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AMERICAN BUILDER

and Building Age

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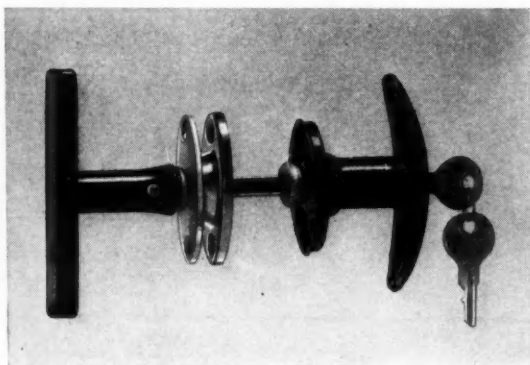
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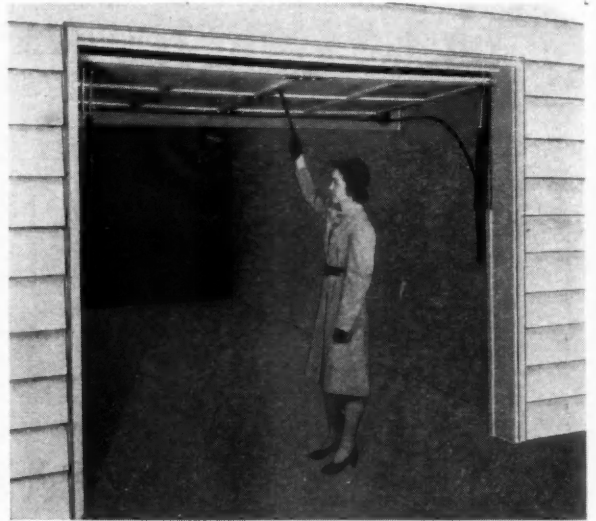
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PUBLISHER'S PAGE

"We, the People," in the New Year

THE year 1939 was an unusual one in general business. During the first five months there was decline. During the next three months there was gradual improvement. From the middle of September—just after the war in Europe began—to the middle of November there was the biggest expansion that ever suddenly occurred. During the remaining month and a half there was some recession—which, however, left business as a whole better than at the end of any year since 1930, excepting 1936.

But throughout 1939, and throughout the last five years, there was one business that gained steadily—i.e., residential construction. It was 71 per cent as large last year as in 1929; 122 per cent as large as in 1930; 151 per cent as large as in 1937, and 134 per cent as large as in 1938. During the last eleven years (basing estimates on the Dodge figures) expenditures for residential construction were approximately as follows:

1929	\$2,140,000,000	1935	\$ 550,850,000
1930	1,240,000,000	1936	881,786,000
1931	920,000,000	1937	996,290,000
1932	345,000,000	1938	1,133,655,000
1933	287,500,000	1939	1,519,000,000
1934	287,500,000		

Having reached bottom in 1933 and 1934, they have increased in every year since, despite the two years' "recession" in most business that began about the middle of 1937.

THE building industry can look back with some satisfaction on the five years' uninterrupted expansion of its business that made it *more than five times* as large in 1939 as at the bottom of the depression.

How about 1940? How about the next five years? The prospects immediately ahead are bright. There is no apparent reason why building should not expand for five years more.

But business as a whole, and the business of each industry, is *still determined by the economic law of supply and demand*. Human beings—politicians, business men, labor leaders, all of us—are

always trying, especially when business is unusually good or unusually bad, to repeal or beat that old law—but never succeed. We—especially politicians—have tried harder in this country to repeal or evade it during the present depression than ever before—and have succeeded only in making it the worst, longest, most ruinous depression in all history. Even in 1939 residential building was still *only one-half as large* as it averaged in 1923-1928, in spite of an increase of 15 to 20 per cent since then in population.

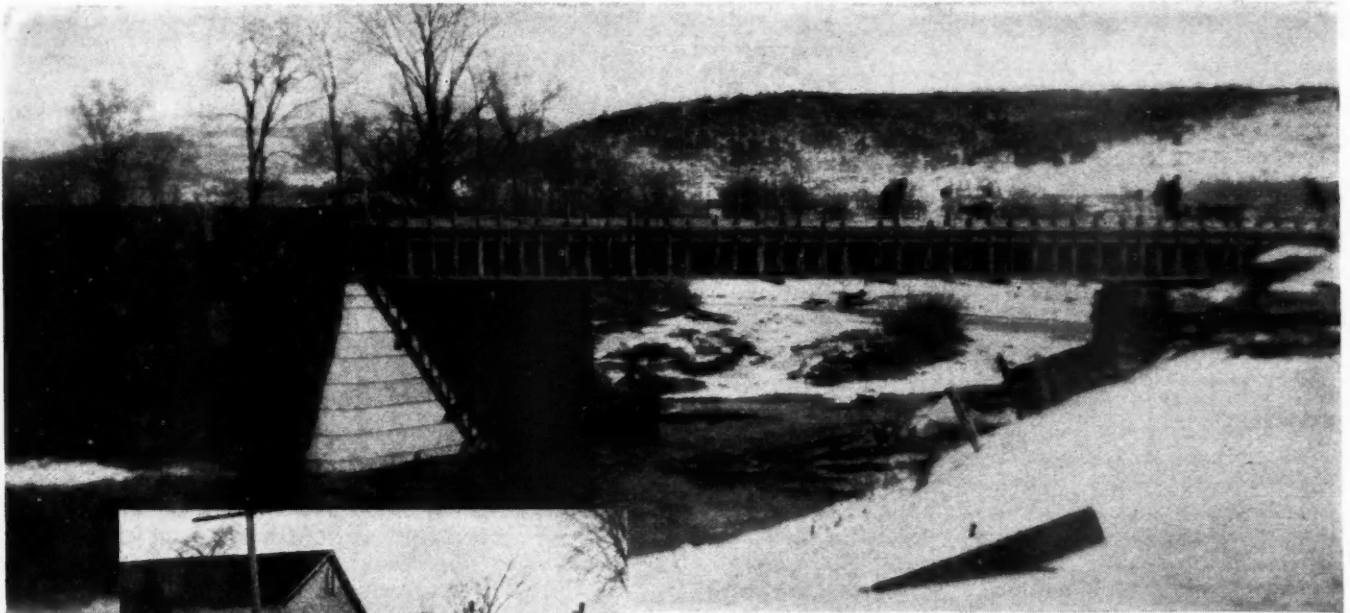
WE may all well ask ourselves, then, at the beginning of this promising New Year: How to maintain and further increase business until we have achieved real prosperity for all of us? The only answer is: *Increase effective demand* for all goods, consumers' and durable, including homes. But how? By asking wages that *business* can afford to pay. By asking prices that the *people* can pay. By making more intelligent and strenuous efforts to sell our products and services. By stopping politicians from monkeying with wages and prices. By stopping politicians from making huge wasteful government expenditures. By stopping politicians from making the increases in taxes necessitated by huge wasteful expenditures—for every dollar unnecessarily added to taxes *reduces demand, and especially demand for durable goods, the most important of which is housing*.

