	274	106	168	167
December	446	306	121	185	140
1946, Total	9,890	7,589	3,782	3,807	2,301
January	469	357	140	217	112
February	488	385	149	236	103
March	567	439	180	259	128
April	661	509	222	287	152
May	768	596	279	317	172
June	871	677	332	345	194
July	982	753	386	367	229
August	1,056	802	424	378	254
September	1,066	810	440	370	256
October	1,070	803	438	365	267
November	987	758	415	343	229
December	905	700	377	323	205
1947, Total/b	12,878	9,262	5,384	3,878	3,616
January	839	657	345	312	182
February	795	619	323	296	176
March	826	612	321	291	214
April	876	633	340	293	243
May	955	677	376	301	278
June	1,070	739	423	316	331
July	1,161	801	473	328	360
August	1,242	856	515	341	386
September	1,279	887	537	350	392
October	1,334	927	570	357	407
November	1,286	937	587	350	349
December	1,215	917	574	343	298

a/ Sources: Departments of Commerce and Labor.
b/ Breakdown of farm construction as to residential and non-residential estimated by HHFA.

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APPENDIX B. Table 4.

Composite index of production for selected construction materials, 1915 to date [a]

(1939=100)

Annual Indexes

Year	Index	Year	Index	Year	Index
1915	101.3	1926	133.3	1937	93.8
1916	108.0	1927	128.9	1938	82.2
1917	97.4	1928	129.5	1939	100.0
1918	80.4	1929	129.2	1940	106.4
1919	90.2	1930	102.4	1941	129.2
1920	95.9	1931	73.4	1942	126.9
1921	82.2	1932	46.2	1943	101.3
1922	104.7	1933	50.9	1944	92.1
1923	123.8	1934	55.2	1945	89.8
1924	125.4	1935	65.9	1946	125.1
1925	134.0	1936	91.0		

Monthly Indexes

	1945	1946	1947
January	82.6	89.5	124.6
February	77.5	87.2	120.7
March	91.3	109.1	130.2
April	88.5	120.4	138.3
May	97.8	125.3	138.3
June	98.4	129.2	138.0
July	91.8	134.6	136.2
August	100.2	147.9	147.0
September	90.1	142.1	145.9
October	93.6	150.8	156.3
November	90.4	139.5	137.1
December	75.7	125.9	

Source: Department of Commerce, "Construction and Construction Materials", October, 1947.

[redacted]

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Table 5-A

PRODUCTION OF SPECIFIED FOREST PRODUCTS

PERIOD	LUMBER		SOFTWOOD PLYWOOD	HARDWOOD FLOORING
	Quantity MM Bd. Ft.	Index	MM Sq. Ft.	MM Bd. Ft.
1939	28,755	100.0	1,000	618.9
1940	31,159	108.4	1,200	726.7
1941	36,538	127.1	1,600	789.2
1942	36,332	126.4	1,840.2	525.7
1943	34,289	119.2	1,495.2	285.5
1944	32,938	114.5	1,484.9	279.4
1945	28,122	97.8	1,222.4	282.4
1946 - Total	35,062	121.9	1,436.5	360.8
1st Quarter	6,656	92.6	313.7	76.9
2nd Quarter	9,296	129.3	370.1	77.7
3rd Quarter - Total	10,006	139.2	351.6	90.9
July	3,222	134.5	95.7	27.6
August	3,513	146.6	126.6	30.3
September	3,271	136.5	129.3	33.0
4th Quarter - Total	9,104	126.6	401.1	115.3
October	3,402	142.0	149.6	39.8
November	3,063	127.8	129.6	37.6
December	2,638	110.1	121.8	37.9
1947				
1st Quarter - Total	7,967	110.9	409.5	133.0
January	2,547	106.3	140.1	44.2
February	2,589	108.1	129.6	41.9
March	2,831	118.2	139.8	46.9
2nd Quarter - Total	n.a.	130.7	429.7	157.7
April	3,106	129.6	148.0	52.0
May	3,209	133.9	142.1	53.6
June	n.a.	128.5	139.6	52.1
3rd Quarter - Total	n.a.	130.3	390.9	193.2
July	n.a.	124.3	104.5	61.2
August	n.a.	136.7	139.4	63.5
September	n.a.	129.9	147.0	68.5
4th Quarter				
October	n.a.	133.7	170.3	76.8
November	n.a.	116.4	144.9	62.2
December				

n.a. Not available.

