Form F. R. 131

BOARD OF GOVERNORS
OF THE
FEDERAL RESERVE SYSTEM

Office Correspondence

Date November 23, 1937.

To Chairman Eccles

Subject: Building Materials Costs

From Lauchlin Currie
LMC.

Attached is a preliminary report on building materials, one of a collection of reports on building which I was in part responsible for getting under way last Spring. It was prepared under the auspices of the Industrial Committee of the National Resources Committee. Instead of making a digest of it I have underlined passages and tables which should take you no more than five minutes or so to look over.

It emphasizes the importance of materials as contrasted with labor in explaining the advance in construction costs the past year.

You have probably already thought of it, but I think strong representations should be made to the President and to the I.C.C. concerning the disastrous effect of the proposed advances in freight charges on building materials.

(CONFIDENTIAL AND PRELIMINARY)

CHAPTER VII. BUILDING MATERIALS AND THE COST OF HOUSING

by Theodore J. Kreps

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Building materials are more significant in the cost of building than labor costs even though labor difficulties are more annoying to many builders. Building materials price levels have risen more rapidly than other prices and are in some cases higher than during the building boom of the "twenties". There are evidences of inefficient distribution and assemblage of materials. Creation of more competitive prices and better industrial organization are the methods for securing lower prices.

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BUILDING MATERIALS AND THE COST OF HOUSING

Introduction and Summary

The importance of building materials in the housing problem is frequently underestimated. Building material costs usually range from somewhere near equal to double the on-site wages bill. Thus a change in the price of building materials may have as much as twice the effect of an equal percentage change in wage rates. Prices and practices in the building materials industries, therefore, deserve careful and continuous examination.

The analysis which is to follow, while done in bold strokes and presented in too brief compass, indicates, on the basis of the fragments of evidence now available, that the wasteful, uncoordinated, and indeed, in some instances, anti-social practices of management in the building materials and building construction industries constitute a formidable obstacle to the recovery of residential building in the United States.

The analysis shows, furthermore, among other things, that building materials have recently caused more than twice the amount of increase in costs of residential construction that can be attributed to increases in wages. Some important building materials are from 20 to 30 percent higher in price than they were on the average throughout the gigantic building boom of the "twenties", notably Douglas fir, yellow pine and white pine lumber, plaster, various steel products and certain types of brick. These precipitate

increases together with inflexibility of materials prices suggest that certain producer organizations have recently perfected the technique of "closely adjusting production to consumption" to the point where the long-sought-for "stabilization" of prices seems on the verge of realization. Thus, the more important building materials continue to be restrictedly produced, inefficiently and even wastefully distributed, and assembled and utilized without benefit of the economies either of large-scale residential building operations or of vertical combinations integrating home-building from sawmill and brick factory to home-owner and investor.

This study summarizes the important available evidence on six questions:

I. What proportion do building materials constitute of the total cost of a house? of a home?

II. In how far are building materials responsible for recent increases in building costs?

III. What has happened to the prices of individual building materials?

IV. How account for recent spectacular rises in the prices of lumber and steel?

V. How are building materials distributed and assembled?

VI. How can the high cost of building materials be reduced?

I. BUILDING MATERIAL VERSUS LABOR COSTS

The first step toward assessing in perspective the place of building materials in the housing picture is to specify the type of house used as standard of reference. In this study attention will be focused upon the single detached one-family dwelling of wood or brick. That is the type in which 22,833,110 families out of a total of 29,904,663 families lived in 1930. In that year 16,164,429 out of a total of 18,536,295 non-farm dwellings were one-family structures. A glance at Figure 1 shows that 3/5 to 3/4 of the cases are the type of non-farm dwelling unit ordinarily build. Judging from the experience of Great Britain and other countries that have made headway toward providing low rental housing, it is the type of structure promising for such a program the largest measure of success.

Most important is, of course, the wooden frame structure. In 1923-25, for example, a survey by the United States Department of Commerce[1/] showed that about 80 percent of dwellings in communities of over 2,500 population, and fully 90 percent of those in smaller communities, were constructed of wood. Another survey by the Fidelity-Phoenix Fire Insurance Company in 1932 covering 40 cities in the United States put the figure somewhat lower -- at 68 percent.

There is, to be sure, wide variation in this regard between individual cities. In Los Angeles virtually all the single and

1/ "Domestic Market Possibilities for Sales of Paints and Varnishes" (GPO, Washington, 1925), pp. 18, 20.

Figure 1

ESTIMATED NUMBER OF

NON-FARM DWELLING UNITS

BUILT ANNUALLY

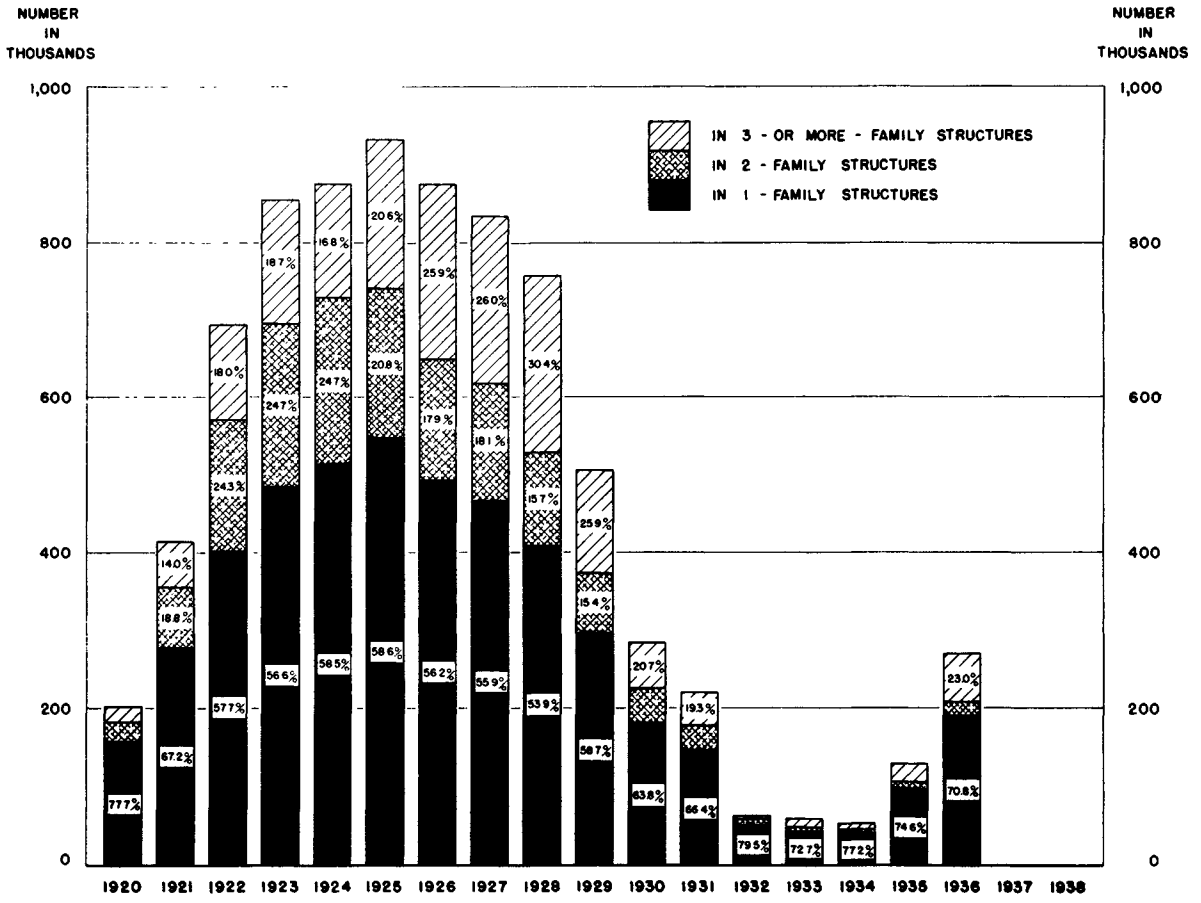
By Type of Structure

Federal Housing Administration
Division of Economics & Statistics
Chart No. C 5 - 553 A.
December 30, 1936

Figure 1.

ESTIMATED NUMBER OF NON-FARM DWELLING UNITS BUILT ANNUALLY

BY TYPE OF STRUCTURE



COMMENTS

NO ACCURATE FIGURES EXIST AS TO THE NUMBER OF DWELLING UNITS BUILT ANNUALLY IN THE UNITED STATES THESE ESTIMATES ARE BASED ON CENSUS DATA AND ON BUILDING PERMIT DATA REPORTED BY THE BUREAU OF LABOR STATISTICS.

THE FEDERAL HOUSING ADMINISTRATION INSURES MORTGAGES ON STRUCTURES CONTAINING ONE TO FOUR FAMILY DWELLING UNITS, INCLUSIVE. THE BASIC DATA PRECLUDE ANY SEGREGATION OF THE ESTIMATES BY THESE PRECISE TYPES, BUT THE MARKET FOR INSURED LOANS ON NEW CONSTRUCTION IS MEASURED APPROXIMATELY BY DWELLING UNITS IN ONE - FAMILY AND TWO - FAMILY STRUCTURES.

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FEDERAL HOUSING ADMINISTRATION
DIVISION OF ECONOMICS & STATISTICS
CHART NO. C 5 553 A.
DECEMBER 30, 1936

two-family houses are of frame construction. In Detroit, according to an estimate by the Department of Buildings and Safety Engineering, from 65 to 75 percent of the dwellings are of frame. In Philadelphia in 1928, on the other hand, of 415,045 dwellings only 9,248, or less than 2.3 percent, were wooden.2/ But the general average none-the-less remains high, probably somewhat more than two-thirds. Consequently, by focusing attention upon single family dwellings of wooden frame construction a large portion of housing is brought within consideration.

Even for the single family house the ratio of materials expense to labor expense varies with the style of architecture, the size of the community, the composite of materials, the geographic area and the method of building and financing. The simpler the plan of the house, the smaller the size of the community, the fewer the gadgets, the further South and West, usually the lower the labor expense. The ratios vary considerably as between houses built to the specifications of the individual owner and those built for a market by a large-scale real estate operator or speculative builder. They also differ markedly as between projects financed and managed by individual contractors utilizing full bargaining strength to get concessions on materials and labor and those projects financed and/or managed by Government agencies where union rates are paid for labor and uniform bids are encountered for the materials. These among many other factors cause a considerable variation in the ratios.

2/ Newman, Bernard J., "What the Rest of the Country Can Learn from Philadelphia," in "Housing Problems in America" (National Housing Association, New York, 1929), Vol. X, p. 40.

Nevertheless, during the last ten years building materials have ordinarily comprised about two-thirds of the cost of the structure and labor slightly over one-third. In the Census of Business for 1935, general building contractors reported only 33.7 percent[3] of the cost of total work performed as consisting of pay roll. The remainder consisted of materials and overhead and profits.

There is, of course, considerable variation within the same city and between various cities. In 1931-32, for example, the Buroau of Labor Statistics obtained the results shown in Table I. Note that materials ratios are relatively high in the South but low in New England and New York, varying from percentages as high as 74 percent in Dallas, Texas, to figures as low as 56.9 percent in Boston, Massachusetts. The variation between individual residences in the same city is even more striking, usually being about ten points or roughly a sixth.

Even when identical quantities of materials and labor are compared, a considerable amount of variation occurs not only between cities but between different periods of time in the same city. The Home Owners' Loan Corporation has been collecting figures on identical quantities of materials and labor requisite to produce a standard wood-frame six-room house.[4]

3/ Census of Business, Construction Industry: 1935, Vol. I, p. 45, Table 2.

4/ For a description of this house see footnote to Table VII, p. VII-21.

These figures are obtained in 90 cities and grouped according to the areas established for the operations of the Federal Home Loan Bank Board.

Table I

Percentage Distribution of Cost of Construction Between Materials and Labor for Residential Construction in Fifteen Specified Cities 1931-1932[a]

	Averages by cities		Range in Individual Buildings			
	Material	Labor	Material		Labor	
			High	Low	High	Low
Atlanta, Georgia	70.1	29.9	73.8	63.5	36.5	26.2
Boston, Massachusetts	56.9	43.1	60.9	43.8	56.2	39.1
Chicago, Illinois	65.1	34.9	65.9	60.3	39.7	34.1
Dallas, Texas	74.0	26.0	30.2	68.8	31.2	19.8
Duluth, Minnesota	66.3	33.7	70.1	62.3	37.7	29.9
Indianapolis, Indiana	59.7	40.3	72.3	56.3	43.7	27.7
Little Rock, Arkansas	67.7	32.3	71.2	62.3	37.7	28.8
New Orleans, Louisiana	69.4	30.6	73.1	60.8	39.2	26.9
New York, New York	59.6	40.4	67.8	57.2	42.8	32.2
Roanoke, Virginia	64.1	35.9	69.3	59.6	40.4	30.7
Saginaw, Michigan	66.5	33.5	67.8	54.1	45.9	32.2
St. Louis, Missouri	63.0	37.0	70.4	55.7	44.3	29.6
Salt Lake City, Utah	65.6	34.4	67.9	61.8	38.2	32.1
Seattle, Washington	57.5	42.5	68.5	55.5	44.5	31.5
Trenton, New Jersey	59.0	41.0	62.7	52.4	47.6	37.3
Weighted average, 15 cities	62.7	37.3				

(a) Monthly Labor Review, October, 1932, pp. 764-765.

In Table II data are presented for 26 of the more important of these cities. Rises and falls in costs are shown for months one year apart, the month of latest available figures in 1937 being compared with the same month in 1936. Notice in the column on the extreme right that the ratios while varying more widely than they did for the respective areas, again group themselves in the interval between 65 and 70 percent, though ranging from roughly 59 percent in Boston, Massachusetts, to 76 percent in Wichita, Kansas.

The next to the last column on the right should be given particular attention. It shows what percentage of the recent increase in costs of a standard 6-room wooden frame house is due to increases in prices of building materials. Notice that in several localities, especially Indianapolis, Indiana, St. Louis, Missouri, Omaha, Nebraska, Nashville, Tennessee, and Providence, Rhode Island, all of the increase in building costs during the last year has been due to materials. In fact, in these cities labor expense actually went down, though only in the case of Omaha, Nebraska, was the decline enough to offset the rise in building materials costs. Note, too, that in only six localities out of the 26 is the share of the rise due to materials less than 60 percent, and in no case is it less than fifty-fifty. In 17 out of the 26 cities it is 74 percent or over.

One further fact should be noted in Table II, namely, the considerable differences in outlay required in the various cities to obtain the same quantity of building materials. In 1936 the figure

Table II

Ratio of Materials Expense to Combined Cost of Labor and Materials[a]/

(Figures do not include miscellaneous items such as insurance and profit.)

Area City	Year	Total	Labor	Percent	Materials	Percent	Percent of rise due to materials
Area 1							
Boston, Mass.	June, 1936	5,039.91	2,102.75	41.7	2,937.16	58.3	
	June, 1937	5,665.54	2,314.99	40.9	3,350.55	59.1	
Increase		625.63	212.24		413.39		66
Providence, R. I.	June, 1936	4,812.38	1,713.60	35.6	3,098.78	64.4	
	June, 1937	5,201.55	1,701.60	32.7	3,499.95	67.3	
Increase		389.17	-12.00		401.17		103
Area 2							
Newark, N. J.	July, 1936	5,055.89	2,167.10	42.9	2,888.79	57.1	
	July, 1937	5,657.76	2,238.10	39.6	3,419.66	60.4	
Increase		601.87	71.00		530.87		88
Albany, N. Y.	July, 1936	4,677.29	1,655.51	35.4	3,021.78	64.6	
	July, 1937	5,294.21	1,919.59	36.3	3,374.62	63.7	
Increase		616.92	264.08		352.84		57
Area 3							
Philadelphia, Pa.	Aug., 1936	4,321.48	1,425.53	33.0	2,895.95	67.0	
	Aug., 1937	5,209.51	1,843.53	35.4	3,365.98	64.6	
Increase		888.03	418.00		470.03		53
Pittsburgh, Pa.	Aug., 1936	4,769.71	1,453.28	30.5	3,316.43	69.5	
	Aug., 1937	5,944.45	1,986.82	33.4	3,957.63	66.6	
Increase		1,174.74	533.54		641.20		55
Area 4							
Birmingham, Ala.	June, 1936	4,398.74	1,383.12	31.4	3,015.62	68.6	
	June, 1937	5,326.62	1,789.14	33.6	3,537.48	66.4	
Increase		927.88	406.02		521.86		56
Tampa, Fla.	June, 1936	4,709.09	1,353.95	28.8	3,355.14	71.2	
	June, 1937	5,025.39	1,373.83	27.3	3,651.56	72.7	
Increase		316.30	19.88		296.42		94
Richmond, Va.	June, 1936	4,413.30	1,329.30	30.1	3,084.00	69.9	
	June, 1937	4,608.65	1,376.70	29.9	3,231.95	70.1	
Increase		195.35	47.40		147.95		76
Area 5							
Cleveland, Ohio	Aug., 1936	5,386.98	2,154.73	40.0	3,232.25	60.0	
	Aug., 1937	6,105.56	2,329.48	38.2	3,776.08	61.8	
Increase		718.58	174.75		543.83		76
Nashville, Tenn.	Aug., 1936	4,472.10	1,400.42	31.3	3,071.68	68.7	
	Aug., 1937	4,836.00	1,397.18	28.9	3,438.82	71.1	
Increase		363.90	-3.24		367.14		101
Area 6							
Indianapolis, Ind.	July, 1936	5,084.02	1,741.50	34.3	3,342.52	65.7	
	July, 1937	5,167.21	1,644.43	31.8	3,522.78	68.2	
Increase		83.19	-97.07		180.26		217
Grand Rapids, Mich.	July, 1936	4,543.29	1,355.48	29.8	3,187.81	70.2	
	July, 1937	4,884.72	1,409.93	28.9	3,474.79	71.1	
Increase		341.43	54.45		286.98		84
Detroit, Mich.	July, 1936	4,639.38	1,562.30	33.7	3,077.08	66.3	
	July, 1937	5,585.42	2,007.05	35.9	3,578.37	64.1	
Increase		946.04	444.75		501.29		53
Area 7							
Chicago, Ill.	June, 1936	5,790.34	2,537.03	43.8	3,253.31	56.2	
	June, 1937	6,336.27	2,678.11	42.3	3,658.16	57.7	
Increase		545.93	141.08		404.85		74
Milwaukee, Wis.	June, 1936	4,858.06	1,592.61	32.8	3,265.45	67.2	
	June, 1937	5,957.19	1,710.66	28.7	4,246.53	71.3	
Increase		1,099.13	118.05		981.08		89
Oshkosh, Wis.	June, 1936	4,924.55	1,541.10	31.3	3,383.45	68.7	
	June, 1937	5,057.19	1,522.73	30.1	3,534.46	69.9	
Increase		132.64	-18.37		151.01		114

Table II (Continued)

Ratio of Materials Expense to Combined Cost of Labor and Materials[a/]

(Figures do not include miscellaneous items such as insurance and profit.)