"We, the people," must end the depression—and fully revive building. It won't come automatically. Nothing that is either bad or good for "We, the people," ever comes automatically. It comes *because we cause it*—whether foolishly or wisely. And when we become *really entitled to prosperity* we will cause it *by ourselves reviving*, and by *compelling others to revive*, the policies in government and business that increased our prosperity in every decade in our country's history excepting the last one.

Samuel O. Dunn

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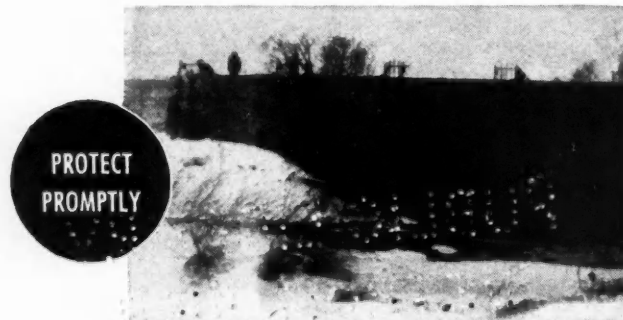
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1940 Building Outlook Bright

10 to 20% Increase in Home Building Forecast for 1940. Review of '39 Shows 474,600 Nonfarm Dwelling Units Built.

DESPITE the war and attending uncertainties, the residential construction industry in the U. S. in 1939 achieved what, in many respects, was a remarkable increase in volume over the previous year. Preliminary estimates of the total number of nonfarm residential units were close to 474,600 as compared with 346,619 in 1938—a 37 per cent increase. Total value of nonfarm residential construction increased from 1.39 billions in 1938 to 1.9 billions in '39—a 36.7 per cent increase.

What is more important at this time is the fact that building volume the latter half of the year, despite the declaration of war, went ahead at an almost record-breaking rate. Residential contracts for November, as reported

by F. W. Dodge, were 22.4 per cent greater than November 1938. Stewart McDonald, Federal Housing Administrator, in reporting FHA mortgage insurance activity in November, said that these figures corroborate earlier predictions of unusually active winter building. "During the four weeks ending November 25," he reports, "11,003 small homes were started under FHA inspection, compared with only 8,552 in 1938—a gain of 28 per cent." He pointed out that FHA mortgage applications on new homes have proved a most effective barometer of residential building activity, since they clearly indicate the definite plans of large numbers of people to build.

Illustrating this point, McDonald said that the FHA figures on mortgage applications on new homes in October were 22 per cent over the preceding year, while building permits in some 1,600 cities for the same period showed a gain of 23 per cent. October residential activity shown by these indices was the second highest month of 1939, being exceeded only by a narrow margin in May, which was the highest on record for FHA.

The fact that the three outstanding indicators of residential building activity—Dodge reports, FHA mortgage applications and building permits—all showed increases of from 20 to 30 per cent in the closing months of the year is highly significant and should indicate an

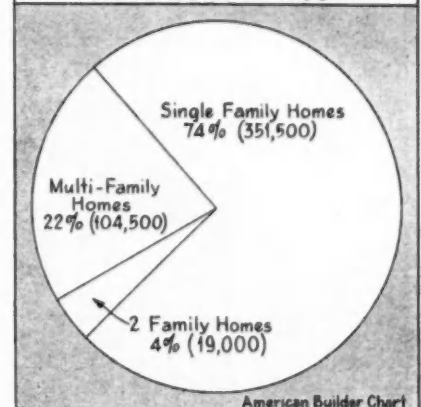
Nonfarm Homes Built in U. S. 1938 and 1939

Estimates by Construction Division, U. S. Bureau of Labor Statistics, Based on Building Permits in More than 2,100 Cities with Population of 40,500,000

Where Built	No. of Cities and Places	Population (1930 Census)	New Dwelling Units	
			1939	1938
1. Cities 500,000 and over	14	21,315,411	113,754	86,400
2. Cities 500,000 to 100,000	79	15,010,325	72,278	40,080
3. Cities 100,000 to 50,000	98	6,491,448	28,766	17,628
4. Cities 50,000 to 25,000	185	6,425,693	31,400	20,335
5. Towns 25,000 to 10,000	606	9,097,200	47,201	35,136
6. Towns 10,000 to 5,000	851	5,897,156	31,741	24,607
7. Villages 5,000 to 2,500	1,332	4,717,590	25,002	21,567
Total URBAN	3,165	68,954,823	350,142	245,753
8. Incorporated Places of Less than 2,500	13,433	9,183,453	124,436	100,866
9. Rural Population Not on Farms or in Incorporated Places		14,191,420		
Total NON-FARM		92,329,696	474,578	346,619
10. Farm Population		30,445,350	*	*
TOTAL U. S.		122,775,046		

NO. I—PRELIMINARY ESTIMATES of all U. S. residential building except farms, prepared under the direction of Herman B. Byer of the Bureau of Labor Statistics. *No estimates available as to number of farm homes built.