Table 5-B

PRODUCTION OF SPECIFIED FOREST PRODUCTS

PERIOD	MILLWORK			
	Pine Open Sash M Units	Ponderosa Pine Doors M Units	Hardwood Doors M Units	Pine Exterior Frames M Units
1939	11,257	2,711	287	2,909
1940	12,251	3,067	217	3,693
1941	14,452	3,990	204	4,653
1942	12,375	2,645	67	3,274
1943	12,641	2,873	34	2,093
1944	11,078	2,836	37	2,076
1945	9,307	2,574	48	1,950
1946 - Total	7,280	2,353	53	2,880
1st Quarter	1,547	531	14	549
2nd Quarter	1,870	568	11	665
3rd Quarter - Total	1,792	571	14	758
July	535	153	4	230
August	649	212	5	266
September	608	206	5	262
4th Quarter - Total	2,071	683	14	908
October	726	234	5	346
November	679	217	4	286
December	666	232	5	276
1947				
1st Quarter - Total	1,997.5	733.1	13.3	970.7
January	709.8	238.5	5.7	371.8
February	612.4	232.5	3.9	277.6
March	675.3	262.1	3.7	321.3
2nd Quarter - Total	2,163.2	855.8	12.9	953.1
April	747.0	285.1	3.9	280.2
May	731.9	291.2	4.6	362.7
June	684.3	279.5	4.4	310.2
3rd Quarter - Total	2,103.5	835.8	14.2	800.0
July	639.9	249.2	3.4	230.5
August	720.0	303.7	6.0	281.0
September	743.6	282.9	4.8	288.5
4th Quarter - Total	2,326.1	855.5	16.3	900.7
October	874.7	327.8	5.6	316.1
November	738.9	284.5	5.6	301.6
December	712.5	243.2	5.1	283.0

Table 5-C

PRODUCTION OF SPECIFIED IRON & STEEL PRODUCTS

PERIOD	CAST IRON SOIL PIPE M Tons	CAST IRON PRESSURE PIPE M Tons	BUTT WELD STEEL PIPE M Tons
1939	417.0/a	722.7/a	953,0/a
1940	450.0/a	790 /a	1,157.1/a
1941	565,6	1,092.3/a	1,768.3/a
1942	n.a.	1,189.0/a	1,372.2/a
1943	159.3	541.4	1,380.6
1944	182.0	507.5	1,479.5
1945	203,0	602,7	1,518.1
1946 - Total	409.2	786.3	1,345.9
1st Quarter	85.5	167.6	224.5
2nd Quarter	84.3	197.5	349.4
3rd Quarter - Total	107.5	211,9	401.9
July	30.2	67.4	118.3
August	36.9	73.4	147.3
September	40,5	71.0	136,3
4th Quarter - Total	132.0	209.3	370.1
October	47.8	84.2	145.8
November	44.1	69.5	144.5
December	40.1	55.6	79.7
1947			
1st Quarter - Total	153.4	255.0	371.3
January	52.3	86.6	121,3
February	49.3	80.4	121.0
March	51.8	88.0	129.0
2nd Quarter - Total	155.1	262.3	456.8
April	54.4	82.0	151.9
May	51,4	94.3	156.8
June	49,3	86.0	148.1
3rd Quarter - Total	128.5	251.1	413.2
July	40.7	76.9	128.6
August	43,5	86.4	146.3
September	44,3	87.8	138.3
4th Quarter			
October	51.7	99.6	156.4
November	42,3	81.1	149,1
December			

a/ Production; all other data for these materials refer to shipment.
n.a. Not available.