Area		Total	Labor	Percent	Materials	Percent	Percent of rise due to materials
City	Year						
Area 8							
St. Paul, Minn.	July, 1936	4,838.61	1,676.65	34.7	3,161.96	65.3	
	July, 1937	6,051.58	2,152.36	35.6	3,899.22	64.4	
Increase		1,212.97	475.71		737.26		61
St. Louis, Mo.	July, 1936	5,160.82	2,225.46	43.1	2,935.36	56.9	
	July, 1937	5,697.36	2,136.87	37.5	3,560.49	62.5	
Increase		536.54	-88.59		625.13		117
Area 9							
New Orleans, La.	Aug., 1936	4,504.27	1,252.40	27.8	3,251.87	72.2	
	Aug., 1937	5,298.32	1,458.54	27.5	3,839.78	72.5	
Increase		794.05	206.14		587.91		74
Houston, Texas	Aug., 1936	5,098.24	1,590.26	31.2	3,507.98	68.8	
	Aug., 1937	5,328.33	1,678.31	31.5	3,650.02	68.5	
Increase		230.09	88.05		142.04		62
Area 10							
Wichita, Kansas	June, 1936	4,547.75	1,098.50	24.2	3,449.25	75.8	
	June, 1937	5,223.06	1,184.35	22.7	4,038.71	77.3	
Increase		675.31	85.85		589.46		87
Omaha, Nebr.	June, 1936	4,896.35	1,565.60	32.0	3,330.75	68.0	
	June, 1937	4,736.18	1,168.38	24.7	3,567.80	75.3	
Decrease		-160.17	-397.22		237.05		[b/]
Area 11							
Portland, Ore.	July, 1936	4,647.72	1,648.30	35.5	2,999.42	64.5	
	July, 1937	5,306.57	1,854.65	35.0	3,451.92	65.0	
Increase		658.85	206.35		452.50		69
Spokane, Wash.	July, 1936	5,009.36	1,634.13	32.6	3,375.23	67.4	
	July, 1937	5,944.84	2,235.43	37.6	3,709.41	62.4	
Increase		935.48	601.30		334.18		36
Area 12							
Los Angeles, Calif.	Aug., 1936	4,644.52	1,604.44	34.5	3,040.08	65.5	
	Aug., 1937	5,260.76	1,758.51	33.4	3,502.25	66.6	
Increase		616.24	154.07		462.17		75

[a/] Source: Federal Home Loan Bank Board. Courtesy of Mr. Corwin A. Fergus, Director, Division of Research and Statistics.

[b/] Total cost declined 3 percent, although the cost of materials increased. If materials cost had remained the same, total cost would have declined 8 percent.

Table II

Ratio of Materials Expense to Combined Cost of Labor and Materials

Source: Federal Home Loan Bank Board, courtesy of Mr. Corwin A. Fergus, Director, Division of Research and Statistics.

varied from as low as $2,900 in Newark, New Jersey to $3,500 in Houston, Texas. In 1937 the lowest figure of $3,200 in Richmond, Virginia, was a fourth lower than the highest figure of $4,250 for Milwaukee, Wisconsin. Clearly these differences, while in part due to differences in freight rates, shift temporarily and regionally in accordance with variations in distributive mark-ups, contractor bargaining power, and the like. The pattern shifts continually.

Thus far the discussion has centered upon the wooden frame single family dwelling built under ordinary conditions. When other materials are used or multiple-family dwellings are erected under governmental auspices the ratios will differ considerably. In Table III is contained a sample of diverse types of conditions. Notice that labor expense is uniformly higher on government projects and for multi-family dwellings than it is for privately built houses.

Building materials, therefore, constitute from 50 to 70 percent of the combined cost of labor and materials. But they constitute a smaller percentage of the total capital cost of the home to the builder and to the buyer, the figure usually being between 40 and 45 percent.

Table III

Material Costs Versus Labor Costs

Place	Material costs (percent of cost of structure)	Labor costs	Type of structure and of operation
Pontiac, Michigan	62.8	37.2	150 houses built by Oakland Housing Corp.
Purdue University			
House No. 1	66.3	33.7	Wood frame and stucco.
House No. 4	72.0	28.0	Walls and roof of pre-fabricated panels.
Atlanta Georgia 1/	57.9	42.1	Techwood apartments - P.W.A.
Miami, Florida	54.1	45.9	Liberty Square project, P.W.A.
Montgomery, Alabama	59.4	40.6	Paterson Courts, P.W.A.
Montgomery, Alabama	58.9	41.1	Riverside Heights, P.W.A.
Cleveland, Ohio	53.8	46.2	Cedar Central Apartments, P.W.A.
Washington, D. C.	50.9	49.1	Alley Dwelling Authority, row type houses.

1/ Source of data for governmental projects: Bureau of Labor Statistics courtesy of Herman M. Byers, Chief of Division of Construction and Employment.

Table IV

Elements in the Cost of a Home

	Westacres Project(a)		Bungalow-4 room(b)	
	Dollars	Percent of selling pr.	Dollars	Percent of selling pr.
1. House construction				
Materials	1,991.44	39.8	2,463.00	61.6
Labor	1,183.24	23.6		
Construction overhead	302.80	6.1	274.00	6.8
Cost of structure	3,477.48	69.5	2,737.00	70.4
2. Land and improvements				
Landscaping and soil	203.39	4.1	51.00	1.3
Water mains	143.76	2.9	---	---
Roads and streets	152.78	3.1	---	---
Land	194.30	3.9	666.81	16.7
Septic tanks and drains	81.07	1.6	---	---
Cost of land	802.30	16.0	717.81	18.0
3. Overhead				
Engineering and architecture	37.47	.7	---	---
Original survey	20.04	.4	---	---
General administrative expense	102.15	2.1	---	---
Total overhead	159.66	3.2	310.43	7.7
4. Cost of house complete	4,439.44	88.8	3,765.24	94.1
5. Selling price	5,000.00	100.0	4,000.00	100.0

(a) Average per home for more than 150 houses built by the Oakland Housing Corporation on its Westacres Project near Pontiac, Michigan.

(b) House B, building estimate of Federal Housing Administration, selling price assumed.

The cost of land similarly varies considerably from time to time and from locality to locality, even within the same city or same portion of the city. But in general a figure of 20 percent seems typical. In 1928, for example, the Veterans Welfare Board of California reported that of the cost of veterans' homes, 22 percent on the average was charged against the lot, and that "the lot, unless under exceptional circumstances, should represent from 20 to 25 percent of the total cost of the home.1/

Another investigator2/ gathered information from builders in twenty-five cities. His findings indicate an average ratio of improved lot cost to total cost of house and lot of 20.2 percent, ranging from 17.7 percent in cities with 50,000 to 100,000 population to 25.7 percent in those with 500,000 to 1,000,000. Subdividers and officials of real estate boards in sixty-four cities gave a general average ratio of 18.1 percent between the cost of the improved lot and the total cost of house and lot. In either event building materials form from 42 (70 x 60) to 52 (80 x 65) percent of the capital costs of the home.

The Standard Statistics Company has estimated that a reduction of interest rates from 6 percent to 3 percent would mean that the number of families which could afford a $3,000 house on a 25-year amortization plan would be increased from about 350,000 at the present time to 6,380,000. With the same equal annual payments for interest and amortization a family paying 6 percent can only afford a $2,940 home, while if

1/ Veterans Welfare Board of California, "Annual Report, 1928" (California State Printing Office, Sacramento, 1928), p. 33.

2/ Whitten, Robert, and Adams, Thomas. "Neighborhoods of Small Homes; Economic Density of Low-Cost Housing in America and England" (published by Harvard University School of City Planning, Harvard University Press, Cambridge, 1931), pp. 34-35, 155-157.

it had to pay only 3 percent it could afford a $4,000 home. The interest rate is thus seen to be a relatively more important item in housing cost than labor or building materials.

II. RESPONSIBILITY OF BUILDING MATERIALS FOR HIGH LEVELS OF BUILDING COSTS

It has been shown (see Table II supra) that building materials account for roughly three-fourths of recent increases. But was the level from which building costs have risen high or relatively low? In short, was the movement in the nature of a recovery from distress and depression levels or did it proceed from levels already out of line?

Figure 2 affords the initial portion of the answer. While the indexes, due to different systems of weighting and construction, show considerable dissimilarity of movement, and though all of them are faulty and unreliable[1/], none of them shows a drop in building costs during the depression exceeding 20 to 25 percent. Moreover, during the heyday of the NRA the indexes rebound on the average to within 10 percent of pre-depression levels. At present, one of them, that of the Engineering News Record (which compounds the prices of steel, cement, lumber and labor), shows a precipitate rise to levels more than 10 percent above any attained during the twenties and unmatched at any time in recent building history except during 1920, the year of postwar inflation.

1/ See especially Lowell J. Chawner, "Construction Cost Indexes as influenced by Technological Change and Other Factors", Journal of the American Statistical Association, Sept. 1935, Supplement Vol.30, pp. 561-576. Chawner points out that general national averages based on quoted prices hide an enormous amount of local variation in the actual costs at which residences are built.

Figure 2.

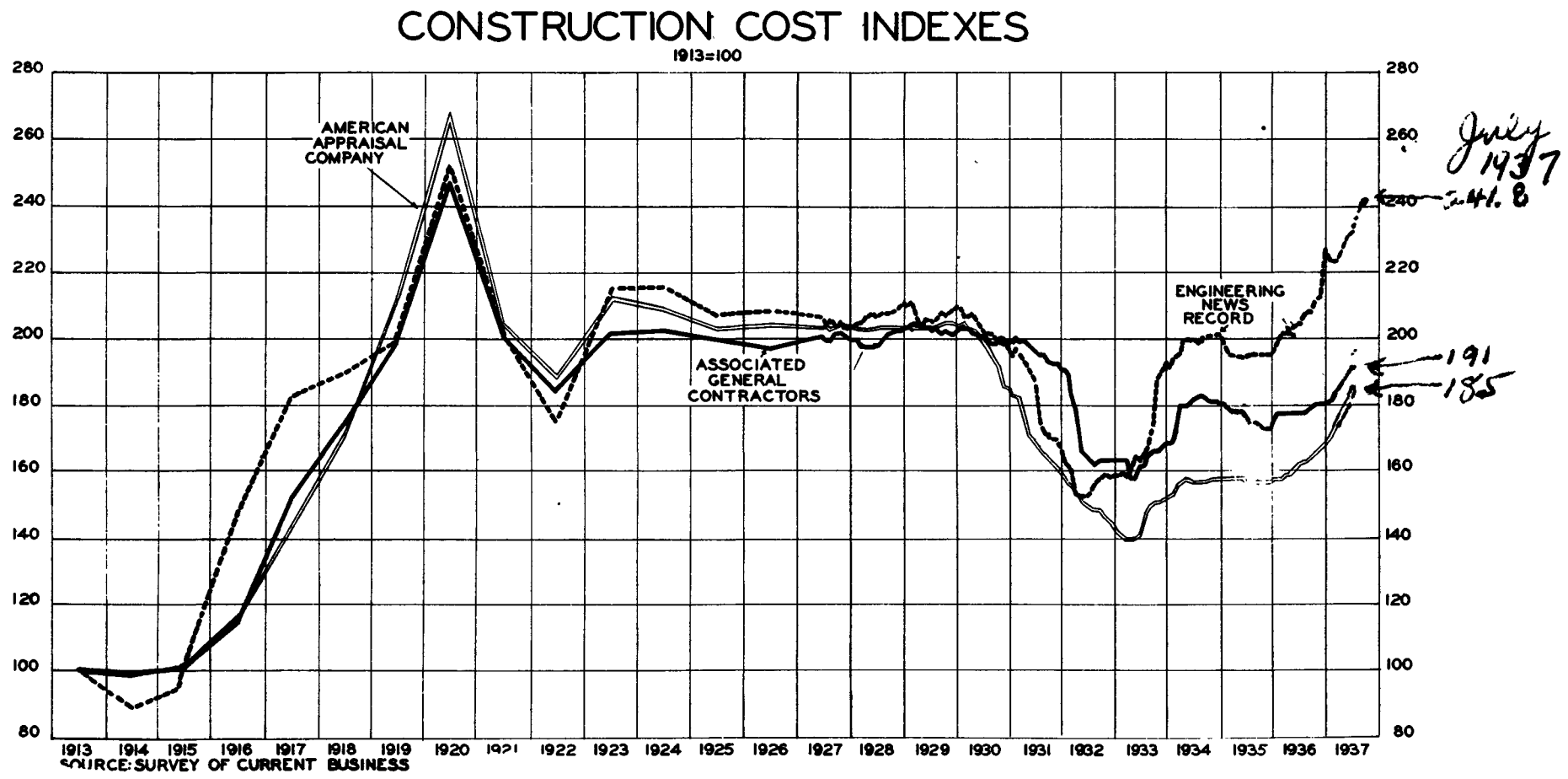


Figure 2

Construction Cost Indexes

1913 = 100

Source: Survey of Current Business

Recent Increases in Building Costs

A similar rise to heights near to or in excess of 1926-29 levels is evidenced in Table V, which while giving no overall average the better shows the crisscross pattern of trends, even as between the larger cities. These variations, of course, represent the results of such factors as differences in building code requirements, in transportation costs, in amount of competition among local contractors and suppliers of building materials, differences in types of building, in productivity of labor and in wage rates, and changes in engineering practices. Notice in Table V that building costs in Cincinnati, Cleveland, Minneapolis, San Francisco, and Seattle definitely exceed 1926-1929 levels, whereas in other cities with the exception of Baltimore, Dallas, New York, and St. Louis, they are within less than 5 percent of those boom heights. Particularly outstanding is the precipitate character of the rise in the 1937 figures over costs in 1936.

The precise amount of this jump, and the variation between localities in this matter, are clearly shown in Table VI. The type of 6-room frame house to which these figures apply is the same as that described in Table II. Notice the unevenness of the pattern even within relatively small areas. As great a difference occurs between Milwaukee and Oshkosh, Wisconsin, for example, as exists between any two cities on opposite sides of the American continent. The largest increases take place in Washington, D.C., St. Paul, Pittsburgh, Philadelphia, Birmingham, and Milwaukee, all over 20 percent. The smallest increases take place in Indianapolis and Little Rock, only one percent. The modal increase is about 10 to 12 percent.

Table V

Rise in Cost of Residential Building by Districts
U. S. Average 1926-1929 = 100

Area	Frame				Brick			
	1926-29 subaverage	June 1937	1936 average	1935 average	1926-29 subaverage	June 1937	1936 average	1935 average
Atlanta	82.7	82.3	68.4	68.4	87.0	88.3	72.4	72.4
Baltimore	107.2	91.0	80.9	80.0	112.0	94.4	85.8	85.5
Boston	116.3	104.8	87.9	91.2	120.3	111.5	94.2	97.6
Chicago	109.2	104.8	97.2	91.5	114.2	111.1	102.9	97.9
Cincinnati	100.5	101.1	84.5	86.4	105.0	108.4	89.9	92.3
Cleveland	107.2	109.2	91.7	87.6	113.4	116.6	98.8	94.5
Dallas	112.8	91.4	82.5	82.8	115.8	96.9	87.1	88.9
Detroit	103.3	95.3	80.6	78.1	108.4	101.8	85.9	83.4
Minneapolis	92.8	103.7	88.6	82.7	98.2	109.2	93.6	88.6
New Orleans	93.3	84.9	73.4	76.2	96.3	88.2	78.8	81.3
New York	133.3	115.0	96.4	92.2	138.4	119.4	101.8	92.5
Philadelphia	100.3	91.0	88.7	85.4	106.3	97.7	95.5	91.9
Pittsburgh	113.3	107.1	92.8	84.1	118.8	114.5	100.4	90.5
St. Louis	118.6	99.2	91.0	91.6	121.1	107.8	99.1	99.7
San Francisco	87.7	96.4	86.5	84.1	93.7	104.9	95.6	91.6
Seattle	84.5	94.4	79.8	81.1	92.2	105.5	86.5	88.6

Source: Survey of Current Business. Index of E. H. Boecker and Associates, Inc.

Table VI

Cost of Building the Same Standard House in Representative Cities in Specific Months

(Source: Federal Home Loan Bank Board)

Federal Home Loan Bank Districts, States, and Cities	Cubic-foot cost		Total Building Cost
	Percent Increase	May 1937	May 1936

Moreover, the level from which this sudden jump of 10 to 12 percent took place was already high. Building materials declined only 24 percent between July of 1929 and February of 1933 while prices in general declined 38 percent. This in itself Dr. Frederich C. Mills designates as an "important barrier to resumption of normal activity".1/.

Despite the rapid rise in general prices in 1933, building materials rose so rapidly that their real costs remained prohibitively high. In 1934 the gap closed somewhat and still more so in 1935. The relative dearness of building materials diminishing, in many places beginnings of a recovery in building activity made their appearance.

But the precipitate price increases during the last twelve months have again widened the gap. In July of this year, in terms of general commodities, the exchange value of building materials not only exceeded 1926 levels by 10 percent but surpassed 1913 levels by more than 30 percent. In short, unless rents and general prices and national income are allowed to overtake the prices of building materials, the strength of the business urge to build houses will be seriously impaired. If building materials are to be more attractive to buyers, their prices, already out of line in 1936 and still more out of line now, must be allowed to sink not only relative to prices in general but to national income and housing rentals.

1/ Frederich C. Mills, "Prices in Recession and Recovery", (National Bureau of Economic Research, 1936), p. 141.

TABLE VI.