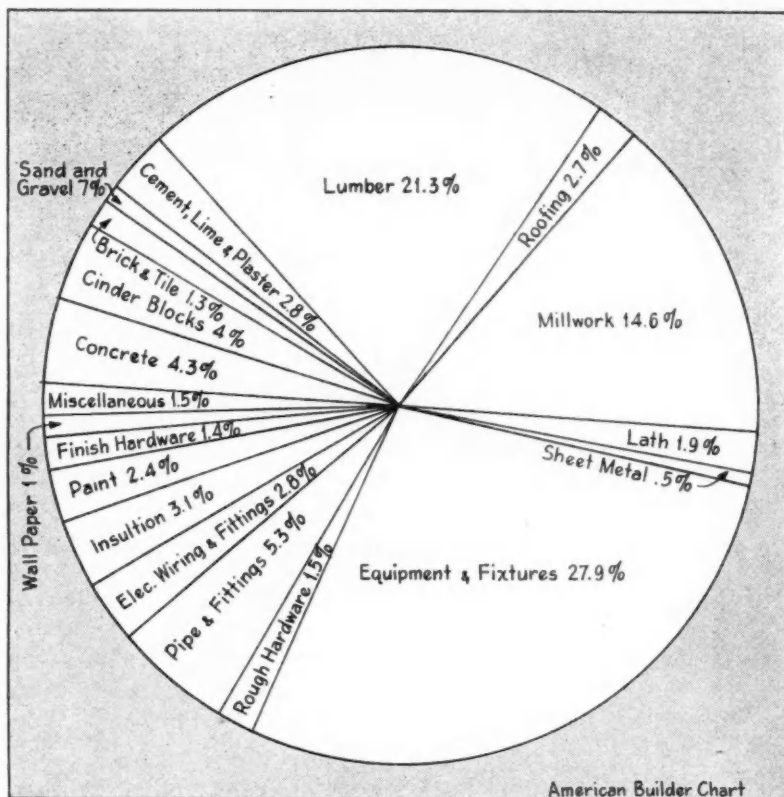
SINGLE FAMILY HOMES MAKE UP 74% OF 475,000 DWELLING UNITS BUILT IN 1939



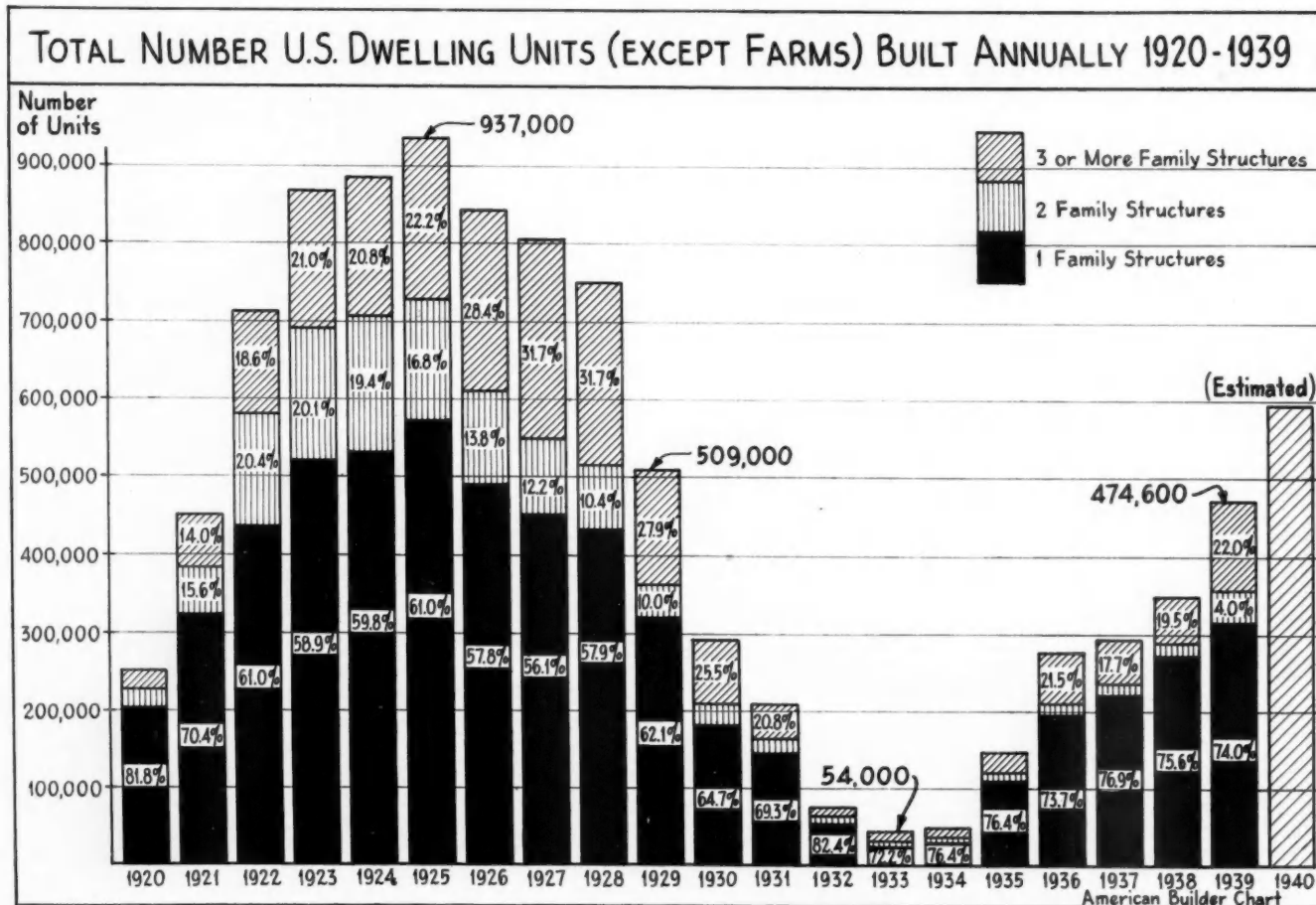
NO. II—SINGLE-FAMILY HOMES accounted for 74 per cent of the residential units provided in the U. S. during 1939.

active start for 1940. The FHA mortgage applications have continued at a high rate right up to the present, indicating a correspondingly large activity in the months ahead.

On the basis of present rather favorable prospects, conservative estimates for next year are that there will be an increase of from 10 to 20 per cent in the number of dwelling units over 1939. Due to the trend towards smaller and lower-priced houses, however, the increase in the dollar volume will be somewhat less than this. An increase of 10 per cent in this year's 474,600 units would bring the 1940 total well above 1929, when 509,000 units were provided. How this volume of residential business would compare with the boom building days of 1924 and '25 and the depression days of 1933 and '34 is indicated on Chart IV. Even with a 10 per cent increase in 1940, total volume would still be only 56 per cent of the 937,000 units built in 1925. Analysts of population trends, obsolescence and housing needs agree that there is an ample backlog to support a much larger building program than is even conservatively estimated for 1940. However, any analysis of the prospects for next year must be qualified by the fact that conditions would be materially changed by (a) sudden ending of the European war; (b) entrance of the United States into the war; (c) a



NO. III—ANALYSIS by the Bureau of Labor Statistics of 8 National Demonstration Homes built in Washington, D. C. Materials accounted for 65 per cent of the cost of house. Equipment and Fixtures item above includes range, refrigerator, heating, plumbing and electrical equipment.



NO. IV—TWENTY YEARS OF HOME BUILDING in the U. S., covering all residential construction except farms, is shown in the above chart prepared by FHA and based on Bureau of Labor Statistics data. From a high of 937,000 units in 1925, volume dropped to 54,000 units in 1933. In 1938 it increased to 346,700, and in 1939 to 474,600. The average for the 10 years—1920 to '29—was 703,400 units.