Table 5-D

PRODUCTION OF SPECIFIED IRON & STEEL PRODUCTS

PERIOD	WIRE NAILS & STAPLES M Tons	CARBON STEEL SHEET & STRIP M Tons	FOUNDRY AND MALLEABLE PIG IRON/c M Gross Tons
1939	720/a	10,298/a	~~2,946~~ 2,671
1940	664/a /b	12,023/a	~~3,683~~ 3,376
1941	780/a /b	15,413/a	~~4,623~~ 4,147
1942	863/a	9,592/a	~~4,416~~ 4,080
1943	849	10,086	~~4,317~~ 3,674
1944	673	11,429	~~4,491~~ 3,830
1945	643	12,809	~~4,359~~ 3,765 prod.
1946 - Total	662.5	13,276	3,904
1st Quarter	101.3	2,359	1,721
2nd Quarter	162.7	3,317	
3rd Quarter - Total	175.4	3,626	1,109
July	51.8	1,113	354
August	61.0	1,273	374
September	62.6	1,240	381
4th Quarter - Total	223.1	3,975	1,074
October	71.4	1,404	387
November	73.2	1,358	385
December	78.5	1,213	302
1947			
1st Quarter - Total	226.6	4,025	1,175
January	79.2	1,357	403
February	70.0	1,236	361
March	77.4	1,432	411
2nd Quarter - Total	213.8	4,286	1,167
April	76.6	1,447	385
May	71.7	1,446	400
June	65.5	1,393	382
3rd Quarter - Total	184.6	4,033	1,072
July	57.4	1,281	335
August	62.8	1,361	370
September	64.4	1,391	367
4th Quarter			
October	70.5	1,508	400
November	66.7	1,393	390
December			

a/ Production; all other data for these materials refer to shipment.
b/ Nails only; all other data include wire staples.
c/ ~~1946 and 1947~~ Data on shipments for sale, as reported by AISI, differ from CPA estimates for these periods, which also included molten metal for direct casting.

Table 5-E

PRODUCTION OF SPECIFIED HEATING EQUIPMENT

Period	Warm Air Furnaces M Units	Floor and Wall Furnaces M Units	Cast Iron Radiation M. Sq. Ft.	Convector Radiation M. Sq. Ft.	Cast Iron Boilers M Lbs.
1939	439	n.a.	60,213	7,318	n.a.
1940	531	223.3	77,055	6,665	283,848
1941	568	342	84,086	6,988	310,896
1942	281	n.a.	59,660	4,390	176,832
1943	198	56	31,000	3,713	172,512
1944	294.2	85.8	17,388	4,500	218,196
1945	364.9	165.7	17,745	7,368	n.a.
1946 - Total	706.0	404.5	38,434.7	25,090.6	248,453
1st Quarter	126.0	59.3	6,446.6	4,076.4	38,990
2nd Quarter	140.7	69.6	9,113.8	4,675.9	58,877
3rd Quarter - Total	184.8	113.4	10,681.8	6,993.2	72,281
July	50.9	33.2	3,206.8	1,863.3	21,188
August	62.7	38.0	3,847.4	2,471.2	25,380
September	71.1	42.2	3,627.5	2,658.8	25,713
4th Quarter - Total	254.5	162.2	12,192.6	9,345.1	78,305
October	85.6	49.9	4,545.7	2,899.2	30,049
November	87.1	59.3	4,382.6	3,426.7	28,400
December	81.9	53.0	3,264.4	3,019.2	19,856
1947					
1st Quarter - Total	229.7	184.6	13,649.3	10,697.3	83,438
January	80.3	64.9	4,618.7	3,519.5	27,982
February	78.1	61.9	4,168.0	3,586.2	26,003
March	71.3	57.8	4,862.6	3,591.6	29,453
2nd Quarter - Total	185.1	121.5	14,275.2	9,937.9	84,911
April	64.8	47.6	4,820.0	3,612.9	28,849
May	64.2	37.1	4,983.8	3,435.0	30,224
June	56.1	36.8	4,471.4	2,890.0	25,838
3rd Quarter - Total	216.6	131.3	13,123.8		74,761
July	58.5	35.1	4,301.8	n.a.	20,506
August	75.7	41.5	4,073.0	n.a.	25,175
September	82.4	54.7	4,749.0	n.a.	29,080
4th Quarter					
October	97.6	72.2	5,863	n.a.	33,090
November	71.7	69.2	5,217	n.a.	29,483

n.a. Not available.