Cost of Building the Same Standard House in Representative Cities in Specific Months[a]/

"Note---These figures are subject to correction"

Federal Home Loan Bank Districts, States, and Cities	Cubic-foot cost		Total building cost	Percent increase June 1936-June 1937[b]/
	June 1937	June 1936	June 1937	
No. 1--Boston:				
Connecticut:				
Hartford	$0.265	$0.236	$6,365	12.3
New Haven	.247	.231	5,933	6.9
Maine:				
Portland	.247	.214	5,916	15.4
Massachusetts:				
Boston	.270	.241	6,487	12.0
New Hampshire:				
Manchester	.245	.228	5,888	7.5
Rhode Island:				
Providence	.247	.229	5,932	7.9
Vermont:				
Rutland	.241	.222	5,792	8.6
No.4--Winston-Salem:				
Alabama:				
Birmingham	.253	.209	6,077	21.1
District of Columbia:				
Washington	.260	.207	6,234	25.6
Florida:				
Tampa	.238	.223	5,716	6.7
West Palm Beach	.267	.246	6,411	8.5
Georgia:				
Atlanta	.225	.204	5,410	10.3
Maryland:				
Baltimore	.225	.205	5,402	9.8
Cumberland	.238	.226	5,711	5.3
North Carolina:				
Asheville	.207	.199	4,968	4.0
Raleigh	.232	.211	5,580	10.0
Salisbury	.198	-	4,746	-
South Carolina:				
Columbia	.204	.196	4,886	4.1
Virginia:				
Richmond	.219	.209	5,248	4.8
Roanoke	.225	.202	5,391	11.4

TABLE VI. (Continued)

Federal Home Loan Bank Districts, States, and cities	Cubic-foot cost		Total building cost	Percent increase
	June 1937	June 1936	June 1937	June 1936 to June 1937 b/
No. 7--Chicago:				
Illinois:				
Chicago	$0.302	$0.277	$7,260	9.0
Peoria	.285	.267	6,833	6.7
Springfield	.291	.269	6,980	8.2
Wisconsin:				
Milwaukee	.282	.231	6,780	22.1
Oshkosh	.240	.234	5,760	2.6
No. 10--Topeka:				
Colorado:				
Denver	.275	.252	6,606	9.1
Kansas:				
Wichita	.247	.215	5,927	14.9
Nebraska:				
Omaha	.249	.233	5,969	6.9
Oklahoma:				
Oklahoma City	.243	.232	5,823	4.7
No. 2--New York: c/				
New Jersey:				
Atlantic City	.257	.239	6,173	7.5
Camden	.244	.211	5,866	15.6
Newark	.270	.241	6,474	12.0
New York:				
Albany	.252	.222	6,048	13.5
Buffalo	.271	.237	6,501	14.3
Syracuse	-	.232	-	-
White Plains	.286	.241	6,857	18.7
No. 6--Indianapolis:				
Indiana:				
Evansville	.242	.233	5,816	3.9
Indianapolis	.245	.242	5,890	1.2
South Bend	.266	.244	6,395	9.0
Michigan:				
Detroit	.266	.221	6,379	20.4
Grand Rapids	.232	.216	5,560	7.4

TABLE VI. (Continued)

Federal Home Loan Bank Districts, States, and Cities	Cubic-foot cost		Total building cost	Percent increase
	July 1937	July 1936	July 1937	July 1936 to July 1937[b]
No.8--Des Moines:				
Iowa:				
Des Moines	$0.270	$0.255	$6,483	5.9
Minnesota:				
Duluth	.266	.236	6,373	12.7
St. Paul	.288	.230	6,911	25.2
Missouri:				
Kansas City	.258	.221	6,198	16.7
St. Louis	.271	.246	6,512	10.2
North Dakota:				
Fargo	.253	.234	6,062	8.1
South Dakota:				
Sioux Falls	.261	.238	6,263	9.7
No.11--Portland:				
Idaho:				
Boise	.261	.234	6,273	11.5
Montana:				
Great Falls	.297	.275	7,134	8.0
Oregon:				
Portland	.252	.221	6,058	14.0
Utah:				
Salt Lake City	.266	.241	6,375	10.4
Washington:				
Seattle	.277	.237	6,642	16.9
Spokane	.283	.238	6,796	18.9
Wyoming:				
Casper	--	.261	--	--
		[d]		
No.3--Pittsburg:				
Delaware:				
Wilmington	.239	.220	5,737	8.6
Pennsylvania:				
Harrisburg	.258	.227	6,186	13.7
Philadelphia	.248	.203	5,944	22.2
Pittsburg	.280	.225	6,730	24.4
West Virginia:				
Charleston	.248	.228	5,957	8.8

TABLE VI. (Continued)

Federal Home Loan Bank Districts, States and Cities	Cubic-foot cost		Total building cost	Percent increase
	May 1937	May 1936	May 1937	May 1936 to May 1937[b]
No. 5—Cincinnati:				
Kentucky:				
Lexington	$0.245	$0.213	$5,887	15.0
Louisville	.255	.222	6,111	14.9
Ohio:				
Cincinnatti	.263	.243	6,321	8.2
Cleveland	.281	.256	6,756	9.8
Columbus	.265	.230	6,352	15.2
Tennessee:				
Memphis	.238	.213	5,704	11.7
Nashville	.226	.212	5,421	6.6
No. 9—Little Rock:				
Arkansas:				
Little Rock	.220	.217	5,285	1.4
Louisiana:				
New Orleans	.246	.211	5,911	16.6
Shreveport	.248	-	5,961	-
Mississippi:				
Jackson	.244	.222	5,849	9.9
New Mexico:				
Albuquerque	.265	.234	6,358	13.2
Texas:				
Dallas	.256	.234	6,143	9.4
Houston	.266	.247	6,391	7.7
San Antonio	.262	.231	6,284	13.4
No.12—Los Angeles:				
Arizona:				
Phoenix	.281	.255	6,742	10.2
California:				
Los Angeles	.251	.218	6,015	15.1
San Diego	.256	.224	6,141	14.3
San Francisco	.267	.251	6,407	6.4
Nevada				
Reno	.277	.263	6,641	5.3

For footnotes see next page.

Footnotes for Table VI.

a/ Source: Federal Home Loan Bank Board.

The house on which costs are reported is a detached 6-room home of 24,000 cubic feet volume. Living room, dining room, kitchen, and lavatory on first floor; 3 bedrooms and bath on second floor. Exterior is wide-board siding with brick and stucco as features of design. Best quality materials and workmanship used throughout.

The house is not completed ready for occupancy. It includes all fundamental structural elements, an attached 1-car garage, an unfinished cellar, an unfinished attic, a fireplace, essential heating, plumbing, and electric wiring equipment, and complete insulation. It does not include wall-paper nor other wall nor ceiling finish on interior plastered surfaces, lighting fixtures, refrigerators, water heaters, ranges, screens, weather stripping, nor window shades.

Reported costs include, in addition to material and labor costs, compensation insurance, an allowance for contractor's overhead and transportation of materials, plus 10 percent for builder's profit.

Reported costs do not include the cost of land nor of surveying the land, the cost of planting the lot, nor of providing walks and driveways; they do not include architect's fee, cost of building permit, financing charges, nor sales costs.

In figuring costs, current prices on the same building materials list are obtained from the same reputable contractors and operative builders.

b/ Computed.

c/ July data.

d/ May data.

(Insert on p. VII-18)

The net result is not only that certain materials such as lumber and brick are underweighted, but others such as cement, plumbing and heating apparatus and paints are considerably overweighted because the amounts sold for other purposes, for roads, industrial and commercial construction, modernization of old structures, and for repairs, are considerably larger than the amount sold for new residences. To gain a real perspective on the importance of these recent increases in the prices of building materials, one needs to know which of them are important for residential building and to what extent.

What Building Materials Are Most Important?

The answer to such a query will, of course, depend on several factors: the type of house, its style of architecture, the locality, freight rates, engineering economies, local supplies of building materials, their relative prices, individual shrewdness and bargaining ability in purchasing them, quantities purchased and specifications demanded by architect, building code, or owner's whim.

But inasmuch as the house upon which major attention has been focused here is the detached frame dwelling, the figures in Table VI provide a fairly reasonable first approximation to a proper perspective concerning the importance of individual materials in the low-cost housing picture. It indicates that lumber is even more important than one might at first surmise. In fact, it takes from 45 to 55 cents of the building materials dollar, from 6 to 11 cents going for unfinished lumber, from 15 to 21 cents going for millwork (frames, doors, trim, etc.), and from 19 to 23 cents going for finished lumber (shingles, siding, sheathing, flooring, etc.).

As between regions of the country the pattern is most irregular, greater differences appearing between two relatively contiguous cities such as New Orleans, Louisiana (53.5) and Houston, Texas (41.4) than between any two areas. But in general the figures are low in lumber-surplus sections, such as Oregon and Washington, and high in interior lumber-deficit areas such as Ohio and Illinois. The variations as between localities for the various grades of lumber is even more striking, unfinished lumber in the Middlewest taking more than twice the slice out of the materials dollar than it does in Portland, Oregon.

The next most important slice of the building materials dollar goes for mason's materials (brick, plaster, cement, lime), roughly 16 to 19 cents. Next in order comes plumbing, about 11 to 13 cents; then heating equipment, from 7 to 9 cents; and finally miscellaneous items, none of which individually take more than 2 or 3 cents out of the building materials dollar. Quite notable here, of course, is the small part played by structural steel.

Even when lumber was 15 to 20 percent lower in price than it is now, in such years as 1931 and 1932, its importance, especially for the cheaper houses was almost equal to that of all other materials combined, and easily three times as important as any other next largest set of materials, such as brick or plumbing equipment. In Table VII, for example, in the range of dwellings then costing less than $2,000, lumber, brick, plumbing equipment and plaster account for nearly 80 cents out of every dollar spent for building materials. In houses costing between $2,000 and $4,000 these four items account for about 70 cents out of every dollar. In the first type of house the lumber dealer gets one-half of the building materials dollar; in the second he gets two-fifths.

Table VII

What Industries Got the Building Materials' Dollar in the Summer of 1937[a]

(in cents)

City	Grand Total	Lumber				Miscellaneous items	Mason materials	Hardware miscellaneous	Painters' materials	Boiler, radiators and fittings	Plumbing
		Total	Unfinished	Millwork	Finished						
Area 1											
Boston, Mass.	100.0	47.7	11.6	14.8	21.3	7.4	17.8	3.2	2.5	7.7	13.7
Providence, R. I.	100.0	49.6	10.5	15.9	23.2	7.5	17.9	3.2	2.3	7.1	12.4
Area 2											
Newark, N. J.	100.0	48.1	11.4	16.7	20.0	10.7	17.8	2.7	2.7	7.2	10.8
Albany, N. Y.	100.0	49.4	10.5	19.4	19.5	6.6	18.9	2.6	2.5	7.1	12.9
Area 3											
Philadelphia, Pa.	100.0	50.3	9.5	20.0	20.8	6.8	18.5	3.0	2.5	6.9	12.0
Pittsburgh, Pa.	100.0	53.0	10.0	19.4	23.6	7.0	18.2	2.4	2.2	6.2	11.0
Area 4											
Birmingham, Ala.	100.0	47.4	9.7	19.7	18.0	6.1	21.6	2.4	2.7	8.0	11.8
Tampa, Fla.	100.0	50.5	9.2	17.9	23.4	5.6	19.7	2.9	2.6	7.3	11.4
Richmond, Va.	100.0	47.4	8.0	17.2	22.2	5.9	19.7	2.9	2.9	8.2	13.0
Area 5											
Cleveland, Ohio	100.0	54.0	11.1	18.9	24.0	7.4	14.6	2.3	2.3	7.5	11.9
Nashville, Tenn.	100.0	49.9	11.6	16.4	21.9	6.2	19.7	2.6	2.8	7.0	11.8
Area 6											
Indianapolis, Ind.	100.0	49.7	10.2	19.1	20.4	7.0	16.5	2.8	2.6	10.0	11.4
Grand Rapids, Mich.	100.0	53.4	11.7	20.1	21.5	6.3	16.8	2.7	2.4	7.2	11.2
Detroit, Mich.	100.0	52.3	10.6	19.8	21.9	7.7	14.9	2.6	2.6	8.8	11.1
Area 7											
Chicago, Ill.	100.0	54.2	10.8	19.8	23.5	6.7	14.0	2.6	2.4	7.5	12.6
Milwaukee, Wis.	100.0	53.8	9.8	27.5	16.5	5.5	12.3	2.6	2.1	9.4	14.3
Oshkosh, Wis.	100.0	40.9	1.3[b]	15.2	20.4	6.9	19.1	2.9	2.6	8.8	12.9
Area 8											
St. Paul, Minn.	100.0	55.4	11.2	21.7	22.5	5.3	15.9	2.5	2.3	7.0	11.6
St. Louis, Mo.	100.0	49.4	9.5	18.7	21.2	7.0	16.8	2.6	2.3	9.5	12.4
Area 9											
New Orleans, La.	100.0	53.5	10.3	21.1	22.1	4.3	19.5	2.7	2.8	6.8	10.4
Houston, Texas	100.0	41.4	9.0	18.0	14.4	6.1	22.3	3.4	3.1	9.4	14.3
Area 10											
Wichita, Kansas	100.0	54.3	10.7	21.4	22.2	6.3	16.1	3.2	2.3	6.8	11.0
Omaha, Nebr.	100.0	48.7	10.1	18.6	20.0	5.3	19.0	2.9	2.6	9.0	12.5
Area 11											
Portland, Ore.	100.0	44.2	5.4	19.4	19.4	5.4	20.2	2.6	2.9	9.5	15.2
Spokane, Wash.	100.0	44.8	7.4	17.0	20.4	5.4	20.5	3.2	2.8	10.1	13.2
Area 12											
Los Angeles, Calif.	100.0	52.0	8.1	24.0	19.9	6.6	15.1	3.4	2.6	8.2	12.1

a/ Source: Computed from data in files of Home Owners' Loan Corporation. Courtesy of Corwin A. Fergus, Director, Division of Research and Statistics.

The house on which costs are reported is a detached 6-room home of 24,000 cubic feet volume. Living room dining room, kitchen, and lavatory on first floor; 3 bedrooms and bath on second floor. Exterior is wide-board siding with brick and stucco as features of design. Best quality materials and workmanship used throughout.

The house is not completed ready for occupancy. It includes all fundamental structural elements, an attached 1-car garage, an unfinished cellar, an unfinished attic, a fireplace, essential heating, plumbing, and electric wiring equipment, and complete insulation. It does not include wall-paper nor other wall nor ceiling finish on interior plastered surfaces, lighting fixtures, refrigerators, water heaters, ranges, screens, weather stripping, nor window shades.

Reported costs include, in addition to material and labor costs, compensation insurance, an allowance for contractor's overhead and transportation of materials, plus 10 percent for builder's profit.

Reported costs do not include the cost of land nor of surveying the land, the cost of planting the lot, nor of providing walks and driveways; they do not include architect's fee, cost of building permit, financing charges, nor sales costs.

In figuring costs, current prices on the same building materials list are obtained every 3 months from the same dealers, and current wage rates are obtained from the same reputable contractors and operative builders.

b/ Probably in error.

Table VII

What Industries Got the Building Materials' Dollar in the Summer of 1937

(Detached 6-room frame house)

Source of data: Computed from data in files of Home Owners' Loan Corporation. Courtesy of Corwin A. Fergus, Director, Division of Research and Statistics.

Table VIII

PERCENTAGE THAT COST OF EACH CLASS OF MATERIAL FORMS OF TOTAL MATERIAL COST OF RESIDENTIAL BUILDINGS, IN FIFTEEN SELECTED CITIES, 1931 - 1932, BY COST CLASSES*

Materials used in-	Cost Class						
	All Cost Classes	Up to $1,999	$2,000 to $3,999	$4,000 to $5,999	$6,000 to $7,999	$8,000 to $9,999	Over $10,000
Total all classes	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Excavating and grading	0.1	0.0	1/	0.1	0.1	0.4	0.1
Brickwork, i.e. Brick	12.9	8.1	10.6	16.0	14.6	9.0	10.2
Carpenter work, i.e. Lumber	39.1	50.1	41.7	36.5	38.5	40.3	40.8
Tile work -- Tile	3.1	1.2	2.5	3.2	3.9	2.7	3.1
Concrete and cement work - Cement	6.7	4.1	8.1	7.4	6.6	7.1	4.8
Electric wiring and fixtures	3.4	3.0	3.4	3.6	3.4	3.4	3.2
Heating equipment	8.4	3.0	6.8	7.1	8.6	10.9	10.8
Plumbing equipment	11.2	14.3	10.3	11.7	10.4	9.6	11.5
Plastering and lathing - Plaster	6.4	6.1	5.8	7.5	5.8	6.4	5.3
Painting - Paints	3.2	3.3	4.0	2.8	2.3	2.9	3.9
Papering - Wallpaper	0.2	0.6	0.5	0.2	0.3	0.3	1/
Roofing - Shingles	4.4	6.2	4.3	3.4	4.3	5.0	5.7
Miscellaneous	0.9	--	2.0	0.5	1.2	2.0	0.6

1/ Less than one-tenth of one percent

* Prepared in the Bureau of Labor Statistics, Division of Construction and Public Employment, Herman Byers, Chief.

Another arrangement of the data, showing the materials not only in the structure, but those used around the yard in driveways, sidewalks, and so on, is depicted in Table IX. In these residences costing slightly over $4,000 lumber was economized, brick and cement being used instead. But even in such instances the lumber bill is about a third of the materials bill, indicating how limited is the amount of substitution that is practical even when lumber prices rise considerably out of line. The consumer, in short, while not completely helpless, is almost so. Even here the important materials remain lumber, brick, cement, and plumbing.

Table IX, it should be remarked parenthetically, adds an interesting detail to our previous discussion concerning materials versus labor expense. It shows that precisely in plumbing, carpenter work, and masonry where the expenditures for labor are ordinarily regarded as most likely to be out of line, practically two-thirds of the expense is incurred for materials and only one-third for plumbers, carpenters, and bricklayers.

The fact has already been mentioned that in certain parts of the United States, notably in and near our large metropolitan centers, the ordinary detached type of frame house so characteristic of small communities is not being constructed to nearly so great an extent as multiple-family or row-type dwellings. Now the latter, while continuing to use lumber and brick, ordinarily use a good deal of iron and steel and their products.

Table IX.

Percentage Distribution of Labor and Materials Cost for Certain Residential Building in Fifteen Cities of the United States by Major Operations: 1931-1932[a]

Cost Item	Combined cost	Labor	Materials	Percent of materials' dollar[b]
Excavating and grading	1.3	98.5	1.5	0.0
Brickwork	14.8	41.6	58.4	13.8
Carpenter work	27.3	32.9	67.1	29.3
Tile work	3.5	44.0	56.0	3.1
Concrete work	11.7	36.5	63.5	11.9
Electric wiring and fixtures	4.5	36.0	64.0	4.6
Heating and ventilating	6.6	24.7	75.3	8.0
Plumbing	10.1	20.3	79.7	12.9
Plastering and lathing	8.2	66.6	33.4	4.5
Painting	4.2	61.5	38.5	2.6
Papering	0.5	55.4	44.6	0.4
Roofing	1.8	32.3	67.7	2.0
Miscellaneous	5.5	24.8	75.2	4.9
TOTAL	100.0	37.3	62.7	100.0

a. Source: United States Bureau of Labor Statistics.

b. Computed.

In Table X are given figures illustrating this metropolitan type of housing development. The noteworthy item in this table is the amazingly small percentage of the dollar spent for lumber in column A, and the high percentage spent for steel. In these government-constructed projects even the doors, window sashes, molding, trim, and furniture were made of steel.