90.7% of FHA Insured Homes Valued Under \$8,000

Property Valuation (House and land)	Percentage		Average valuation			Percent of total valuation in—	
	Distribution	Cumulation	Total	House	Land	House	Land
Less than \$2,000.....	0.1	0.1	\$1,694	\$1,481	\$ 213	87.4	12.6
\$2,000-2,999.....	3.7	3.8	2,609	2,301	308	88.2	11.8
3,000-3,999.....	15.2	19.0	3,488	3,065	423	87.9	12.1
4,000-4,999.....	23.5	42.5	4,409	3,845	564	87.2	12.8
5,000-5,999.....	22.8	65.3	5,384	4,656	728	86.5	13.5
6,000-6,999.....	17.9	83.2	6,305	5,373	932	85.2	14.8
7,000-7,999.....	7.5	90.7	7,328	6,228	1,100	85.0	15.0
8,000-9,999.....	5.7	96.4	8,650	7,282	1,368	84.2	15.8
10,000-11,999.....	1.8	98.2	10,600	8,823	1,777	83.2	16.8
12,000-14,999.....	1.0	99.2	13,006	10,703	2,303	82.3	17.7
15,000 or more.....	.8	100.0	17,588	14,179	3,409	80.6	19.4
U. S. Total, All Groups.....	100.0		5,530	4,745	785	85.8	14.2
Within Metropolitan Areas.....			5,810	4,950	860	85.2	14.8
Outside Metropolitan Areas.....			4,775	4,191	584	87.8	12.2
Average All Groups.....							
1938.....			\$5,530	\$4,745	\$ 785	85.8	14.2
1937.....			5,978	5,065	913	84.7	15.3
1936.....			6,255	5,229	1,026	83.6	16.4
1935.....			6,450	5,321	1,129	82.5	17.5

Total New Private Construction in U.S. in 1939 Set at 3.5 Billions. Public Construction Estimated at 2.8 Billions

NO. V—100,000 NEW HOMES financed by FHA in 1938 are analyzed in this table prepared by the Statistical Division of FHA. More than 90 per cent of FHA houses were valued (with land) at under \$8,000. More than 65 per cent were valued under \$6,000. There has been a constant decrease in the cost of FHA insured houses each year. The largest number (46.3 per cent) fell in the price classification between \$4,000 and \$6,000.

drastic skyrocketing of building costs. At present none of these seems likely.

Of equal importance during the closing months of 1939 was the large volume of modernization and repair work reported. More than a million dollars a day in modernization and repair loans was reported to the FHA for insurance during the 60 business days ending December 4, Administrator McDonald announced. Loans reported during these 60 working days numbered 149,027, totaling \$60,360,170. In the month of November alone, 63,903 loans were reported, totaling \$24,485,511—the largest number of loans insured under Title 1 of the National Housing Act in any month since April 1936.

Rapid improvement in commercial, industrial and manufacturing business has had a beneficial effect on construction of this type. Small commercial and manufacturing buildings, shops, stores, garages and similar structures affected by expansion of business activity are expected to show marked improvement in 1940. Industrial centers, benefiting by war orders, are most likely to see major improvements of this type as well as expansion of private residential construction.

Preliminary estimates of residential building in 1939 by Herman B. Byer, Chief of the Division of Construction and Public Employment of the Bureau of Labor Statistics, are shown in Table 1. The increasing scope of

Value of Total Construction Contracts (37 Eastern States)

Classification	1938 ACTUAL	*1939 ESTIMATE		1940 ESTIMATE	
	Dollars	Dollars	% Change From 1938	Dollars	% Change From 1939
Commercial Buildings.....	215,807,000	250,000,000	+16	290,000,000	+16
Manufacturing Buildings.....	121,084,000	170,000,000	+40	240,000,000	+41
Educational Buildings.....	334,066,000	200,000,000	-40	135,000,000	-32
Hospital and Institutional.....	115,598,000	84,000,000	-27	95,000,000	+13
Public Buildings.....	114,060,000	102,000,000	-11	75,000,000	-26
Religious Buildings.....	35,816,000	40,000,000	+12	40,000,000	0
Social and Recreational.....	107,983,000	84,000,000	-22	75,000,000	-11
Misc. Non-Residential.....	27,723,000	28,000,000	+1	35,000,000	+25
TOTAL NON-RESIDENTIAL.....	1,072,137,000	958,000,000	-11	985,000,000	+3
(Public).....	572,318,000	401,000,000	-30	330,000,000	-18
(Private).....	499,819,000	557,000,000	+11	655,000,000	+18
Apartment and Hotels.....	256,232,000	418,000,000	+63	525,000,000	+26
1 and 2 Family Houses.....	701,796,000	905,000,000	+29	983,000,000	+9
Other Shelter.....	27,759,000	17,000,000	-39	22,000,000	+29
TOTAL RESIDENTIAL.....	985,787,000	1,340,000,000	+36	1,530,000,000	+14
(Public).....	86,226,000	205,000,000	+138	338,000,000	+65
(Private).....	899,561,000	1,135,000,000	+26	1,192,000,000	+5
PUBLIC WORKS AND UTILITIES.....	1,139,004,000	1,057,000,000	-7	1,065,000,000	+1
(Public).....	1,046,176,000	919,000,000	-12	872,000,000	-5
(Private).....	92,828,000	138,000,000	+49	193,000,000	+40
TOTAL CONSTRUCTION.....	3,196,928,000	3,355,000,000	+5	3,580,000,000	+7
(Public).....	1,704,720,000	1,525,000,000	-11	1,540,000,000	+1
(Private).....	1,492,208,000	1,830,000,000	+23	2,040,000,000	+11

*Based on ten months data.

NO. VI—CONSTRUCTION OUTLOOK IN 37 EASTERN STATES is analyzed in the above chart by the F. W. Dodge Corp. A 41 per cent increase in manufacturing buildings and a 16 per cent increase in commercial buildings for 1940 are indicated. An increase of 1 per cent in public construction and 11 per cent in total private construction are indicated, making an increase of 7 per cent for both in 37 states.

the Bureau's coverage of building activity, in which building permits are gathered from more than 2,100 cities and villages with a population of over 60,500,000, makes the data on number of residential units the most complete and reliable obtainable. The Bureau's basic data and estimates have been accepted as the basis for accurate appraisals of residential activity by such government institutions as the Federal Home Loan Bank Board, the Federal Reserve Board, the Federal Housing Administration, Department of Commerce and other institutions vitally concerned with this industry.

In Table 1, the number of dwelling units provided in rural areas as well as urban is estimated. These rural areas (Columns 8 and 9, Table 1) provided an estimated 124,436 dwellings in 1939, as compared with 100,866 in 1938. Attention is called to these figures since they are frequently omitted in building calculations by persons who base their estimates on the Bureau's *urban* figures alone. The estimated dwellings in urban areas—that is, all cities and towns with a population of over 2,500, as shown in Table 1—was 350,142 in 1939.

The most active building communities were towns of 5,000 to 10,000, where the rate of activity was 53.8 homes per 10,000 population. The next highest rate was in the largest cities where, however, activity was swelled by the addition of public housing under the U. S. Housing Authority program. Small towns and rural areas adjacent to towns (Sections 8 and 9, Table 1) were among the most active building areas with a rate per 10,000 population of 53.2.