Table 5-F

PRODUCTION OF STAPLE PLUMBING FIXTURES

Period	Bathtubs (Metallic) M Units	Sinks & Sink-Tray Combinations M Units	Lavatories M Units	Water-Closet Bowls M Units	Water-Closet Tanks M Units
1939	886.9	1,468.5 /b	1,428.0	1,584.6	1,315.6
1940	972.8	n.a.	n.a.	2,035.8	1,652.9
1941	1,177.0	n.a.	2,068.0	2,434.0	n.a.
1942	n.a.	n.a.	n.a.	n.a.	n.a.
1943	n.a.	n.a.	n.a.	n.a.	n.a.
1944	n.a.	n.a.	n.a.	n.a.	n.a.
1945	256.7	681.6	1,012.1	1,413.9	1,342.9
1946 - Total	1,093.8 /a	2,237.1	1,788.4	2,113.2	1,908.2
1st Quarter	181.0	385.0	365.0	500.0	447.8
2nd Quarter	263.8	536.5	416.2	508.0	464.4
3rd Quarter - Total	292.4	540.3	447.1	500.8	459.7
July	81.9	163.1	134.0	149.1	139.6
August	103.8	199.4	159.4	180.8	165.3
September	106.7	177.8	153.7	170.9	154.8
4th Quarter - Total	356.5	775.3	560.1	604.5	536.3
October	106.7	252.4	174.0	207.9	187.9
November	123.9	206.7	191.8	194.1	172.4
December	125.9	262.2	194.3	202.5	176.0
1947					
1st Quarter - Total	383.6	922.6	631.4	584.3	502.1
January	n.a.	n.a.	n.a.	n.a.	n.a.
February	n.a.	n.a.	n.a.	n.a.	n.a.
March	n.a.	n.a.	n.a.	n.a.	n.a.
2nd Quarter - Total	422.9	734.6	709.7	596.9	526.5
April	n.a.	n.a.	n.a.	n.a.	n.a.
May	n.a.	n.a.	n.a.	n.a.	n.a.
June	n.a.	n.a.	n.a.	n.a.	n.a.
3rd Quarter - Total	392.1	576.0	642.5	622.0	555.1
July	n.a.	n.a.	n.a.	n.a.	n.a.
August	n.a.	n.a.	n.a.	n.a.	n.a.
September	n.a.	n.a.	n.a.	n.a.	n.a.
4th Quarter - Total	n.a.	n.a.	n.a.	n.a.	n.a.

a/ 1946 data include a small quantity of non-metallic bathtubs; all other periods include only metallic bathtubs.

b/ Includes sinks only; data on sink-tray combinations are not available.

n.a. Not available.

Table 5-G

PRODUCTION OF SPECIFIED NON-METALLIC PRODUCTS

PERIOD	CLAY BRICK MM Brick	STRUCTURAL CLAY TILE M Tons	VITRIFIED CLAY SEWER PIPE M Tons	GYPSUM BOARD & LATH MM Sq. Ft. a/	PORTLAND CEMENT M Bbls.
1939	4,748	1,639	1,076.2	1,548	122,259
1940	4,096/b	1,034.6/b	906.6/b	2,031	130,217
1941	4,938	1,125	1,128.0	2,777	164,031
1942	3,388	1,045	1,380.0	2,428	182,781
1943	1,918	845	927.1	2,305	133,424
1944	1,878	716	738.9	2,116	90,906
1945	2,289	739	697.5	2,104	102,805
1946 - Total	4,868.6	1,273.2	1,080.8	3,147.2	163,805
1st Quarter	931.6	244.5	195.8	651.1	30,190
2nd Quarter	1,136.5	301.7	247.5	725.1	39,230
3rd Quarter - Total	1,453.8	361.2	314.9	853	48,083
July	481.5	119.0	107.9	275	15,420
August	501.3	125.4	108.0	300	16,213
September	471.0	116.8	99.0	278	16,450
4th Quarter - Total	1,346.7	365.8	322.5	917.9	46,302
October	509.8	128.3	116.6	318	16,410
November	455.7	124.0	102.9	306	15,335
December	381.1	113.5	103.1	293	14,557
1947					
1st Quarter - Total	1,051.4	306.9	326.8	899.2	40,229
January	376.8	112.1	113.0	317.2	13,406
February	334.6	97.4	104.5	295.0	12,618
March	340.0	97.4	109.3	287.0	14,205
2nd Quarter - Total	1,204.2	314.9	334.6	911.7	43,926
April	377.6	107.5	101.9	295.0	14,566
May	412.0	105.7	117.0	306.7	13,389
June	414.6	101.7	115.7	310.0	15,971
3rd Quarter - Total	1,361.2	343.5	338.1	977	51,141
July	438.6	118.8	109.7	336	16,342
August	466.6	114.2	111.4	326	17,480
September	456.0	111.2	117.0	315	17,319
4th Quarter					
October	511.4	115.8	120.7	330	18,300
November	461.1	106.1	117.8	340	16,814
December				354	