In general, however, Table X corroborates the evidence of the preceding tables and charts which indicated that lumber, brick, cement, and plumbing account for more than two-thirds of the ordinary expenditure for building materials. If these items rise considerably in price, they are bound to cause an increase almost as large in the cost of building, for they constitute 70 percent of the total outlays for building materials, which in turn constitute 60 to 65 percent of the cost of the structure and 42 to 46 percent of the cost of the home. The cost of these four items is consequently from 42 to 45 percent of the cost of the structure and 30 to 33 percent of the cost of the home. If they rise 20 percent, a 9 to 10 percent rise in building costs results. The importance of knowing how much precisely these items have risen recently in price is obvious.

Table X

Share of Individual Materials in Building Materials' Dollar in 1936 a/

Type of Materials	Value of material orders placed b/	Percent of total Ac/	Bd/	Ce/
ALL MATERIALS	$3,078,314	100.0	100.0	100.0
ELECTRICAL WIRING, FIXTURES, EQUIPMENT AND SUPPLIES	182,682	5.9	3.3	4.5
FOREST PRODUCTS	261,328	8.5	28.3	32.1
Cork	16,484	.5		
Lumber and timber	128,650	4.2	14.7	16.7
Millwork	116,194	3.8	13.6	13.4
IRON AND STEEL, AND THEIR PRODUCTS	856,238	27.8	16.2	14.1
Cast iron pipe	58,030	1.9	3.7	3.4
Doors, window sash, frames, molding, trim, etc.	241,431	7.9	---	5.2
Hardware, builders	71,826	2.3	3.9	1.5
Metal furniture	57,952	1.9	0.4	---
Metal lath and channels	46,393	1.5	0.2	0.4
Reinforcing and structural steel	264,887	8.6	3.0	2.2
Wire and wireworks products, not elsewhere classified	7,534	0.2	2.7	1.1
Other products of iron and steel	108,185	3.5	1.3	0.2
COMPOSITION FLOORING AND LINOLEUM	27,793	0.9	0.5	---
PAINTS AND VARNISHES	42,831	1.4	3.8	3.1
HEATING AND VENTILATING EQUIPMENT AND SUPPLIES	251,178	8.2	6.2	13.6
PLUMBING SUPPLIES AND FIXTURES, NOT ELSEWHERE CLASSIFIED	304,086	9.9	10.2	9.9
ROOFING, WATERPROOFING, AND CAULKING MATERIALS, N.E.C.	72,694	2.4	1.2	2.5
SHEET METAL (COPPER)	15,789	0.5	---	---
STONE, CLAY, AND GLASS PRODUCTS	1,004,536	32.6	29.7	22.0
Brick, hollow tile, and other clay products	248,245	8.1	8.1	1.8
Cement	117,634	3.8	3.6	1.3
Ceramic tile	15,277	0.5	---	---
Concrete products, including pre-mixed concrete	384,063	12.5	12.0	10.0
Glass	19,665	0.6	---	1.0
Marble, granite, limestone, and other stone products	40,160	1.3	---	---
Sand and gravel	71,925	2.3	1.3	0.9
Wall plaster, wallboard and insulating materials, n.e.c.	107,567	3.5	4.7	7.0
MATERIALS NOT CLASSIFIED	59,159	1.9	0.6	3.4

a/ Source: Assembly of materials prepared by the Bureau of Labor Statistics. Courtesy of Herman E. Byers, Chief of Division of Construction and Public Employment.

b/ Contracts let by Procurement Division of the United States Treasury for materials for 5 low-cost housing projects financed from PWA funds; namely, the Techwood project, Atlanta, Georgia (21 buildings containing 604 dwelling units, 1 dormitory of 194 rooms, 11 buildings forming 186 garages, 1 building with stores, etc.); the Liberty Square project, Miami, Florida (35 buildings with 243 dwelling units, etc.); the Paterson Courts project, Montgomery, Alabama (17 buildings with 156 dwelling units); the Riverside Heights project, Montgomery, Alabama (11 buildings with 100 dwelling units, etc.) and the Cedar Central project, Cleveland, Ohio (19 buildings with 650 dwelling units, etc.)

c/ Column A -- Computed from figures in preceding column.

d/ Column B -- Computed from figures not recorded here of amounts spent by the Alley Dwelling Authority of Washington, D. C., for materials to construct 12 row-type single dwellings in the Hopkins Place project.

e/ Column C -- Average per house on Westacres project of 950 houses built by the Oakland Housing Corporation, Pontiac, Michigan.

III. WHAT HAS HAPPENED TO THE PRICES OF INDIVIDUAL BUILDING MATERIALS?

The most important facts concerning the prices of lumber, brick, steel and cement are clearly shown in Figure 3. Notice the precipitate character of the rise since December, 1936, especially, in lumber and steel. Both of them now exceed 1926 levels, each having increased 24 percent from June of 1936 to June of 1937. The remaining constituents of the general building materials index, in addition to being of distinctly minor importance, have risen very little if at all, paint and paint materials rising 5 percent during the period, plumbing and heating equipment 6 percent, and miscellaneous materials 12 percent. Lumber and steel are the items mainly responsible for the recent 13 percent rise in the wholesale prices of building materials.

Particularly noteworthy in Figure 3 are the "staircase" movements in the prices of steel and cement, both of them being industrially "managed" prices. Their movements indicate infrequent and sluggish response to changes in demand, curious ability to stick at high levels, singular resistance to the impact of even so severe a depression as that of 1932, and rapid post-depression attainment of levels not far below those of the prosperous twenties, with current advances to heights equal to or above even those existing during the last building boom. While the exigencies of space make impossible charting the prices of all building materials showing such staircase movements, the reader should picture to himself a situation not dissimilar to that in cement and steel for every one of the materials concerning which are shown periods of prolonged inflexibility in prices in Table IX.

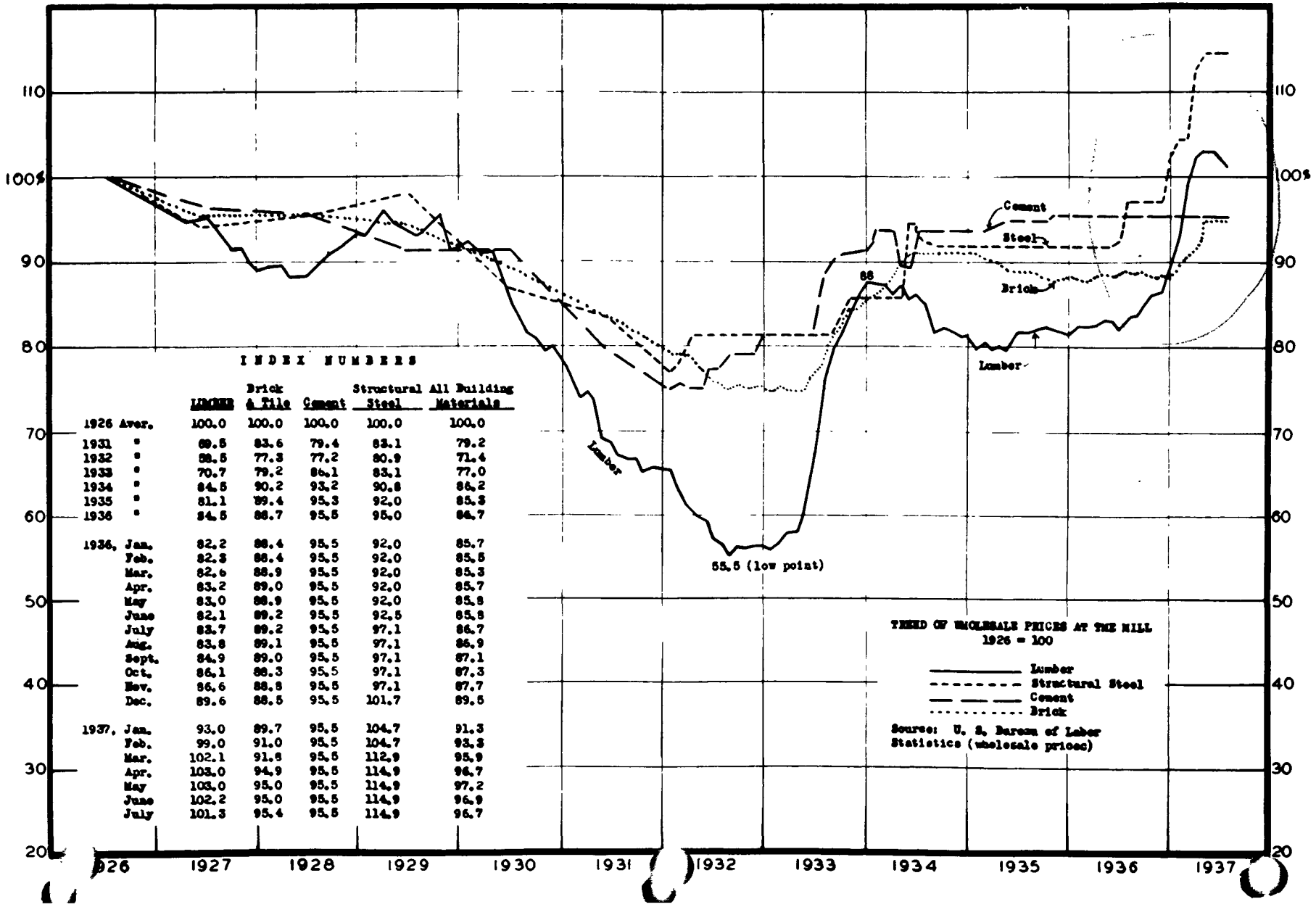
Figure 3

Price Trends of Lumber and Other Building Materials

Trend of Wholesale Prices at the Mill
1926 = 100

Source: U.S. Bureau of Labor Statistics
(wholesale prices)

PRICE TRENDS OF LUMBER AND OTHER BUILDING MATERIALS



INDEX NUMBERS

		Lumber	Brick & Tile	Cement	Structural Steel	All Building Materials
1926	Aver.	100.0	100.0	100.0	100.0	100.0
1931	"	69.5	83.6	79.4	83.1	79.2
1932	"	58.5	77.3	77.2	80.9	71.4
1933	"	70.7	79.2	86.1	83.1	77.0
1934	"	84.5	90.2	93.2	90.8	86.2
1935	"	81.1	89.4	95.3	92.0	85.3
1936	"	84.5	88.7	95.5	95.0	84.7
1936,	Jan.	82.2	88.4	95.5	92.0	85.7
	Feb.	82.3	88.4	95.5	92.0	85.5
	Mar.	82.6	88.9	95.5	92.0	85.3
	Apr.	83.2	89.0	95.5	92.0	85.7
	May	83.0	88.9	95.5	92.0	85.8
	June	82.1	89.2	95.5	92.5	85.8
	July	83.7	89.2	95.5	97.1	86.7
	Aug.	83.8	89.1	95.5	97.1	86.9
	Sept.	84.9	89.0	95.5	97.1	87.1
	Oct.	86.1	88.3	95.5	97.1	87.3
	Nov.	86.6	88.8	95.5	97.1	87.7
	Dec.	89.6	88.5	95.5	101.7	89.5
1937,	Jan.	93.0	89.7	95.5	104.7	91.3
	Feb.	99.0	91.0	95.5	104.7	93.3
	Mar.	102.1	91.8	95.5	112.9	95.9
	Apr.	103.0	94.9	95.5	114.9	96.7
	May	103.0	95.0	95.5	114.9	97.2
	June	102.2	95.0	95.5	114.9	96.9
	July	101.3	95.4	95.5	114.9	96.7

The fact must however be recognized that though the wholesale list price quotations remain identical, individual buyers may obtain varying actual net prices because of varying discounts, terms and allowances. In spite of this consideration if the quoted prices indicate anything concerning these prices it is difficult to label them highly competitive. Such price rigidities tend to indicate control by business men over market processes, a control which is an aid to, and results from, the exercise of something akin to monopolistic power.1/ In short, the fundamental reasons for price rises or declines of building materials are those which influenced the executives in some materials industries to make their decisions.

It is to be regretted that limitations of space do not permit a detailed study of the facts and the forces behind each of the facts shown in Table IX. Obviously such a study would run into volumes. But the table shows, first of all, that precisely the most important of building materials, the various kinds of lumber, are from 15 to 25 percent higher than they were in 1929 and even higher by as much as 35 percent than the levels of prices in the base year 1926. Plaster is double what it was in 1929, cast-iron pipe 60 percent higher, even sand and face brick are more than 10 percent higher. Precisely the items already inordinately high in price in 1936, soft wood lumber and steel items, have three asterisks in front of them, showing that they rose more than 20 percent during the last twelve months.

1/ See especially Dr. J. K. Galbraith's "Monopoly and Price Rigidities," Quarterly Journal of Economics, May 1936, Vol. 4, No. 3, pp. 456-475.

Table XI

Price Increases in the Most Important Individual Building Materials

Materials Now Above 1929 Levels in Price

Materials Which Have Not Yet Reached 1929 Levels in Price

Data from Bureau of Labor Statistics, Courtesy of Jesse W. Cutts,
Chief, Division of Wholesale Prices;
Percentages computed.

Table XI (continued)

Price Increases in the Most Important Individual Building Materials[a/]

Building Material	Price Index (1926= 100) June 1929	June 1936	June 1937	1937 in relation to 1929	Prolonged Price Inflexibility Period	Level
Materials Which Have Not Yet Reached 1929 Levels in Price (continued)						
***Common mortise locks	120.3	66.0	84.2	-30	----------	-----
***Plain white oak no. 1	87.9	68.2	83.0	-6	July 1932-June 1933 July 1935-Nov. 1936	60.6 68.2
*Heating boilers	97.0	77.0	87.8	-15	Aug. 1935-June 1936 July 1936 to date	77.0 82.8
Mason's lump lime	87.4	79.2	78.5	-10	----------	-----
Inside flat wall paints, all shades	85.0	78.0	76.5	-10	Jan. 1926-Nov. 1927 Sept. 1929-Dec. 1930 Feb. 1931-May 1932 July 1933-May 1936	100.0 90.0 84.0 78.0
Insulation building board	82.8	75.9	75.9	-8	July 1926-Oct. 1928 Dec. 1928-July 1930 Oct. 1933-July 1935 and since May 1936	94.3 82.8 75.9
***Knobs, steel bronze plated	114.3	57.1	74.3	-35	Jan. 1926-Nov. 1928	100.0
Window glass, American Grade A	107.7	78.7	69.7	-35	Chaotic shifts in price this year.	
Bath tubs, enameled	79.0	66.7	66.7	-16	Jan. 1926-Dec. 1926 Mar. 1927-Mar. 1928 Jan. 1931-Dec. 1931 Feb. 1936 to date	100.0 85.0 74.1 66.7
Water closets	111.5	63.1	63.1	-43	Feb. 1936 to date	63.1
Sinks, ordinary kitchen	80.3	55.7	55.7	-31	Jan. 1926-Dec. 1926 Mar. 1927-Mar. 1928 Feb. 1929 - Feb. 1930 Jan. 1931-Dec. 1931 Feb. 1936 to date	100.0 85.0 80.3 77.9 55.7

a/ Data from Bureau of Labor Statistics. Courtesy of Jesse W. Cutts, Chief of Division of Wholesale Prices. Percentages computed.

***Increases in price from June of 1936 to June of 1937 of more than 20 percent.

**Increases in price over 10 percent but less than 20 percent.

*Increases under 10 percent.

Those with no asterisk did not increase in price.

Table XI

Price Increases in the Most Important Individual Building Materials a/

Building Material	Price Index (1926 = 100) June 1929	June 1936	June 1937	1937 in relation to 1929	Prolonged Price Inflexibility Period	Level
Materials Now Above 1929 Levels in Price						
*Douglas fir boards, 1"x8"	110.4	122.3	134.3	22	Apr. 1927-Apr. 1928	98.5
***White pine window sash	100.0	93.7	128.7	29	Jan. 1926-Jan. 1930 Aug. 1935-Oct. 1936	100.0 93.7
Plaster per ton	62.5	125.0	125.0	100	Jan. 1926-Nov. 1927 Feb. 1931-Nov. 1933 Feb. 1934 to date	100.0 112.5 125.0
*Red cedar shingles	114.2	114.8	124.9	9	Staircase price movements	
***White pine standard doors	101.6	94.1	121.4	19	Jan. 1926-Nov. 1928 Dec. 1928-July 1930 Aug. 1935-Nov. 1936	100.0 101.6 94.1
***Structural steel	95.6	92.5	114.9	20	----------	-----
**Asbestos pipe covering	92.0	92.0	108.0	17	Oct. 1928-Aug. 1930 Sept.1931-July 1933 Nov. 1935-July 1936	92.0 80.0 92.0
***White pine door frames	98.7	83.7	106.2	8	Jan. 1926-Feb. 1928 Aug. 1934-Apr. 1936	100.0 76.5
**Douglas fir drop siding	105.1	86.1	105.1	same	----------	-----
***8-penny wire nails	100.0	80.0	103.6	4	----------	-----
**Prepared roofing, individual shingles	69.0	88.5	103.6	50	Staircase price movements	
**Cast iron 6" soil pipe	69.3	88.0	103.2	49	July 1934-Nov. 1936	88.0
*Western pine window frames	98.5	98.5	103.0	5	Jan. 1926-Feb. 1928 Aug. 1934-Mar. 1936	100.0 77.6
***Prepared roofing, strip shingles	76.2	85.3	103.0	35	Staircase price movements	
*Building sand	90.6	98.2	102.2	13	----------	-----
Douglas fir plaster lath	884.1	97.0	97.0	15	Sept.1936 to date	97.0
**Yellow pine flooring	82.1	80.7	96.5	18	----------	-----
***Galvanized sheets	91.9	78.5	96.2	5	Aug. 1934-May 1936	78.5
Cement	94.6	95.6	95.6	1	Apr. 1935 to date	95.6
**Light colored front brick	84.9	82.9	94.4	11	July 1929-Feb. 1931 June 1932-June 1933 May 1934-Sept. 1935	82.2 74.2 89.0
Materials Which Have Not Yet Reached 1929 Levels in Price						
*Radiation by steam or water	118.1	93.1	99.8	-16	Jan. 1929-Dec. 1929 July 1936 to date	118.1 99.8
**Black steel pipe, 3/4"	100.0	83.3	96.2	-4	Jan. 1926-Apr. 1930 May 1934 -Jan. 1936	100.0 92.6
Builder's varnish	100.0	95.3	95.3	-5	Jan. 1926-Feb. 1931 Dec. 1933-Dec. 1935 Jan. 1936-to date	100.0 86.1 95.3
*Linoleum	107.4	90.6	95.1	-12	Jan. 1926-Oct. 1927 Oct. 1933-Sept. 1934 Jan. 1935-Dec. 1936	100.0 94.3 90.6
**Galvanized steel pipe	100.0	82.0	94.0	-6	Jan. 1926-Apr. 1930 May 1934-Jan. 1936	100.0 91.2
**Rough barn white pine no. 2	99.9	81.9	93.4	-6	Dec. 1934-Apr. 1936	79.0
House paint, all shades	100.0	92.0	92.0	-8	Jan. 1926-Aug. 1929 Dec. 1933 to date	100.0 92.0
*Common building brick	98.5	88.8	91.3	-7	----------	-----
Hollow building tile	97.1	89.9	89.9	-7	Jan. 1927-Aug. 1930 May 1934 to date	97.1 89.9

The last column merits particular study. It reveals in striking fashion how prevalent inflexible prices are in the building materials' industries. It also shows that those industries with the best records, those at the bottom of the list, the makers of plumbing and heating equipment, of paints and of specialty hardware, are characterized fully as much by inflexible prices as those industries with the worst records, those at the top of the list, the producers of softwood lumber, structural steel products, building sand and cement. The crucial difference, however, is that the former are finished products, ready to be delivered to the consumer often under advertised trademarks, while the latter are raw materials or semi-processed goods. Moreover, the former usually apply to the products of one firm in one market while the latter are in many cases composite figures of prices quoted by many plants in many markets. Needless to say, such composites show a larger degree of flexibility than actually exists, for they change whenever price quotations change in any one of the several markets covered.