Of the approximately 474,600 new dwelling units built in 1939, 74 per cent were one-family dwellings, 4 per cent two-family dwellings, and 22 per cent multi-family dwellings or apartments. As indicated in Chart II, the total number of nonfarm single-family dwellings was 351,500. This compares with 316,000 single-family homes built in 1929, so that in this classification residential building has gotten well above 1929 volume. Included in the 474,600 total nonfarm dwelling units built in 1939 are an estimated 50,000 public housing units built under the sponsorship of the U. S. Housing Authority. The USHA public housing dwellings for the country as a whole consist of 54 per cent one and two-family dwellings and 46

**New Construction Activity in the United States
1937 - 1939'
(millions of dollars)**

	1920-1929 Average	1937	1938	1939 ²
Private Construction (excluding utilities).....	5,878	2,686	2,432	2,960
Utility Construction (private ownership).....	1,147	640	500	550
Public Construction.....	1,947	2,014	2,157	2,800
Total Construction.....	8,972	5,340	5,089	6,310

¹These estimates measure current construction activity as represented by actual expenditures for labor, materials, and other items.

²Preliminary estimate.

NO. VII—PRIVATE U. S. CONSTRUCTION, including utilities, in 1939 is estimated in the above table by Lowell J. Chawner of the Bureau of Foreign and Domestic Commerce, at 3.51 billions of dollars, compared with public construction of 2.8 billions. The 1920-'29 average for private construction, excluding utilities, was 5.88 billions.

per cent multi-family dwellings—a fact that will come as a surprise to many who thought that USHA was building almost exclusively apartment structures.

Any analysis of building figures such as is here presented must, of course, be considered in the light of local building conditions. Although the total for the country as a whole was 37 per cent better in 1939 than in 1938, the actual building conditions were anything but uniform throughout the country. Local business conditions, population movements and the efficiency of local building men have made some communities boom while others remain stagnant.

Careful analysts of the building market feel that 1940 may see a change in the distribution of building activity—that certain metropolitan areas that have been most active the last few years will level off and possibly recede in volume. Such losses, it is felt, will be more than compensated for in other areas which are now coming to the front where building has not been so good.

(Continued to page 112)

New Private Construction In U. S.—1932-1939

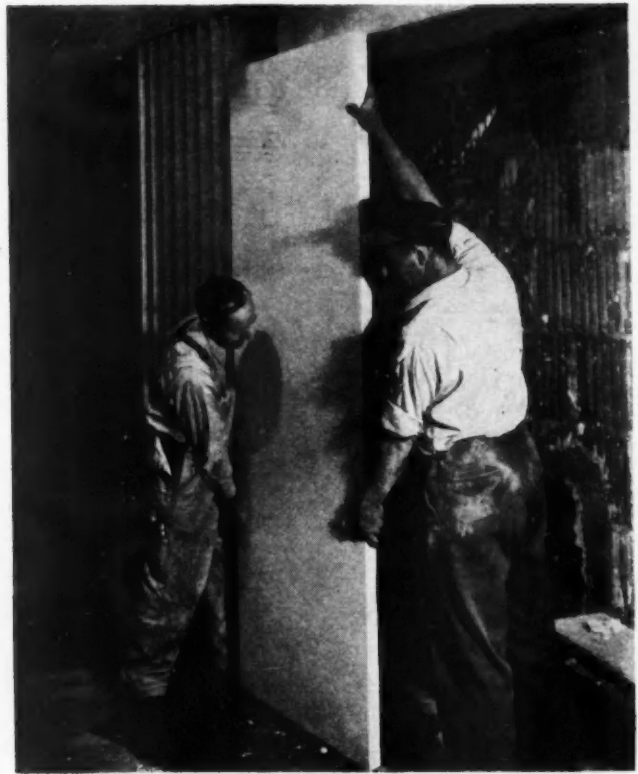
Data from U. S. Bureau of Foreign & Domestic Commerce'
(Millions of dollars)

Year	Residential (non-farm)	Nonresidential Building								Deduct non-residential building by utilities	Total private non-residential building	Farm construction (includes repairs)	Total private construction ¹
		Commercial	Factory	Religious and Memorial	Educational	Social and Recreational	Hospital and Institutional	Miscellaneous	Total non-residential				
1932	641	*263	*78	*49	*49	*64	*32	26	*561	22	*539	125	*1,305
1933	314	*135	*128	*25	*17	*27	*16	20	*367	10	*357	175	*846
1934	272	*167	*173	*22	*34	*31	*15	23	*464	11	*453	200	*925
1935	533	*204	*136	*25	*37	*27	*11	21	*462	12	*450	284	*1,267
1936	1,101	*268	*222	*32	*61	*49	*20	21	*674	16	*658	328	*2,087
1937	1,393	*386	*391	*42	*40	*59	*27	17	*962	29	*933	360	*2,686
1938	*1,390	*311	*192	*49	*42	*74	*34	28	*730	*24	*706	*336	*2,432
1939	†1,900	†310	†200	†1	†1	†1	†1	†1	†760	†30	†730	†330	†2,960

¹Not available.
*Revised.

²Excludes construction by privately-owned public utilities.
†Preliminary.

NO. VIII—A COMPREHENSIVE ANALYSIS of new private construction in the U. S., except utilities, 1932 to '39, is made in the above chart prepared under the direction of Lowell J. Chawner of the Bureau of Foreign and Domestic Commerce. Nonfarm residential construction increased from 1.39 billions to 1.9 billions, or 36.7 per cent. Total private construction, except utilities, increased from 2.43 billions to 2.96 billions, or 21.8 per cent. For similar figures carried back to 1920 see American Builder, Jan., 1939, page 28.



CURVED, fluted and angle-shaped precast panels used in Chrysler Building modernizing job, reception room of Universal Atlas Cement Co.

Architectural Concrete Slabs

"Living Color" Achieved in Striking New Concrete Panels with Exposed Aggregate Surface, as Illustrated in the View on this Month's Front Cover

MODERNIZING of the main offices of the Universal Atlas Cement Company in the Chrysler Building in New York happened to coincide with the celebration of the fiftieth anniversary of the company. Something special was called for, and the material selected was a promising new product that strikingly illustrates recent progress in architectural concrete.

As illustrated on the front cover of this issue of *American Builder*, the material used consists of large, thin architectural concrete slabs with a colorful exposed aggregate surface. The precast panels have unusual strength and adaptability made with a white cement matrix to set off the exposed aggregate surface in living colors and textures; Walter Dorwin Teague was the designer.

The architectural concrete slabs used in the Universal Atlas reception room represent the latest development in the art and craftsmanship of concrete design as perfected by John J. Earley of Washington and other specialists.