a/ Shipments.
b/ Coverage is incomplete.

Appendix B. Table 5

SOURCES OF DATA OF
PRODUCTION OF SELECTED BUILDING MATERIALS, 1939 - AUGUST 1947

Lumber: Quantities, in board feet, through May 1945: Bureau of the Census, and U. S. Forest Service. Index: Construction Division, Department of Commerce.

Plywood: 1939 - 41: Douglas Fir Plywood Institute as reported to Civilian Production Administration. 1942-47: Bureau of the Census.

Hardwood Flooring: 1939 - 1946: Civilian Production Administration estimates based on data furnished by the Oak Flooring Mfrs. Assn. and Maple Flooring Mfrs. Assn. adjusted for estimated production by non-members. 1947 data are unadjusted reports from those associations.

Millwork: National Door Manufacturers' Association.

Plumbing Fixtures: 1939, 1940, 1941, 1945, 1947: Bureau of the Census. All other years: Civilian Production Administration.

Cast Iron Soil Pipe: 1940 - 1941: Civilian Production Administration. All other years: Bureau of the Census.

Cast Iron Pressure Pipe: 1939 - 42: Cast Iron Pipe Institute. All other years: Bureau of the Census.

Butt-weld Steel Pipe: 1939 - 41, & 1947: American Iron and Steel Institute. All other years: Civilian Production Administration.

Warm Air Furnaces: 1939 - 1944: Civilian Production Administration. All other years: Bureau of the Census.

Floor and Wall Furnaces: 1939 - 1944: Civilian Production Administration. All other years: Bureau of the Census.

Cast Iron Radiation: 1947: Bureau of the Census: All other years: Civilian Production Administration.

Convector Radiation: Civilian Production Administration.

Cast Iron Boilers: 1940 - 1944: Civilian Production Administration. All other years: Bureau of the Census.

Nails: 1939: Bureau of the Census: 1940 - 42: Office of the Housing Expediter estimates based on American Iron and Steel Institute and Census data; 1943 - 46: Civilian Production Administration, 1947: OHE estimates based on American Iron and Steel Institute data, adjusted for estimated production by non-members.

Carbon Steel Sheet: 1939: Bureau of the Census. 1940 - 42: Office of the Housing Expediter estimates based on American Iron and Steel Institute and Census data. 1943 - 46: Civilian Production Administration. 1947: Office of the Housing Expediter estimates based on American Iron and Steel Institute data, adjusted for estimated production by non-members.

Foundry-Malleable Pig Iron: ~~1939 - 42:~~ American Iron and Steel Institute. ~~1943 - May 1947: Civilian Production Administration and Office of the Housing Expediter. All other data are Office of the Housing Expediter estimates based on American Iron and Steel Institute reports of total pig iron production.~~

Clay Brick: 1941: Works Progress Administration; January - August 1942: Civilian Production Administration. All other data: Bureau of the Census.

Structural Clay Tile: 1939: Structural Clay Products Institute. 1941: Works Progress Administration; January - August 1942: Civilian Production Administr tion. All other data: Bureau of the Census.

Gypsum Board and Lath: 1939 - 45: Bureau of Mines. 1946 - May 1947: Civilian Production Administration. June-August 1947: Estimates of Construction Division, Department of Commerce, subject to adjustment as quarterly data became available from the Bureau of Mines.

Portland Cement: Bureau of Mines.