Prices of Lumber, Brick, Steel and Cement

Limitations of space again preclude showing the variations in price that exist for nearly every one of the 39 items listed above, variations between wholesale and retail prices, variations between distributing outlets, shifts in the pattern of price spreads geographically and through time. But the extent of such variations from the single figure given above should not be underestimated. In Table XII, for example, a cross section of geographic price spreads is given for an aggregate of 440 feet

of lumber, 6 barrels of cement, 600 brick, 280 pounds of reenforcing bars, and 10 yards of crushed gravel or stone. Notice in the column on the extreme right that the cost in Montana, Colorado, and Wisconsin was a third higher than that in California, Florida, Oregon or Texas.

The interstate variation in the individual items is even larger. Lumber in Washington, South Carolina, and Alabama costs less than half the sum required in Wisconsin, Utah, New York, and Iowa. Cement is nearly twice as high in Washington as it is in California or Michigan. Ten yards of crushed stone or gravel cost only $9.80 in Massachusetts and $30.75 in South Carolina. Concrete reenforcing bars are twice as cheap along the Atlantic and Pacific seaboard as in the Rocky Mountain area. Even brick costs vary by 75 percent, 600 brick costing $6.00 in Illinois, Texas, and New Mexico, and $10.50 in Washington and the Rocky Mountain area.

In how far the startling price increases noted in Table XII have occurred in each of the various States and cities is, of course, a matter of far too great detail to attempt to present here. A priori there seems no reason to believe that these price rises have either been uniform in time and amount or horizontal in character to an extent substantially to maintain the price contours or price map which can be drawn on the basis of the data given above. Moreover, there seems little ground for expecting that the forces which lead to price changes in each region are either identical or of roughly equivalent strength and effectiveness.

TABLE XII

PRICES OF FIVE PRINCIPAL CONSTRUCTION MATERIALS IN 27 STATES
AS OF JUNE 15, 1937

	Lumber	Cement	Crushed Stone or gravel	Steel	Brick	Total
Alabama	$9.24	$12.00	$19.90	$7.62	$7.63	$56.39
Arizona	18.11			13.02		
Arkansas	11.00	15.36	16.00	10.28	9.00	61.64
California	16.17	10.50	10.70	8.62	7.20	53.19
Colorado	17.09	14.64	15.00	14.73	10.50	71.96
Connecticut		14.58	29.70		7.20	
Delaware	14.30	13.08	14.50			
Florida	11.75	12.00	16.10	6.83	6.60	53.28
Georgia	11.00	12.06	23.50	8.40	6.58	61.54
Idaho	13.06	16.98	12.00	12.49	6.60	61.13
Illinois	13.55	12.48	16.00	6.92	6.00	54.95
Indiana	15.40	13.98	15.00	9.52	9.30	63.20
Iowa	21.12	14.16	20.00	8.92		
Kansas	18.48	13.44				
Kentucky	15.40	13.56	17.50	8.57	8.10	63.13
Louisiana	11.48	12.90	21.40	7.22	9.14	62.14
Maryland	10.92	13.08	14.50	10.64	9.60	58.14
Massachusetts	17.24	12.42	9.80	8.57	9.30	57.33
Michigan	14.74	10.50	18.60	9.24	9.40	62.48
Minnesota	14.52	15.00	14.00	8.68	10.80	63.00
Mississippi	12.10	15.48	15.90	8.54	6.30	58.32
Missouri	13.42	13.02	16.40	8.96	9.00	60.80
Montana						83.91
Nebraska	18.48	15.54		9.04	8.55	
Nevada	15.40	17.40	20.00			
New Hampshire		13.53	14.50			
New Jersey	16.13	11.25	13.90	7.53	6.88	55.69
New Mexico	13.20	19.08		8.96	6.00	
New York	18.73	11.58	12.50	8.86	6.90	58.57
North Carolina		15.21	27.04		8.70	
North Dakota	17.16	18.66	29.25	8.32	16.20	89.59
Ohio	12.76	13.32	14.00	8.40	9.55	58.03
Oklahoma	17.60	14.10	16.70	7.56	7.50	63.46
Oregon	10.68	14.10	15.70	6.83	8.40	55.71
Pennsylvania	15.40	13.20	16.90	8.85	9.00	63.35
South Carolina	10.19	12.60	30.75			
South Dakota		14.88				
Tennessee	12.32	15.18	15.37	9.34	8.25	60.46
Texas	16.28	12.90	12.00	8.57	6.00	55.75
Utah	13.80	16.80		14.00	8.10	
Virginia	14.70	14.46	21.60		9.00	
Washington	9.20	19.80	19.60	6.83	10.50	65.93
West Virginia		13.32	26.00		8.40	
Wisconsin	19.36	14.58	18.75	8.74	8.70	70.13
Wyoming	18.70	17.64		10.10	10.30	

a. Source: Works Progress Administration, courtesy of Peter Stone, Chief Construction Statistics Section.

But insofar as general factors may have been important, factors of demand as registered by the volume of residential construction or factors of supply as measured by production, shipments, costs, or stocks, they on balance would retard rather than support rising prices. No one can say that the embryonic building boom shown in Figure 4 represents an insistent demand of proportions strong enough to send prices skyrocketing. Nor have shipments been particularly heavy. As is clearly shown in Table XIII, they have at no time reached levels even 60 percent as high as were accomplished at lower levels of prices in 1927 and 1928. There has scarcely been for the most part even a semblance of a strain on productive capacity.

While wages and other costs of producing materials have risen in some cases a good deal, such increases have not occurred exclusively in the areas or in the plants of the manufacturers producing the building materials that have risen most. Plumbing and heating equipment and paints, for example, are produced precisely in the centers of the most highly publicized wage increases and utilize craft labor of highest skill. Nor does the factor of wage increase explain why the prices of lumber, for example, should rise in areas where it is produced by unorganized, low-paid labor. Nor does labor expense constitute in most cases a sufficiently large proportion of total costs to make a 20 or 30 percent rise in wages mean more than a 4 or 6 or 8 percent increase in total costs.

In short, try as one scientifically can, the balance of general forces would seem to favor moderation or reduction in prices of building materials. Compared with other items in the price structure building materials already high should, in the recent parade of increases in price quotations, have lagged behind. Instead, they have been leaders.

Table XIII

Shipments of Construction Materials

Index of Thirty Items Unadjusted for Seasonal Variation

(Monthly Average 1929 = 100)

	1925	1926	1927	1928	1929	1930	1931
JAN	68	69	67	71	69	57	49
FEB	73	67	73	71	67	59	45
MARCH	95	90	95	95	90	72	54
APR	116	106	107	102	103	88	69
MAY	125	130	119	125	114	98	79
JUNE	124	133	128	125	116	99	82
JULY	129	131	123	125	121	101	81
AUG	134	137	139	138	133	102	79
SEPT	129	134	131	129	120	102	77
OCT	126	133	126	137	121	97	76
NOV	95	102	97	101	84	62	51
DEC	80	73	71	74	61	47	34
AVG	108	109	106	108	100	82	65

	1932	1933	1934	1935	1936	1937	1938
JAN	34	24	32	34	45	58	
FEB	32	24	29	34	43	59	
MARCH	36	31	39	43	59	74	
APR	45	37	48	54	71	83	
MAY	48	50	58	59	78	85	
JUNE	51	55	53	58	89	87	
JULY	47	57	51	61	91	83	
AUG	57	49	61	67	90		
SEPT	56	50	55	70	98		
OCT	55	50	65	75	100		
NOV	34	35	46	54	71		
DEC	24	29	33	42	58		
AVG	43	41	48	55	74		

Note: The index is subject to revision, August 1936, thru July 1937.

Source: Public Works Administration, Projects Division, and Federal Housing Administration, Division of Economics and Statistics.

This presents a puzzle to which hardly any clue exists save that shown in the column on the extreme right in Table XI. There, it will be remembered, the fact emerged clearly that at no time in recent industrial history save possibly the period from 1926 to 1929 have more building materials enjoyed longer periods of stability and inflexibility in price than in the years 1935 and 1936. In short, the fragments of evidence now available suggest forcibly that among the general phenomena which might explain recent extraordinary increases in the prices of building materials, the favorable opportunity for concerted action was of singular importance. Absolute verification or disproof of such a surmise, of course, is impossible without detailed inquiry and exhaustive investigation.

IV. BOTTLE-NECKS IN INDIVIDUAL BUILDING MATERIALS INDUSTRIES

To make sure what, where, and how important the bottle-necks are which restrict the flow of production in individual industries one would need critically to examine and present all the categories of information found in competent industrial monographs such as that of Professors Daugherty, de Chazeau, and Stratton in the Economics of the Iron and Steel Industry (2 vols., McGraw-Hill, New York, 1937) or that of the Industry Studies Section of the NRA in Economic Problems of the Lumber and Timber Products Industry (Division of Review, Work Materials No. 79, March 1936). Here only the briefest of thumb-nail sketches will be given.

Furthermore, limitations of space permits examination of only two such industries; namely lumber and steel. The first was selected because of its overwhelming importance and its framework of competition moderated by able trade association leadership. the second because of its actual and potential importance and its framework of monopoly. These two industries with brick, cement, and plumbing equipment, it will be remembered, account for most of the building materials dollar. Although brick prices have also risen recently, lumber and steel price increases remain the most formidable menace to the recovery of housing.

Why Have Lumber Prices Risen?

Beginning with lumber, let us recall a few well-known facts. Some sort of lumber is manufactured in practically every state of the Union, used in every state, and both imported and exported, often from and to the same foreign country. Within the industry there are really several entirely different businesses. Moreover, there are well over 25,000 sawmills, about 35,000 retail lumber yards, and several thousand wholesalers. Among these exist a variety of manufacturing, distributing, and selling policies, and combinations thereof.

It is at once the industry of small cross-roads enterprises and gigantic corporations. Numerous competitive complications exist: competition with lumber substitutes; unequal freight rates between manufacturers and consumers equally distanced; competition between species more or less equally suitable to one purpose; competition of various grades; smaller manufacturers compelled to undersell

larger manufacturers, to offset the advantages the latter have in more economical and extensive distribution facilities in a product of superior quality and of a greater degree of refinement (such as drying methods, use of preservative treatments, the production of completed items, e.g., the knock-down box, the ready-for-assembly house and other ready for use items); competition created by the disorganization in the channels of trade; and, finally, the effect of various transportation methods and fluctuation in water rates.

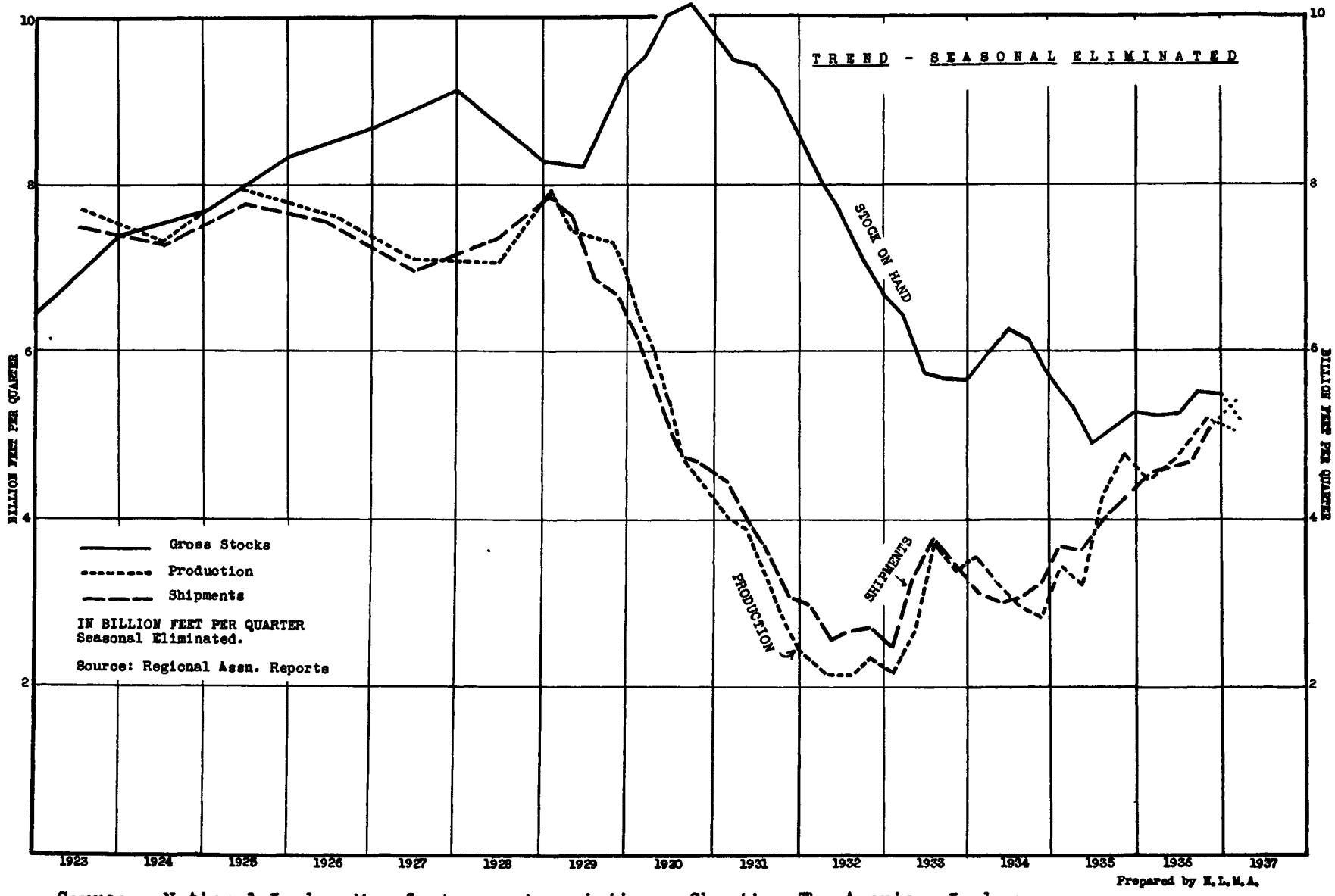
The importance of transportation is sometimes inadequately realized. In 1936, for example, west coast operators shipped 2,353,000,000 ft. of lumber whose f.o.b. mill value was $17.28 per M feet or 53.7 percent of selling price while average computed freight cost was $14.87 per M feet, or 46.3 percent of wholesale price which was $32.15. At Atlantic seaports the average C.T.F. loaded price paid for west coast lumber was $26.03 per M of which 41 percent went to intercoastal carriers or $10.58 per M and 59 percent of $15.45 was the average f.a.s. price received by the west coast sawmill.

Obviously when intercoastal rates are high or tonnage scarce southern mills will begin to invade eastern markets. When ocean rates are low, west coast lumber will by backhaul shipment from Atlantic ports invade the logical market of the South.

Figure 4 shows the relationship of production, shipments, and stocks of lumber from 1923 to date. Notice the scissors effect both in 1923 and 1937 between production and stocks.

Figure 4.

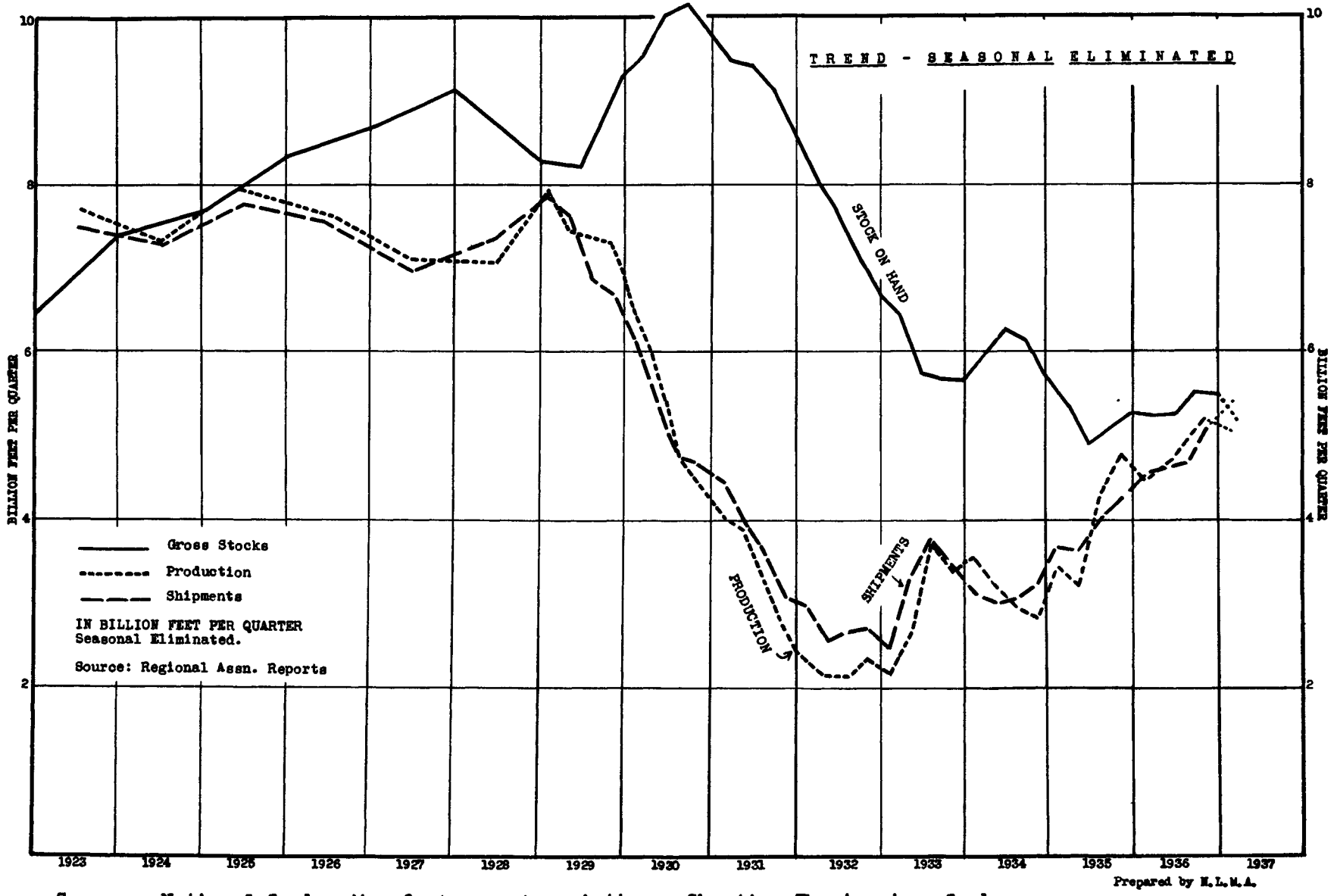
SOFTWOOD PRODUCTION, SHIPMENTS, STOCKS



Source: National Lumber Manufacturers Association. Charting The American Lumber Industry. February, 1937, p. 24.