Wide Field of Use

Thin concrete panels of this type are now available commercially for modernization work or new structures and for interior and exterior use. They are produced under factory conditions in sizes up to 100 square feet and in practically any shape required. Since the panels can be produced in sweeping curves, angles, panels or

fluted shapes, they open up a new field for permanent type exterior or interior facing material.

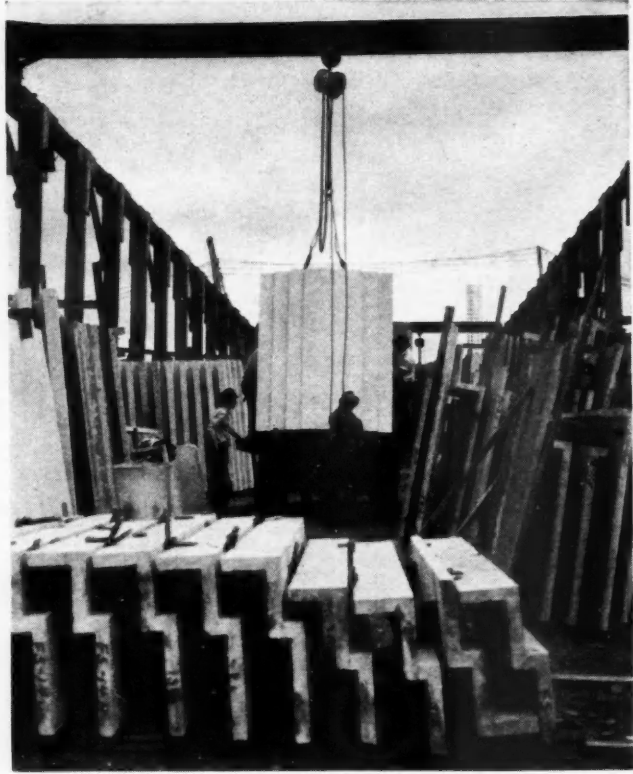
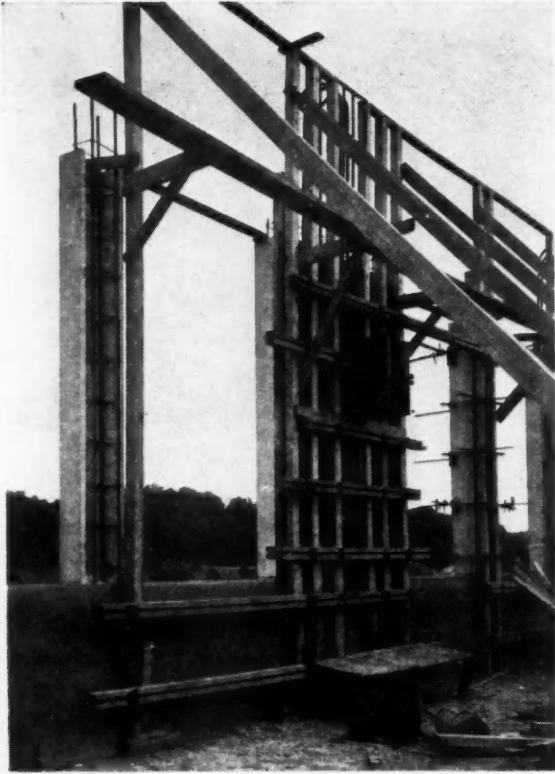
Color plays an important part in the architectural concrete slab and is obtained through the use of a pure white portland cement base to which are added carefully selected aggregates of crushed quartz, marble, granite, ceramics or vitreous enamel. Through the use of these varicolored aggregates, permanent colors or shades in any desired combination are possible.

Since the surface consists of millions of particles of these selected exposed aggregates, it has a brilliance and depth of color that can best be described by saying that it is a "living color."

Slabs Used as Forms

Since the rigid concrete panels are made under controlled conditions using a dense, high-strength mix in connection with welded galvanized steel reinforcing, they can be produced in large sections of remarkable thinness. In a building wall a single slab is often used for the coping and parapet, or a spandrel section may be cast in one piece to include sill, spandrel and soffit. Through the use of larger and fewer sections, it is possible to effect an 80 per cent reduction in trouble-producing joints.

In some types of remodeling, and in many types of new construction, architectural concrete slabs may be



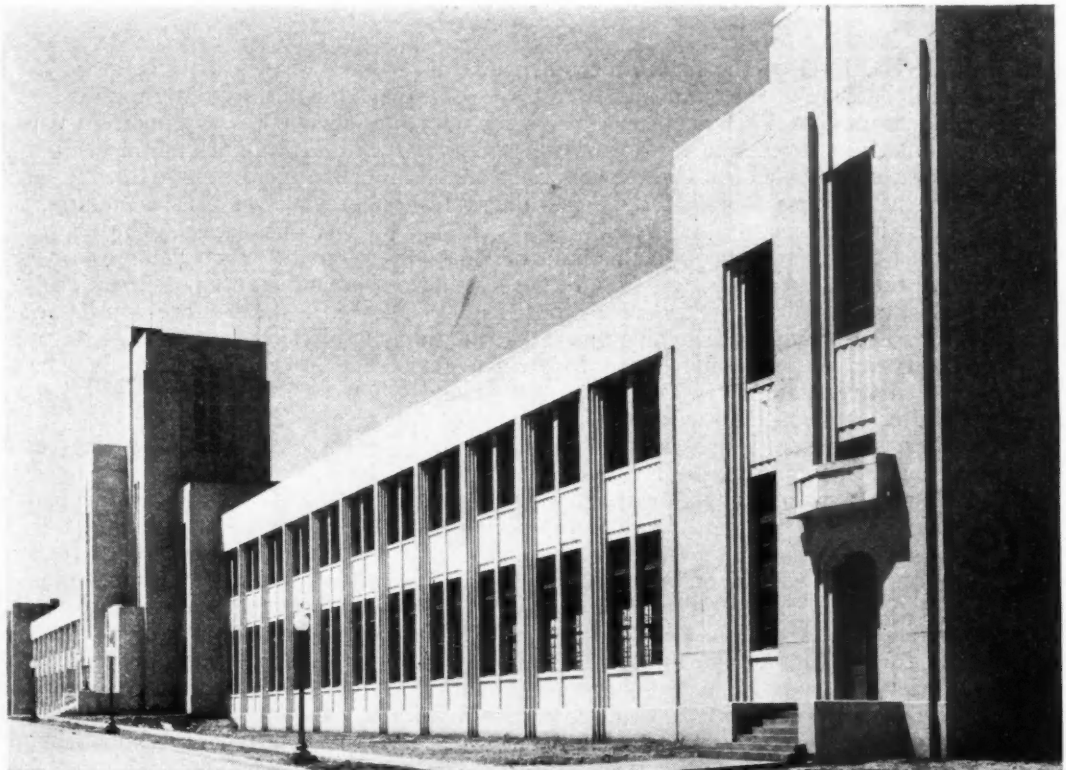
ARCHITECTURAL concrete slabs used as outer form for structural concrete in the U. S. Naval Testing Basin at Carderock, Md.