Figure 4.

SOFTWOOD PRODUCTION, SHIPMENTS, STOCKS



Source: National Lumber Manufacturers Association. Charting The American Lumber Industry. February, 1937, p. 24.

Figure 4. Softwood Production, Shipments, Stocks Graph, showing gross stocks, production, and shipments, 1923-1937.

The National Lumber Manufacturers' Association is, of course, alert to the crucial importance of this relationship between production and stocks. An excerpt from its Analysis of the Lumber Situation, September, 1937, supplement to the Twenty-Fifth Quarterly Report of the Lumber Survey Committee to the Department of Commerce is particularly illuminating. It reads, p.2:

"For 20 weeks national lumber production has exceeded new orders, the aggregate being 19.7 per cent, according to reports of the regional associations to the National Lumber Trade Barometer. This unbalancing situation has already become harmful and if long continued will be destructive of stable markets. Plans for adjustment of output to accomplish a better balance with demand have been proposed and partially put into effect in some lumber producing regions. But the national figures still indicate continued excessive production in most regions."

The widespread character of this industrial planning and marked control is revealed by the Lumber Survey Committee in the press release already mentioned in the following words, p.1 "Unfilled order files have been reduced continuously during the second quarter and until recently at an increasing rate....well considered effort to correct this condition is underway in principal regions. This effort should be continued and extended."

A final word of caution should be emphatically kept in mind. The sketchy analysis given above throws light on only one circumstance; namely, how it came about that lumber prices rose in 1936 and in 1937. It does not cover such facts as costs, consumption, production, profits, taxes, wastes, and the like, nor does it deal with long range problems

such as the reasons for the fact that lumber prices during the twenties stayed up on a plateau some two to two and one-half times the pre-war levels. It merely points out that after breaking somewhat during the depression (though not as did the prices of other commodities to lower than pre-war levels) lumber prices promptly rose to levels which, "out of line" in 1926, are now even more out of balance with prices in general, with rents and with consumer incomes.

In short, the lumber industry is suffering from an aggravation of old maladies, not from anything new. Basically collectivistic attempts at production and price control are symptoms rather than causes, symptoms, namely, of basic economic ills of long standing for which the lumber industry has found no cure, ills exhaustively analyzed in numerous official state and federal documents and elsewhere.

Why Have Steel Prices Risen?

Turning to the steel industry let us keep in mind the same caution. Without attempting to summarize the many penetrating analyses of the fundamental economic structure of the iron and steel industry such as the study already mentioned, let us try briefly to single out the factors that account for the recent abrupt jump in steel prices.

In contrast with the lumber industry which produced in the summer of 1937 only 56.6 percent of its average weekly cut in the period from 1926 to 1929, and operated its plants only four days a week, the steel industry has been operating at unusually high levels of capacity. Figure 8 gives the record since January of 1936. This means for an industry of such heavy capitalization as steel with its relatively large percentage of fixed costs that overhead costs per ton of steel were substantially reduced.

The actual amount of reduction varies of course from plant to plant, and from operation to operation, so that even were detailed cost figures available they would portray the general situation less adequately than those given in Table XIV (below). The fact seems clear that overhead costs per ton or output were lower in 1937 than in any year of recent steel history.

Table XIV. Reduction in Overhead Costs per Ton of Steel Output (Assuming interest and depreciation at 5 percent of total investment)[a]

Percent of capacity operation	Output of finished steel, tons (at existing capacity)	5 percent of total investment	Dollars per ton of output	Difference for each 10 percent change (per ton)
80	$39,200,000	$195,000,000	$4.98	
70	34,300,000	195,000,000	5.68	$ .70
60	29,400,000	195,000,000	6.64	.96
50	24,500,000	195,000,000	7.96	1.32
40	19,600,000	195,000,000	9.95	1.99
30	14,700,000	195,000,000	13.25	3.30
20	9,800,000	195,000,000	19.90	6.65

Year	Average percent of capacity	Approximate output of finished steel (tons)	5 percent of total capitalization	Dollars per ton of output
1926	83.5	33,805,000	$197,708,500	$5.85
1929	88.5	39,500,000	200,172,150	5.10
1932	19.5	9,600,000	203,680,000	21.20
1933	33.1	12,260,000	198,973,000	12.25
1936	67.3	32,000,000	191,668,000	6.00
1937[b]	82.0	40,000,000	195,000,000	4.88

a. Source: Computed by Mr. R. L. Harding, chief of the Division of Metals and Minerals of the Bureau of Foreign and Domestic Commerce.

b. At rate of first half.

But the cost of raw materials due to the insistent export demand for scrap has been increasing. Exports of scrap in the first half of 1937 were 103 percent above those for the corresponding half of 1936, Japan taking 61 percent of the total of 2,172,660 gross tons exported. On Sept. 1, 1937 the best grade of steel scrap sold for $22.50 per gross ton at Pittsburgh, and pig iron at $23.50, figures substantially above the 1929 quotations of $19.00 and $18.50 per ton respectively. As a result in 1936 materials and other expenses took a 30 percent larger slice of the sales dollar than they did in 1929.

Another noteworthy feature here is the fact that the proportion going into payrolls was almost exactly the same in 1936 as it was in 1929. In other words, despite the fact that the steel industry now pays its labor higher average rates per hour than any other industry in the country except the automobile industry (Bureau of Labor Statistics figures were $36.20 per week and 85.0 cents per hour for steel in April, 1937 as opposed to $35.90 per week and 65.0 cents in 1929) "total monthly payrolls of the industry", (Steel Facts, July, 1937, p.1) "have risen 175 percent since 1933 while production has increased 173 percent." Interest, taxes, depreciation and depletion and payrolls appear to take the same share of the sales dollar in 1936 that they did in 1929. But the slice of the sales dollar spent for materials is nearly a third larger.

An extremely rough comparison of 1936 data with 1937 figures proves challenging. "More than a score of steel companies representing 90 percent of the ingot capacity of the country" are reported (Steel Facts,

July 1937, p. 3) as "having total gross sales revenues of $2,073,000,000 during 1936." Wages, being 38¼ percent of that figure therefore totalled roughly $812,760,000. A reasonably high estimate of the tonnage of steel produced is 32,000,000 tons. Pay rolls per ton thus averaged at least $25.40 per ton. In July of 1937 total production was 3,189,000 tons and total pay rolls $87,800,000, an average of $27.50 on pay rolls per ton, a difference of $2.10. If the July 1937 figures can be assumed to represent a month wherein the initial and obvious managerial adjustments to higher wage costs had been substantially completed, then the price received for structural steel of $50,40 on August 1, 1937, as compared with an average of $41.44 in 1936, represents an addition of $9.00 compared with increased wages of $2.10. This assumes that labor gets $\frac{27.50}{50.40}$ or 55 percent of the structural steel dollar. If labor gets only 38½ cents the amount of increased wage cost per ton of structural steel is $1.48 or roughly one-sixth of the increase in price.

An independent check of this computation and one dramatically showing the effect of increases in the prices of scrap and pig iron, is given in Table XV, a set of computations for which I am likewise indebted to Mr. Harding. It shows the rise in wage cost of structural steel from 1936 to 1937 to be $1.46.

In conclusion the fact should be emphasized that very little in this analysis deals with long range factors in the steel industry. The war boom may collapse. Scrap prices may fall from their present fantastic heights. If so, perhaps all steel prices and with them

Table XV. Prices of Cost Items in Making Structural Steel[a]

Year	Pig iron, #2 Valley, average per ton	Scrap, #1 H. M. Pittsburgh	Average hourly wages	Average hours per week	Taxes paid per ton	Average man hours per ton of structural steel[c]	Wage bill per ton of structural steel	Selling price of structural steel
1926	$18.55	$15.48	$0.636	48	$2.60	16.3	$10.37	$43.00
1929	18.19	16.30	.65	50	2.78	16.0	10.40	43.00
1932	13.98	7.54	±.51	27	6.06	29.7	16.32	34.80
1933	15.24	9.47	.523	33	3.55	28.0	14.64	35.73
1936	19.70	14.82	.679	39	3.20	18.5	12.56	41.44
1937[b]	24.00	21.75	.85	43	3.40	16.5	14.02	50.40

VII-45

a. Sources: Prices from Iron Age, wages and hours from Bureau of Labor Statistics. Compiled by Mr. R. L. Harding, chief of the Division of Metals and Minerals, Bureau of Foreign and Domestic Commerce, Department of Commerce.

b. Five months.

c. (Exclusive of pig iron.) This varies with rate of operations. Labor Dept. Serial No. R 240 from Monthly Labor Review, May 1935, used in these items as basis for calculations.

structural steel prices will fall from the levels to which rearmament programs, wars, and rumors of wars have now elevated them. One could hardly expect steel producers to refuse to take advantage of the existing situation. Whether they market their product as pig iron, scrap, plates, shapes or structural steel is obviously a matter of indifference. As long as prices stimulated by such demand remain they will continue to be an obstacle of formidable character to housing construction.

Similar analyses would have to be made of various other building materials industries to permit a proper appreciation of all the hindrances in the supply of building materials. But it is hoped that the two examples given here have revealed to some extent the knotty character of the problem, the inter-industry entanglements, the various monopolistic obstructions, and other difficulties which stand between the potential new-home-owners, a renter of low income and freer, cheaper flows of building materials.

V. BOTTLE-NECKS IN DISTRIBUTION OF BUILDING MATERIALS

The inefficiencies of retail and wholesale distribution of building materials are a matter of common knowledge. The editors of Fortune in their book on Housing America have characterized the situation, pp. 52-53, as follows:

> "Since so much material is, or has been in the past, ordered in special lots and special quantities and special sizes selling necessarily at special prices, the material men have come to think of their products universally in those terms. Nothing else explains the notorious price

spread in building materials, certainly averaging 100 per cent, nor the fact that a man finds himself in a completely new and different world of values, a sort of fairyland of prices, the moment he undertakes to buy anything having to do with a house. A brass bowl which applied to another use might possibly cost $25 will cost $200 if he wishes to attach it to his ceiling for the purpose of diffusing light. And fifteen cents' worth of metal and enamel may in an extreme case cost him $15 by the time it has been applied as a replacement to the top of his water-closet reservoir. As an example of the ripening of prices in the jobber's warehouse, the history of plain copper gutter has considerable eloquence:

Ingot copper	7½¢ per lb.
Cost of melting, rolling, cutting, etc., including freight and manufacturer's overhead and profit	6¾¢ per lb.
Manufacturer's price	14¼¢ per lb.
--which amounts to	11½¢ per foot
Wholesaler's selling costs and profit, including freight, warehousing, overhead, and profit	6½¢ per foot
Roofer's selling costs and profit, including costs of handling and storing	18¢ per foot
Retail price	36¢ per foot
--which amounts to (or three times the manufacturer's price)	45¢ per lb.

Obviously, then, the man of means who wishes a house after his own heart, although he may justly demand of the building industry that it find some means of selling him his materials and his labor and his financing at prices commensurate with the prices holding in other industries, has no right to compare housing costs with, say, automobile costs, for if he built his $2,000 car as he builds his house, it would cost him for parts alone upward of $5,000."

The manner in which materials are purchased for the ordinary home is clearly shown in Table XVI.

Retailing Building Materials

The net result of such buying practices is, of course, a multiplicity of dealers in the business of furnishing the building supplies. In 1935 according to the Census of Business there were more than 73,000 retail dealers in the lumber-building-hardware group with average

Table XVI. **List of** Miscellaneous Purchases Made in Two Selected Months by General Contractor in Building a Single-Family House

December			December		
5	15 bbls. cement	$32.25	18	1 keg 8d.com.nails	$4.00
	Copper wire nails	1.70		Paint pot	.25
8	Reinforcing rods	6.91		Copper flashing	1.88
9	6 d.cut finish nails	5.40		Sheet lead	.88
	65 lbs. 8 d. nails	2.93		Coupling	1.43
	Miscellaneous	1.50	20	30 cement blocks	4.20
10	30 bags cement	16.13	26	Wallboard and boards	23.65
	2 steel sash	7.00	30	Lumber	30.31
	20 bags cement	10.75		Boards	170.00
11	100 cu.ft. insulation	20.00	March		
12	Lead, oil, turpentine	9.53	1	200 gal. fuel oil	15.00
	6 joist hangers	5.30	3	Lag screws	.52
	5 brushes	1.95	6	Nails	8.75
	23 ft. lead pipe	8.80	10	1 brush	.35
	5 rolls Bermico	6.25		250 gal. fuel oil	18.75
	2 rolls insulating paper	4.50	11	Drawer pulls and bolts	5.65
	35 ft. asbestos paper	2.80		7 rolls Bermico	8.75
	10 lbs. roofing cement	1.25		Sandpaper	.73
	2 kegs 8 d. com. nails	7.60	20	1 lt. wire glass	.25
	1 keg 20 d. nails	3.50	23	1 angle iron	1.50
	2 thermometers	1.60		2 bags lime	.90
15	20 ft. spruce	1.29		1 bundle lath	1.12
	Pipe and bends for drains.	2.67	24	Miscellaneous	1.97
16	Lead flashing	.90		7½ bbls. cement	16.14
17	Pipe and drain bends	9.33	27	1 push button	2.00
18	1 roll insulating paper	2.25	28	Bermico paper	1.00
	3 rolls Bermico	3.75		Cesspool grate and ring	7.50
	16 lts. wire glass	2.58	31	Pipe, bends and cement	19.22
	12½ lbs. putty	.69		8 tons Blue Dust	24.00
	Express	.56		2 sets sash balances	4.28

Bemis, Economics of Shelter, Vol. II, p. 187.

volume of sales only $24,000. Almost a fourth of them had total sales of less than $5,000 each. In fact, only 139 lumber and building materials dealers in the United States sold more than $300,000 worth of product, and they made only one-eleventh of all sales.

In probably no industry is the criss-cross pattern of distribution more complex than in the building materials industries. Some potentials are ordinarily delivered direct to the customer as for example, sand and gravel. Some are obtained at general merchandise stores, some at hardware stores, some direct from the manufacturer or the wholesaler. Building materials dealers frequently handle other products, lumber yards handling fuel, oil, coal, garden supplies and the like.

To attempt a detailed description of the many channels of distribution through which building materials reach the consumer is, therefore, out of the question. Nor does space permit presenting evidence on the mark-ups, terms of sale, organization of outlets and the like as they vary between regions, between stores, between building materials, between modes of distribution, between phases of the ups and downs of building, and so on. But the nature of these complications can readily be inferred from a few selected facts on lumber.

Distribution of Lumber from Plants

Needless to say, the extraordinary expensiveness of our inherently wasteful system of distribution have been fully realized by the manufacturers, retailers and wholesalers of building materials for a long period of time. Almost every conceivable type of experiment to reduce them has been tried or is in operation.

Table XVII illustrates what has been done in the lumber industry. It shows how lumber manufacturers distributed their product in 1935. In distributing their products in 1935, lumber manufacturers sold very little to their own wholesale branches or to their own retail stores. More than a third was sold directly to industrial and other large users, a fifth to wholesalers and jobbers, a fifth to retailers, and about one eighth directly to household consumers.[1]

A clue to the handling costs, exclusive of freight charges, which are incurred between the manufacturer and the retailer is contained in Table XX. While these figures cover only that portion of lumber and other building materials that is handled by wholesale and industrial distributors, none the less, they show the kind of cost that is incurred no matter how building materials are finally put into the hands of the retailers. Notice that the typical wholesale house does between $100,000 and $200,000 worth of business. Those doing over a million dollars worth sell only one fifth of the total amount reported sold, despite the fact that the ratio of expenses to net sales for the group selling between one and two million dollars worth of "lumber and millwork" is the lowest of the list, 15.5 percent. On the average the ratio for "lumber and millwork" is 19.1 percent. In short, about a fifth of the dollar which the wholesaler receives from his customers, i.e., the retailers, goes for expenses. The proportion going into profits is, of course, not included.

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1. Census of Business, 1935: Distribution of Manufacturer's Sales, p. 96.