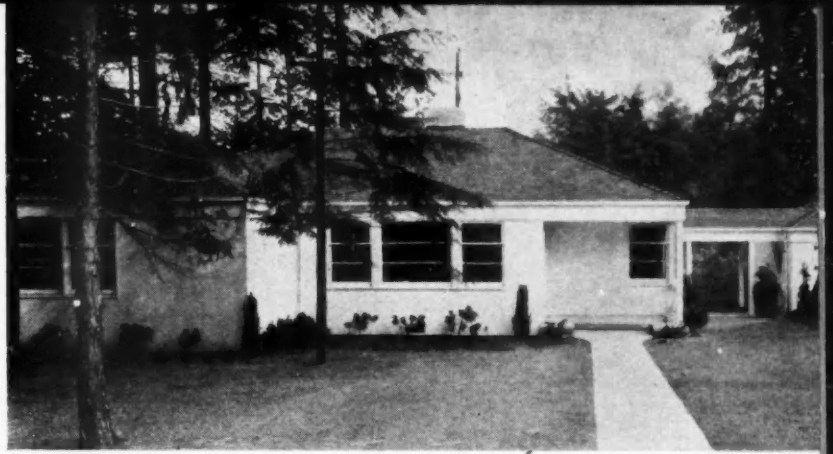
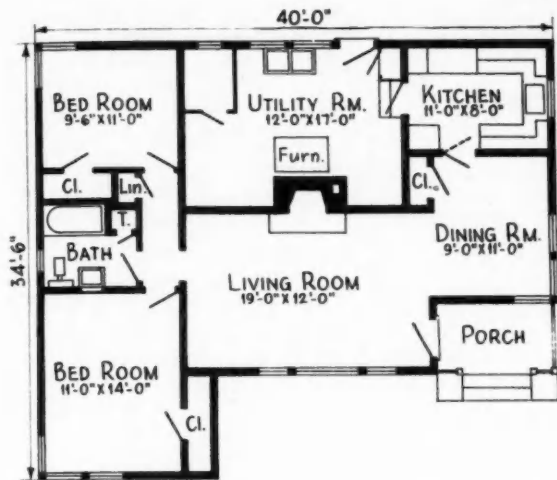
used as forms for concrete, particularly the outer form as illustrated in the two photographs above, taken in the construction of the U. S. Naval Testing Basin Building at Carderock, Md. The precast slabs were set in place as the outside forms for the structural concrete. The exterior slabs were thus bonded tightly to the structural frame and became an integral part of it. In the Carderock job the exterior panels used consisted of Mo-Sai panels made with Atlas White cement by the Dextone Company

of New Haven; the completed building is shown below.

The importance of the architectural concrete slabs as forms, in addition to the saving in forming materials, is that they permit the use of a thin, permanent, surfacing material bonded to the structural frame at low cost. This provides a colorful finished surface which requires no further treatment, which is permanent and which can be used in large-sized units to eliminate a large percentage of joints. (Continued to page 116)

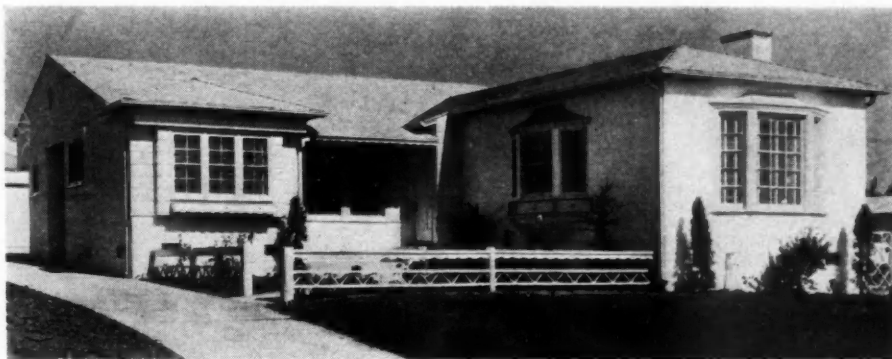
NAVAL testing basin at Carderock, Md., with exterior walls of architectural concrete slabs made by Dextone Co., New Haven. Interior walls by John J. Earley, Washington (who was also consultant on exterior slabs). Turner Construction Co. were the general contractors.



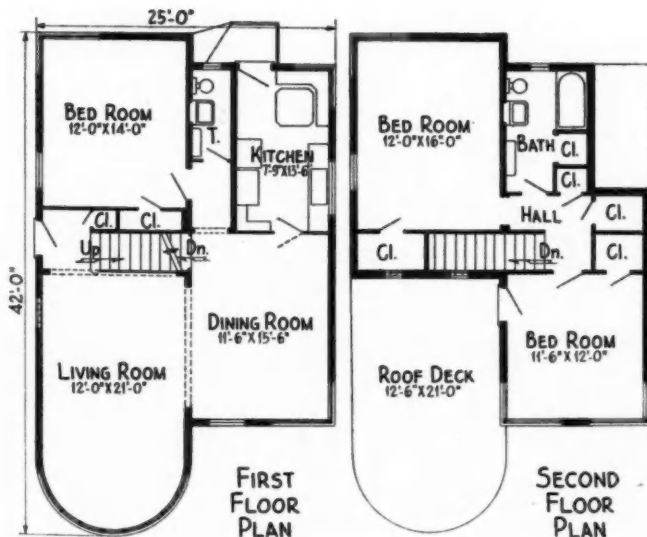
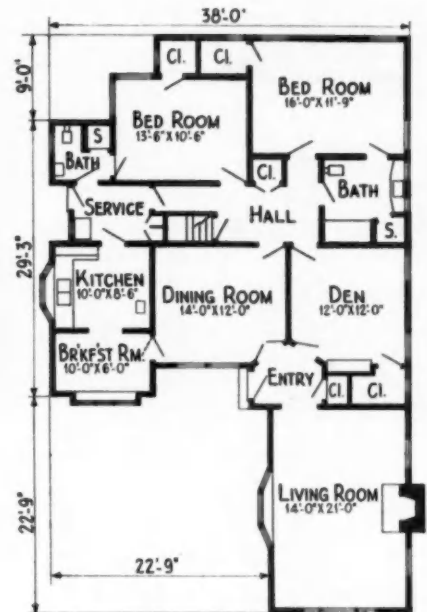


BUILT without a basement, this house suggests a good arrangement for utility room planning. It was built in Hugh Russell's Westover Addition, Seattle, Wash.; Smith, Carroll & Johanson, architects. The exterior tends toward the modern with its simple lines and the corner windows with horizontal muntins.