CENSUS OF BUSINESS
WHOLESALE DISTRIBUTION: 1935

UNITED STATES SUMMARY

TABLE 4.--SALES AND EXPENSES BY BUSINESS SIZE GROUPS
WHOLESALE MERCHANTS AND INDUSTRIAL DISTRIBUTORS COMBINED

For 142 kinds of business

KIND OF BUSINESS	Total, all establishments				Establishments with sales of: Under $10,000				$10,000 to $49,999				$50,000 to $99,999				$100,000 to $199,999			
	Number	Net Sales (add 000)	Expenses (add 000)	Expenses, % to Sales	Number	Net Sales (add 000)	Expenses (add 000)	Expenses, % to Sales	Number	Net Sales (add 000)	Expenses (add 000)	Expenses, % to Sales	Number	Net Sales (add 000)	Expenses (add 000)	Expenses, % to Sales	Number	Net Sales (add 000)	Expenses (add 000)	Expenses, % to Sales
Lumber and Construction Materials	2,263	$338,949	$69,902	20.6	191	$906	$310	34.2	692	$19,333	$5,124	26.5	470	$33,446	$7,905	23.6	461	$66,875	$15,182	22.7
Builders' supplies (full line)	505	74,442	16,085	21.5	26	119	35	29.4	152	4,559	1,095	24.1	113	8,379	1,748	20.8	107	15,429	3,106	20.1
Lumber and millwork	1,082	190,342	36,376	19.1	75	349	113	32.4	288	8,176	2,044	25.0	213	15,103	3,383	22.4	242	35,784	7,802	21.8
Brick, tile and terra cotta	112	8,309	1,806	21.7	9	36	7	19.4	47	1,261	292	23.2	29	2,094	494	23.6	17	2,157	484	22.4
Cement, lime and plaster	123	18,374	3,358	18.3	9	47	20	42.6	40	1,290	298	23.1	26	1,747	359	20.5	27	4,165	877	21.1
Glass	256	21,544	6,653	30.9	42	203	73	36.0	106	2,458	861	35.1	46	3,206	1,190	37.1	41	5,604	1,898	33.9
Sand, gravel and crushed stone	96	9,575	2,770	28.9	17	90	36	40.0	31	852	285	34.3	20	1,409	423	30.0	13	1,774	546	30.8
All other	89	16,363	3,914	17.8	13	62	26	41.9	29	783	249	31.8	23	1,506	314	20.8	14	1,962	469	23.9

KIND OF BUSINESS	Establishments with sales of: $200,000 to $299,999				$300,000 to $499,999				$500,000 to $999,999				$1,000,000 to $1,999,999				$2,000,000 and over			
	Number	Net Sales (add 000)	Expenses (add 000)	Expenses, % to Sales	Number	Net Sales (add 000)	Expenses (add 000)	Expenses, % to Sales	Number	Net Sales (add 000)	Expenses (add 000)	Expenses, % to Sales	Number	Net Sales (add 000)	Expenses (add 000)	Expenses, % to Sales	Number	Net Sales (add 000)	Expenses (add 000)	Expenses, % to Sales
Lumber and Construction Materials	191	$46,330	$9,450	20.4	140	$53,043	$10,481	19.8	81	$52,504	$9,509	18.1	29	$40,521	$6,262	15.5	8	$25,991	$5,679	21.8
Builders' supplies (full line)	52	12,563	2,503	19.9	35	13,497	2,643	19.6	12	7,969	1,531	19.2	4	x	x	x	2	x	x	x
Lumber and millwork	105	25,554	4,980	19.5	81	30,768	5,532	18.0	53	33,394	5,783	17.3	20	27,204	3,967	14.6	5	14,010	2,772	19.8
Brick, tile and terra cotta	8	1,999	369	18.5	2	x	x	x	--	--	--	--	--	--	--	--	--	--	--	--
Cement, lime and plaster	8	1,828	396	21.7	6	2,027	336	16.6	4	2,563	439	17.1	3	4,707	633	13.4	--	--	--	--
Glass	10	2,448	724	29.6	7	2,628	789	30.0	7	5,003	1,118	22.3	--	--	--	--	--	--	--	--
Sand, gravel and crushed stone	6	1,431	405	28.3	7	2,679	743	27.7	2	1,360	332	24.4	--	--	--	--	--	--	--	--
All other	2	507	73	14.4	2	x	x	x	3	2,215	306	13.8	2	x	x	x	1	x	x	x

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Table XVII. United States Summary. Sales and Expenses by Business Size Groups, Wholesale Merchants and Industrial Distributors Combined[a]

Exerpt for Lumber and Construction Materials business.

a. Source: Census of Business. Wholesale Distribution, 1935, Vol. 1, pp. 85-89.

Retailing Lumber

But once in the retailers hands the process of cumulating costs has by no means ended, for retailers of building materials incur the same variety of expense as do retailers of other merchandise, expenses for handling and delivery, for advertising, maintenance and repair of premises, taxes, insurance, and so on. The amount of this expense when translated into mark-up varies with the size and type of business, with merchandising policies, and the like. It differs from time to time in the same store, from item to item, from store to store, and, of course, from place to place.

An example of the amazing variation that exists in this regard between geographic areas is given in Table XVIII. This variation is, of course, quite the ordinary run of affairs and exists in no less striking a fashion between stores in the same city and between stores in a metropolitan city and those in the suburbs. Notice that the average mark-up in cost is about 40 percent, although it varies from percentages as high as 60 in certain southern states to figures below 30 percent in South Dakota and the District of Columbia.

Another noteworthy feature is the relatively high amount of interest and bad debts expense, indicating the marked extent to which building materials dealers endeavor to encourage homebuilding by financing the builder and homeowner. The enormous variation in 1934 probably reflects depression conditions, for the percentage on cost of goods sold is below 2 percent in the Carolinas, Delaware, North Dakota and the District of Columbia and over 10 percent in Idaho and Rhode Island.

Table XVIII

Profits and Expenses, Retail Lumber Dealers[a/]

Known Dealers 23,531 — Dealers Reporting 3,554

State	Sales Volume 000 Omitted	Percentage of Each to Total Cost of Goods Sold						
		Gross mark-up realized	Rework Mill Exp.	Handling Delivery Expense	Selling & Admin. Expense	Interest & Bad Debts Expense	Total Expense	Profit Loss -
United States	$ 166,763	38.39	1.04	9.85	23.64	4.53	39.06	.67-
Alabama	1,409	53.87	5.93	12.37	26.43	4.92	49.65	4.22
No. California	2,426	37.80	1.41	9.80	20.38	4.38	35.97	1.83
Carolinas	107	60.21	9.45	12.53	32.87	1.89	56.74	3.47
Florida	6,068	41.56	1.53	9.59	20.64	4.49	36.25	5.31
Georgia	1,786	39.49	3.13	10.49	19.28	2.69	35.59	3.90
Illinois	3,871	37.86	.17	9.89	23.29	4.43	37.78	.08
Indiana	6,307	38.47	.73	9.22	24.42	4.65	39.02	.55-
Kentucky	1,842	45.11	1.09	10.14	28.27	4.57	44.07	1.04
Louisiana	1,630	37.32	.15	9.84	22.97	2.13	35.09	2.23
So. Michigan	6,099	38.87	.96	11.06	22.93	4.41	39.36	.49-
Delaware	548	40.58	-	10.21	21.06	1.75	33.02	7.56
District of Columbia	193	27.12	-	6.87	10.95	1.63	19.45	7.67
Maryland	1,827	38.23	1.25	9.61	21.88	3.98	36.72	1.51
So. New Jersey	1,282	38.91	1.16	11.79	30.65	14.32	57.92	19.01-
E. Pennsylvania	9,030	39.31	.84	12.35	23.04	4.11	40.34	1.03-
Mississippi	551	44.46	.08	10.73	30.70	7.27	48.78	4.32-
Colorado	3,435	32.74	.16	7.72	20.99	3.02	31.89	.85
New Mexico	813	35.05	.16	5.43	21.63	3.48	30.70	4.35
Wyoming	823	44.54	-	6.85	26.75	6.66	40.26	4.28
Nebraska	3,784	30.35	.01	7.80	20.84	2.84	31.49	1.14-
No. New Jersey	3,111	48.01	.57	14.73	31.42	5.39	52.11	4.10-
New York City	3,914	46.29	.96	16.29	27.80	3.95	49.00	2.71-
Connecticut	4,985	41.64	.07	12.71	22.45	6.20	41.43	.21
Maine	661	43.40	3.60	8.09	23.18	3.82	38.69	4.71
Massachusetts	6,349	41.26	1.71	13.78	24.73	4.46	44.68	3.42-
New Hampshire	405	48.59	7.73	15.08	22.01	5.08	49.90	1.31-
New York State	9,349	39.78	1.23	10.95	25.21	4.84	42.23	2.45-
Pennsylvania Part	183	52.88	13.19	9.12	16.82	7.14	46.27	6.61
Rhode Island	883	45.97	.95	14.37	35.47	12.09	62.88	16.91-
Vermont	353	46.24	2.45	7.13	31.17	1.43	42.18	4.06
Iowa	3,689	31.75	-	9.74	15.62	2.55	27.91	3.84
Minnesota	2,538	33.11	-	9.14	17.96	3.55	30.65	2.46
North Dakota	1,381	33.43	-	4.43	24.40	1.26	30.09	3.34
South Dakota	1,047	28.81	-	3.33	24.59	2.88	30.80	1.99-
Ohio	10,590	44.21	1.53	11.07	26.89	5.62	45.11	.90-
W. Pennsylvania	4,268	42.08	1.36	10.76	27.45	5.80	45.37	3.29-
Arkansas	167	38.92	-	11.99	20.06	6.29	38.34	.58
Kansas	3,013	37.74	.01	5.50	25.87	4.41	35.79	1.95
Missouri	5,039	34.47	.43	6.65	22.75	3.04	32.87	1.60
Oklahoma	5,354	33.74	-	4.42	22.91	4.37	31.70	2.04
Tennessee	1,275	43.78	1.28	8.91	29.04	4.64	43.87	.09-
Texas	6,914	38.10	.25	3.14	27.27	4.69	35.35	2.75
Utah	551	32.48	.55	7.78	18.27	6.54	33.14	.66-
Virginia	3,293	37.46	2.97	9.69	20.93	3.78	37.37	.09
Idaho	280	37.10	-	6.35	18.44	13.64	38.43	1.33-
Montana	2,078	41.48	.44	9.29	21.59	6.93	38.25	3.23
Nevada	96	37.03	-	7.27	28.84	3.28	39.39	2.36-
Oregon	633	47.38	.03	9.34	29.95	3.74	43.06	4.32
Washington	1,917	43.06	.92	13.41	23.52	5.11	42.96	.10
West Virginia	1,001	38.14	1.05	9.33	20.71	6.30	37.39	.75
No. Michigan	210	35.43	-	10.95	16.49	2.86	30.30	5.13
Wisconsin	8,931	32.49	.29	8.81	19.00	4.05	32.15	.34
Cook City, Illinois	3,509	42.15	.35	11.61	29.13	4.92	46.01	3.86-
St. Louis Cty.	1,855	45.07	2.66	.81	31.19	3.02	50.68	5.61-
Arizona	2,535	38.84	.01	10.75	24.03	4.35	39.14	.30-
So. California	10,547	30.20	3.12	9.98	21.26	4.64	39.00	8.20-

a/ Source: NRA study on the lumber industry. Kreps arrangement of table compiled by D. N. Burnham, C.P.A., Division of Review, NRA.

Table XVIII. Profits and Expenses, Retail Lumber Dealers, 1934

Known Dealers, 23,531 Dealers Reporting 3,554

Showing for chief items of expense the percentage of each to total cost of goods sold, by states.

Source: NRA study of the Lumber Industry (Kreps arrangement).

One other fact remains to be observed and emphasized: the magnitude of, and variation in, selling and administrative expense. It is uniformly from one-half to two-thirds of total expense. Its components as reported in another place in the volume from which this table is taken are in order of size: officers or partners salaries, 28 percent; office wages, 20 percent; salesmen's salaries, commissions, and travel, 13 percent; insurance, 10 percent; taxes, 5 percent; rent, 4 percent; advertising, 3 percent; postage, telephone, heat, accounting fees, legal fees, donations, office maintenance, etc., 17 percent.

On the whole and particularly so in the case of Rhode Island, Nevada and Mississippi, a net percentage of loss occurs wherever selling and administrative expenses are high. Per contra regions like the District of Columbia with a low figure (it is actually less than a third that of Rhode Island, being 10.95 percent as opposed to 35.47 percent) show the highest percentage of net profit. None the less despite the relatively large mark-up notice that on balance lumber dealers in 1934 lost money. There you have the distributive lumber problem in a nutshell--large price spread, hordes of dealers, enormous duplication of selling and administrative expense, and small net profits, if any.

In Table XIX is presented a vertical cross section of the lumber industry from stump to consumer. While it applies to a particular market, New York, for a particular period of time, for particular kinds of lumber sold direct from mill to retailer, it gives an approximate picture of general conditions and suggests the numerous possibilities of variation. Cost to the consumer is in every case from 2 to more than 3 times total mill cost.

Table XIX. Lumber Cost at New York, New York, Code Period January to March, 1934[a]

	Douglas Fir Water	Douglas Fir	Southern Pine	Western Pine	Oak
Shipping weight per M feet	3,100#	2,800#	3,000#	2,300#	4,300#
Freight rate per 100 pounds	-	$0.87	$0.37	$0.73	$0.41
Costs per M. B. M.					
Stumpage	$2.42	2.42	4.31	2.11	6.31
Logging and Milling					
Labor	5.11	5.11	7.58	6.35	9.27
Other costs	6.58	6.58	6.13	7.77	6.91
Shipping and selling					
Labor	1.06	1.06	1.61	1.90	2.35
Other costs	1.21	1.21	1.07	1.95	1.53
Overhead and administrative					
Officers and owners pay	.62	.62	1.05	.76	4.11
Other costs	1.80	1.80	3.50	2.60	-
Total mill cost[b]	$18.80	$18.80	$25.25	$23.44	$30.48
Freight	10.20	24.36	11.10	16.79	17.75
Cost to retailer	$29.00	$43.16	$36.35	$40.23	$48.33
Retail costs[c]					
Labor	6.51	9.69	18.16	9.08	10.83
Officers and owners pay	1.77	2.64	2.22	2.46	2.95
Other costs	5.96	8.88	7.48	8.28	9.94
Total cost to consumer	$43.24	$64.37	$54.21	$60.00	$71.95
RECAPITULATION:					
Stumpage	2.42	2.42	4.31	2.11	6.31
Logging and milling	11.69	11.69	13.71	14.12	16.18
Selling and administrative	4.69	4.69	7.23	7.21	7.99
Freight	10.20	24.36	11.10	16.79	17.75
Retailers costs	14.24	21.21	17.86	19.77	23.72
Cost to consumer	$43.24	$64.37	$54.21	$60.00	$71.95

a. Source: NRA study on the lumber industry (Kreps arrangement).
b. Total mill costs derived from Industry cost questionnaires.
c. Retail costs derived from Industry cost questionnaires.

Notice particularly that logging and mill labor even under NRA regulations in no case got more than 15 cents of the consumer dollar, and in the case of west coast labor, 12 cents. The railroads generally got twice that amount, and the retailer usually a good bit more than the railroad. In fact, if logging and sawmill laborers' NRA wages had been halved, the reduction in the price to the consumer, even if passed on 100 percent would be less than 7 percent and usually fail to exceed 6 percent.

This consideration emphatically corroborates the contention made in Section IV, Table XI, above, particularly in commenting upon the more than 20 percent rise in the price of West Coast lumber in the last year, that such a rise could not possibly represent only a compulsory increment due to increased wage costs, for average sawmill hourly earnings in July of 1937 were 54.2 cents per hour as opposed to 46.8 cents in July of 1936, an increase in wage expense (assuming no change in labor productivity) of 16 percent, which if passed on entirely would be responsible for only a 2 to 3 percent rise in price to the consumer, and about a 5 to 7 percent increase in f.o.b. mill price.

In conclusion, let no one charge the skeletal analysis given above with naively assuming a parallel trend, constant spread or continuously identical or proportional relationships between the prices of labor plus other production costs of building materials, and wholesale prices, retail prices, building costs, and selling prices of houses to consumers. Obviously such an assumption does violence to the most salient facts. (See for example Figure 5.) Each of these sets of prices is subject to special influences and special market

conditions. The prices of houses to homeowners bears little, if any, fixed relationship to reproduction costs of the structure, since factors like style of house, local population whims and movements, business developments, and so on are more important.

Similarly building costs correspond but loosely with local retail prices of building materials for not only do types of materials used depend somewhat on changing consumer fancy and foible but the quantity absorbed varies with price and technological progress. Retail prices of building materials, like those of commodities in general, follow wholesale prices only sluggishly, depending to a large extent on local distributor competition.

And, as has been shown above, changes in wholesale prices like those of wholesale prices in general take place for a variety of special monetary, financial, and even political reasons wholly dissociated with changes in wage rates or in other costs, - if indeed these are known or can be ascertained. Numerous interstitial price shifts take place vertically within the industry and geographically between uses and users, types of outlets and modes of distribution.

In sum, the price universe of building materials instead of resembling a layer cake with increments in cost transmitted vertically, more nearly resembles a chaotic conglomerate the more difficult to resolve because presenting neither planes of cleavage nor continuous threads but mainly obdurate, intercemented, heterogeneous massivity in which one can hardly hope to make a dent.

Figure 5. Lumber Prices, Comparison of Wholesale and Retail Price Trends

Yellow Pine Flooring

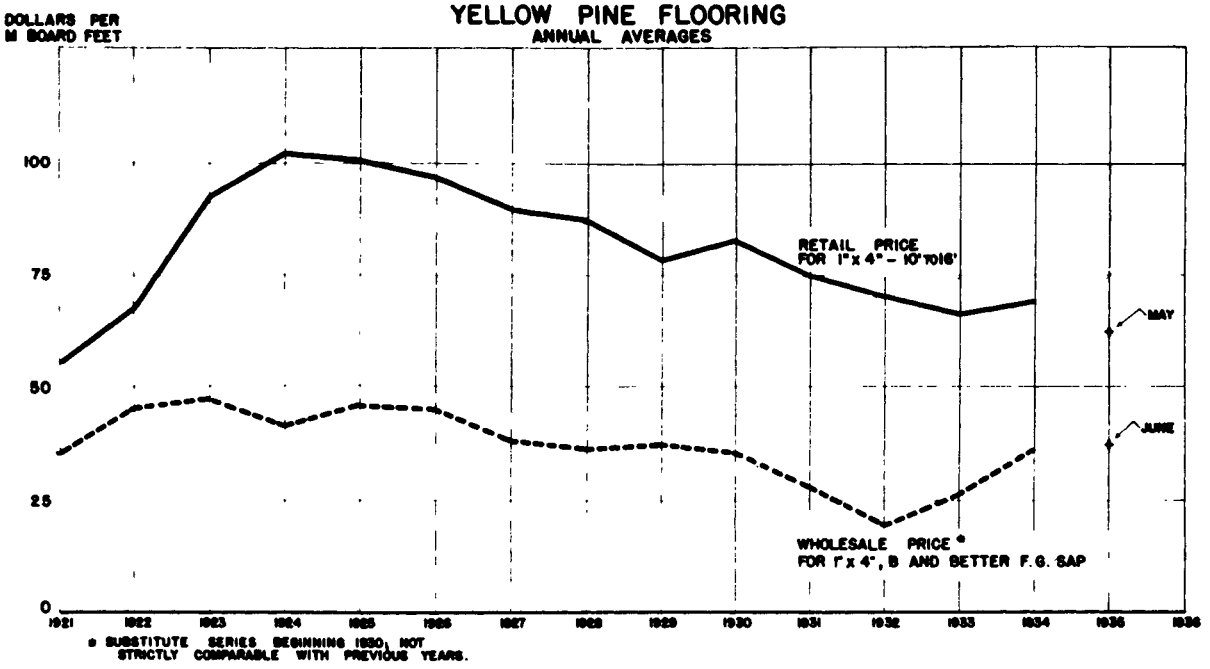
Douglas Fir Flooring

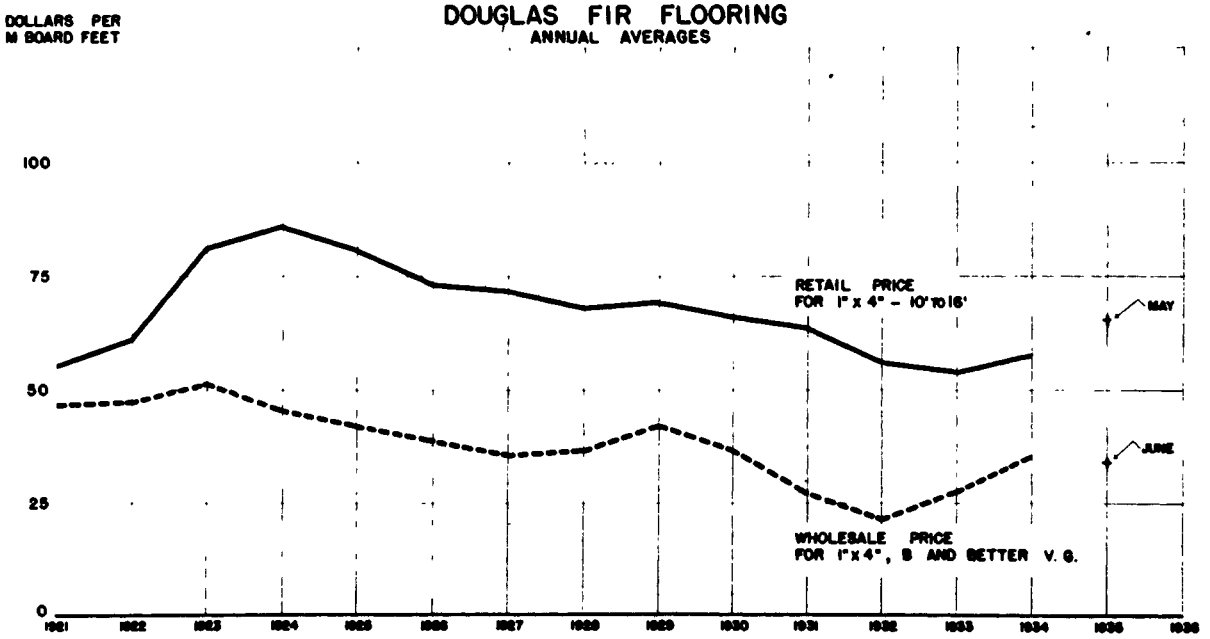
Source: FHA

Figure 5.

LUMBER PRICES

COMPARISON OF WHOLESALE AND RETAIL PRICE TRENDS





SOURCE. WHOLESALE PRICES – BUREAU OF LABOR STATISTICS.
RETAIL PRICES – PUBLIC WORKS ADMINISTRATION.

FEDERAL HOUSING ADMINISTRATION
ECONOMICS AND STATISTICS DIVISION
CHART NO. C 106-531 A1.

VI. HOW CAN THE HIGH COST OF BUILDING MATERIALS BE REDUCED?

To reduce the high cost of building materials and widen this most formidable bottle-neck to more housing requires activities of two kinds, those tending to increase the efficiency of production, distribution and lower the prices of building materials, and those which bring about maximum economy in their assembly at the site.

Business and governmental efforts towards getting more materials at lower prices will, of course, vary with the particular industry concerned, but they fortunately need concern only a handful of such industries. As was noted above most of the construction dollar goes for four or five items, - lumber, steel, brick, cement, and heating and plumbing equipment. Of these, the plumbing and heating equipment industries, as has been seen, constitute admirable examples of industries that have kept down prices, with the result that despite the present low level of building, production and sales have since the last quarter of 1936 averaged higher than in 1929.

The materials problem so far as manufacture is concerned is, therefore, concentrated in the lumber, steel, brick and cement industries. It resolves itself into four questions: how get lower lumber prices? How reduce the price of steel? How get cheaper brick? How bring down the price of cement?

A complete program of action will of course, require tackling each problem individually after careful investigation and consultation with the trade associations and leading producers in each field. In the lumber industry certain natural forces are even now at work causing stocks to accumulate, a most wholesome development which ought to cause lumber prices to decline. But no such promise of relaxation of the grip of

collectivistic restrictive activity of business exists in the other industries. Steel and cement have for years had a basing point system of control of prices. Both are produced by large scale production methods and controlled by gigantic aggregates of capital.

How Remove Restrictions of Production of Lumber, Steel, Brick, and Cement

Clearly the means of escape readily available are few lying far outside the reach of any economic power which the consumer possesses. For the consumer cannot easily take his patronage elsewhere. He must have some place to live. Of course, if the price of building materials consisted 100 percent of labor, the consumer-laborers' problem would be solved almost overnight because American business enterprise, particularly in the steel and cement industries, has developed its technique of reducing and keeping down labor costs almost to perfection. The great difficulty, however, is that by far the largest share of the building dollar goes for overhead expenses including fixed costs, financial charges such as interest or bonded indebtedness, selling and administrative expense, and officers' compensation. Pricing policy seems to be dominated by other than cost consideration.

But the consumer is not altogether helpless except in the measure he permits himself to be. An initial device which might have an especially salutary effect on the production and prices of lumber and steel would be to take off the tariff.

Another device which might be suggested is action under the anti-trust laws. This assumes that illegal combination exists which would have to be proved. A detailed study of information in the hands of government officers of various government bodies, federal, state, and municipal might indicate action which could be taken by legal departments.

A third device open to the consumer is that of utilizing to the full his own bargaining power, particularly insofar as it is concentrated in the purchases by cities, counties, states, and national governments. Stronger units might help weaker units, putting in a competitive bid to supply local governments at reasonable prices. Governmental purchasing agents should coordinate their purchases and concentrate the bargaining power inherent in large-scale buying, operating in the same manner, for example, as does the bargaining power of the large automobile concerns to secure concessions from the steel industry.

Policies of public buying should be critically reexamined. It might be true, for example, that instead of trying to secure bids on individual contracts, cities and other consumer governmental units might initiate a wellknown practice of certain highly successful chain stores and small mail order houses; namely, contract to take all of an individual's output for a period of years. If governmental agencies (public housing authorities) find that even this inducement is insufficient to influence an individual producer to break away from the organized might that controls him and his industry, it is theoretically possible to further follow corporate practice by producing their own materials. Even the mightiest of American business units of bargaining power finds such a device necessary to guarantee adequate supplies of raw materials at reasonable prices. Municipal purchasing agents have demonstrated the method of combined purchasing. City fire departments manufacture parts of their own equipment. The federal government has let independent contracts where evidence of collusive bidding could be shown.

Many other devices will suggest themselves as detailed examination is made of the individual industries, - devices such as changes in tax policies, reduction or readjustment of freight charges, manufacture and distribution of building materials for low-cost houses by relief labor, elimination of wholesaler and retailer by factory to site operations, and the like.

Obviously in each case the problem is three-fold: manufacturing costs and prices, f.o.b. mill or plant, are high; freight costs and wholesale prices are high; distributor costs and retail prices are high. Building materials compound the high costs of monopolistic 1/ or quasi-monopolistic activities in manufacturing, high freight charges, and the wastes of our traditionally inefficient system of distribution, ways of tackling the monopoly problem, the railroad problem and the distributive problem in building materials probably vary with the specific building material under consideration. Detailed and efficient programs of action can only be evolved after more thorough inquiry and critical deliberation.

Handicraft Retail Character of Assembly of Building Materials

Even at present prices houses could be built more cheaply if the process of assembly were less disorganized. At present the job of putting up a house is one of assembling roughly thousands of parts counting items which must be ordered as such to specification, involves hundreds of operations such as hammering or planning, requires a score of individual skills or trades, roughly several hundred items of equipment, varying from transits to concrete mixers, and usually

1/ The term "monopolistic" is here used in its economic rather than its legal sense.

a dozen or more separate contracts, each involving a separate setting of bids based on hit-or-miss estimates, providing for contingency allowances, guarantees of proper performance, and so on. On every job is the sub-subcontractor who often has never heard of accounting and keeps his office in his hat, and who consequently tries to stay on the safe side in his estimates but often fails. Each one figures the cost of materials, adds on a percentage for waste, incurs the overhead of running from job to job for labor and equipment, and adds a profit which is as much as he thinks he can get considering the bid of a genuine competitor if such in reality exists, and the shrewdness or bargaining leverage of the contractor or purchaser.

Almost universally there are local tie-ups, reciprocity arrangements between contractors and building materials dealers, between architects, building supply houses, and building and loan associations or banks, and between contractors and labor organizations. Every device of local pressure imaginable is utilized to keep the contracts in the community, particularly where local dealers or contractors have perfected arrangements for dividing the local market between them.

Such tie-ups should not be given blanket condemnation. It is not impossible that contractors who know their subcontractors and who have semi-permanent arrangements with them add an element of efficiency to the building operation which can otherwise be achieved only by corporate integration or large-scale operators. Competitive bidding contains large elements of waste. Duplicate designing of slipshod character, collusive bidding within narrowly agreed ranges, "cleared bids" dominated by an association, overhead for contracts not received are all expensive. They account to some extent for irregular operation and high overhead as well as labor costs.

The existing organizations always tend to oppose change. Accepted methods are the easiest to use. When they seem to react to the financial advantage of all concerned it would be strange to find any other attitude.

It is not strange also to find those who have investment in high-cost construction to lack interest in lower reproduction costs.

With so many powerful forces opposed to change, the traditional method of building tailor-made homes has experienced little change or improvement. Use of labor-saving devices is the exception. Often contractors recruit laborers for each job and operate on a shoestring so slender that they even lack the capital to take advantage of quantity and cash discounts. Materials are dumped on the site and fitted by the "cut-try-and-cut-again" procedure. Operative builders putting up a block or row of houses are rarely found, accounting even in 1929 for only 2 percent of the total value of residences built, most of the building is done by small contractors. Table XXII contains the details and speaks emphatically for itself. The small volume of business done, the very small number of employers per establishment, and the paltry thousands of dollars worth of materials installed by the firms contained in this sample excellently depict the small retail character of the business. Moreover, on the whole the larger firms are here represented.

Are There Economies in Large Scale Operations?

This suggests, in conclusion, possibly one of the most promising ways of reducing the high cost of building materials; namely that of large scale building through which can be realized the economies of large order purchasing and transportation of materials, and of central planning and control of development. The experience of a few such large scale operations may well be worth describing.

Table XX. Building Contractor in 1935[a]

Type of contractor	Number of establishments		Value of work performed		Employees (average per year)		Cost of materials installed	
	Total	In this sample	Total (add,000)	Average per firm	Total	Average per firm	Total (add 000)	Average per firm
General building	8,337	7,139	$352,329	$47,000	105,302	13.3	$162,641	$22,800
Carpentering	7,853	5,698	25,129	4,400	6,038	1.1	9,677	1,600
Concreting	981	869	10,465	12,000	3,609	4.1	4,383	5,000
Electrical	8,473	3,413	70,371	21,000	16,299	4.9	28,997	8,500
Excavating and/or foundation	375	342	11,716	34,000	3,938	1.1	2,478	7,500
Glass and glazing	141	86	1,851	21,000	404	4.7	756	8,900
Heating and plumbing	23,856	13,741	214,642	16,000	45,752	4.0	103,005	7,500
Roofing and sheet metal	5,927	2,889	47,844	16,000	12,209	4.2	20,836	7,200
Masonry	1,288	823	10,203	12,000	2,996	3.6	3,980	4,800
Ornamental iron	158	145	1,369	9,400	316	2.2	618	4,300
Painting, paperhanging, decorating	11,078	6,186	38,605	6,200	12,394	2.0	9,464	2,900
Plastering	899	720	9,476	13,000	3,180	4.4	3,261	4,500
Tile and mantel	891	665	13,686	20,600	3,793	5.7	6,478	9,700
Wrecking and demolition	129	108	2,325	21,000	931	8.5	124	1,100

a. Source: Data are taken or computed from the Census of Business, Construction Industry: 1935, Table 2, Vol. I, p. 45. Figure for total number of firms, ibid., Table 1, Vol. I, p. 1.

Architectural Forum (August 1937) describes an experience of President N.M. Ruben of a Chicago Appraisal Company who demonstrated a saving of 13 percent in a development of only ten houses. He "took bids from Chicago sub-contractors on a two-story Colonial brick veneer home complete with winter air conditioning, and on the same house built ten times over. His comparative figures are based on actual plans and specifications and on the bids received from the subcontractors approached.

"Significant deductions from Appraiser Ruben's comparative figures:

> "The pipe trades-heating, ventilating, and plumbing--are fields showing relatively slight differentials.
>
> "Plastering likewise is a trade in which the operative builder can effect only a slight saving, and then only if he is a shrewd buyer.
>
> "Greatest savings can be marked up in the shell of the building. Concrete, masonry, and lumber--those items over which the general contractor has chief control--are all fields where bulk purchase of materials and a large covering contract will reduce costs.
>
> "Carpentry and millwork, embracing staircases, provide another category where savings can be effected.

"Obvious corollary to Appraiser Ruben's comparison is that multiplying his base house by ten is not enough to effect as appreciable savings as with a larger project. Thus the roofing contractor might well have figured that his reduction in materials for ten houses would be offset by the spasmodic use of his labor.

"Bids received on the most important items entering into Appraiser Ruben's hypothetical house are listed under 'Individual Buying'. Average costs for the same structure duplicated ten times are listed under 'Operative Buying.'"[1]

1/ Architectural Forum, August, 1937, Vol. 67, No. 2, p. 54.

The article goes on to give the following table which well merits detailed study:

	Individual Buying	Operative Buying
Excavation, backfill, grading	$250	$250
Foundations, dampproofing	750	680
Structural steel	50	50
Masonry walls	1,030	950
Carpentry, including millwork, hardware, insulation and stairs	2,978	2,429
Plastering	710	615
Sheet Metal	80	70
Roofing	125	125
Tile	145	145
Painting and decorating	650	535
Glass and glazing	70	70
Plumbing, sewerage, gas fitting	850	760
Heating, air conditioning	685	600
Electric wiring, service	232	174
Electric fixtures	75	75
Calking, weatherstrips	45	35
Shades and blinds	25	25
Linoleum	75	75
Building permit	52	52
TOTAL	$8,877	$7,715

Again, the firm, American Houses, Inc., has found in putting up their new Plywood Asbestos Shingle Houses (prefabricated) that the cost of structure for building a single house was $1,356.64 and in large quantities was $1,249.66 or $107 less of which $27.00 represented saving in excavation and $40.00 represented saving in laying foundations.

Another indication of the economies of large-scale operations is the fact that the Westacres project at Pontiac, Michigan, built more than 150 houses of roughly the same type as Purdue University's House No. 1, the former at a cost of structure of $3,477.48, the latter at a cost of structure of $4,852.45, a difference of nearly 40 percent.

Similarly, the TVA in building 152 houses at Norris, Tennessee found that its operations showed a saving of $505 below the average bid per house, its final TVA "job cost" being $5767 per house as opposed to an average of all bids, adjusted to cover the same work of $6272. Expectations of economies of not less than 10 and not more than 20 percent of the total were not realized because of special factors, such as the steep hillside on which the houses had to be built relatively long distances apart, the fact that immediate necessity required the housing to be constructed during the winter months and the inclusion of many experimental features such as a steel house, a stone house, precast floor slabs in several of the houses and the like. These special costs are estimated to have fully equalled the 20 percent of saving anticipated from large scale operations.1/

As final bit of evidence on this point should be cited the Meadville, Pennsylvania project where in 1936 a wooded hillside was transformed into a community of 202 houses in eight months. The Federal Housing Administration insured a 4 percent loan of $1,012,000 amortizable in 30 years. "Corporation officials estimate that the houses built under this plan cost 25 percent less than individually-built houses of comparable size and quality."2/

1/ See Louis Grandgent, Houses at Norris, Tennessee, memorandum to the Tennessee Valley Authority, March 14, 1936, p. 11.

2/ The Construction Industry Yearbook, 1937 edition, published by the Engineering News Record, p. 79.

But large scale operations require not only a far larger investment per contractor than the industry now has. It requires the existence of large undeveloped tracts in and near cities where a large and clear-cut shortage of housing exists. As long as houses continue to be built on individual lots as the need develops such economies are frequently more than nullified by the scattering of operations, the moving and supervision of men and equipment, and by the general increase in overhead. It is true, however, that in Great Britain large firms build houses in groups of 50 or 100 in about ten weeks, the house selling for about $2,250 and the land costing about $275. One such firm was recently building simultaneously in 21 communities, and proudly boasted that in less than ten years it had marketed 30,000 houses. But in the United States the cost reduction possibilities from mass building, even if a vertical building trust were formed integrating operations from the sawmill to the rediscounting of the mortgage, are for the time being problematical, except under special circumstances.

Some large concerns have felt that the difficulties of supervision and organization cause increases in overhead which more than offset other savings. Unless large-scale projects consisting of many individual houses are developed savings through large-scale operation are doubtful and most small houses will still be built under traditional methods. This points to the necessity for more efficient distribution of materials at lower cost as a matter of the most immediate concern.

Some Examples of Vertical 14 Organized Building Operations

At present in the United States it seems that genuinely low-cost housing can only be built by special groups of persons. Trailer manufacturers are providing accommodations for nearly a million families in mobile houses. Cottage camps and auto courts have provided inexpensive and moderately comfortable accommodations for tourists. Many industrial firms know how to build good but inexpensive company houses for their workers, the Newport News Shipbuilding and Drydock Corporation recently completing 75 2-and 3-bedroom frame houses for its Negro laborers at a cost completely furnished of only $2400. The transient unemployed and vagrants used to provide cheap housing for themselves under sheets of corrugated iron carried from city dumps. The two pre-fabricating companies of the American Rolling Mills Company have built 300 houses, and General Houses, Incorporated, has built about 40.

But to date probably the best large-scale development in the field is the Westacres project at Pontiac, Michigan which has throughout this paper been frequently mentioned. It constructed two-story houses with an acre of land for $4,439 or at $2.60 a square foot. The largest development is that of the Gross Morton project, Long Island, where 232 of a projected 1,000 one and one-half story houses have been built at a cost of $5,298 or at $2.23 a square foot. Another example is that of Colonial Garden Homes, Long Island, which consists of a house 26 ft. by 36 ft. plus a garage on a lot 53 ft. by 100 ft., all for $3,000. The development producing the cheapest house is that of Realty Associates, Inc. on Long Island who provide 4-room frame cottages on lots 43 ft. by 100 ft.

for $2,500.1/ The best and cheapest partly prefabricated house is the New American Houses Plywood Asbestos Shingle House.2/

The net conclusion is thus that while large-scale building operations have in special instances reduced the wastes of assembling building materials by 13 to 25 percent, the development of vertical trusts on a natural basis will be slow. In this regard as in others the process of obtaining a reduction in the high prices of building materials, of lowering freight charges, and reducing distributive margins like that of integrating the various uncoordinated craft skills and operations is beset with a barbed wire entanglement of vested interests, traditional organization, and stubborn consumer individualism through which it seems almost impossible to cut a path to a solution.

1/ It should not be assumed that these prices are for houses of the same quality. Likewise the question of cost is a matter of the character of financing and the length of life of the house and the community.

2/ The findings of this paragraph are essentially the findings of R. L. Davison, Director of Research of the Pierce Foundation, contained in a report which he made of his investigations on the topic of large-scale housing last year.