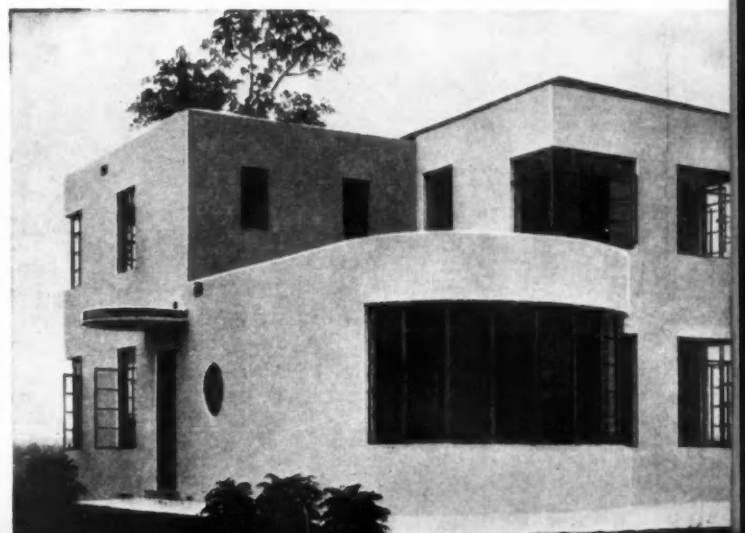
Planning and Styling Trends for the 1940 Home Market

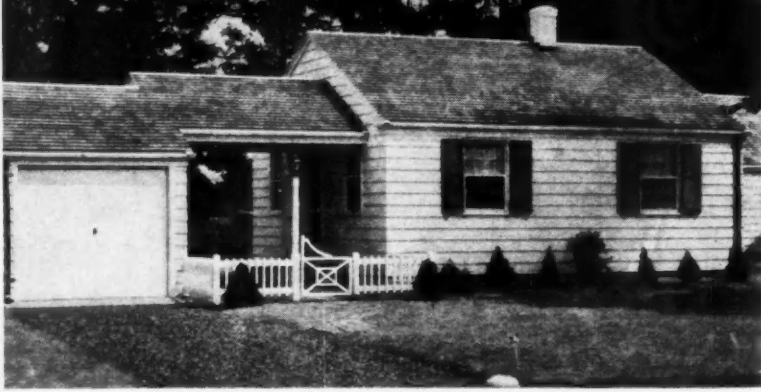


THE California Monterey type home above was built by John Hoppert, Los Angeles, in the Janss Investment Corp. development in Westwood Hills. The seven-room plan, although fairly deep due to the extension of the living room, is narrow enough to fit on a city lot; it is much more compact than the usual southern type home and, while there is no patio, there is ample ventilation.

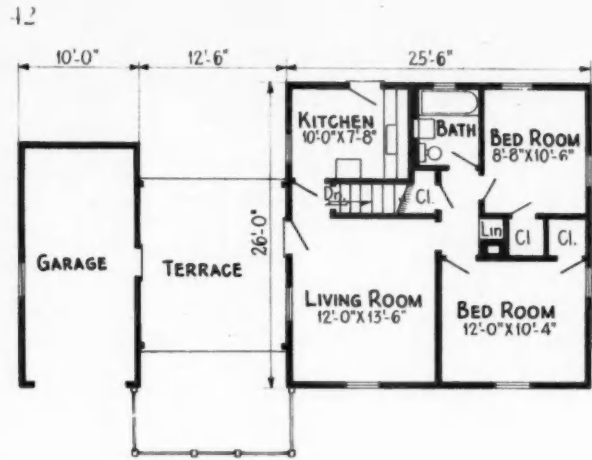


MODERN in appearance, open plan, and materials, this home built in Northfield, Ill., has walls of stucco on metal lath over steel frame; Eric Sundvahl, architect.





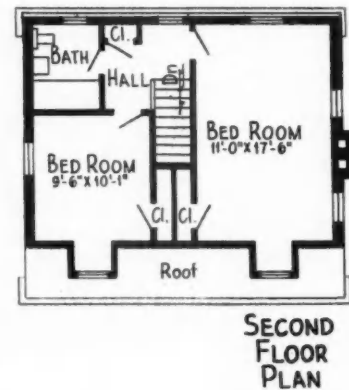
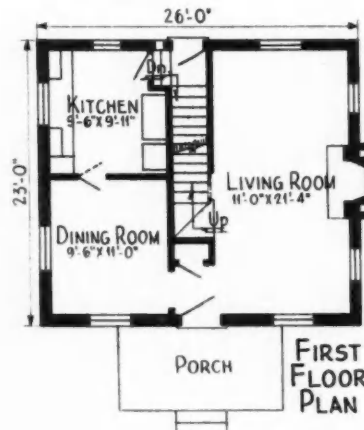
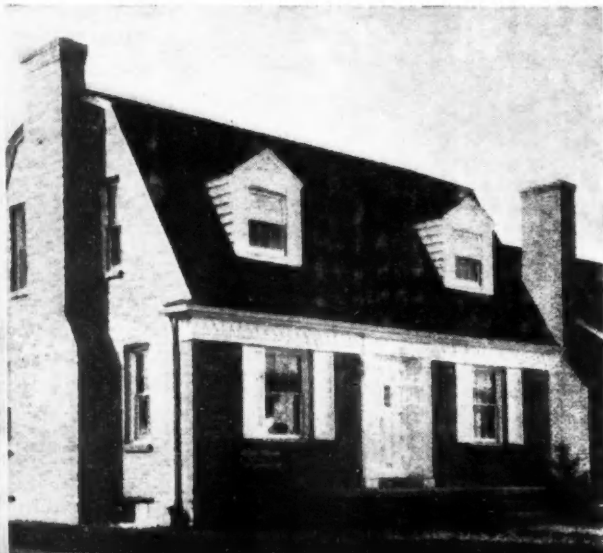
TYPICAL of the small, low cost home, this model house was built in Hartford, Conn., by August F. Tobler in co-operation with the Davis & Bradford Lumber Co. and The Hartford Times.



THE five-room bungalow above fulfills the continued demand for compact planning. It was designed by John D. Cobb, Washington, D.C., architect, and built in Northwood Park, Md., by Garden Homes, Inc. Maximum use of floor area, good circulation, terrace and living porch, and provision for extra bedrooms on the second floor are features.

TRUCOST ESTIMATING FIGURES for these and other home designs shown with plans in this issue will be mailed free to any reader requesting them on his business stationery and indicating which ones are desired; each of these new Service Sheets lists the quantity survey of materials for one design.—The Editors.

BELOW: This Dutch Colonial design was one of the houses in the Duchess Project home demonstration, as built by Fred Stadelman, Detroit. It was one of the popular models presented because of its good five-room arrangement and trim styling. Included are air conditioning, complete insulation, numerous accessory items.

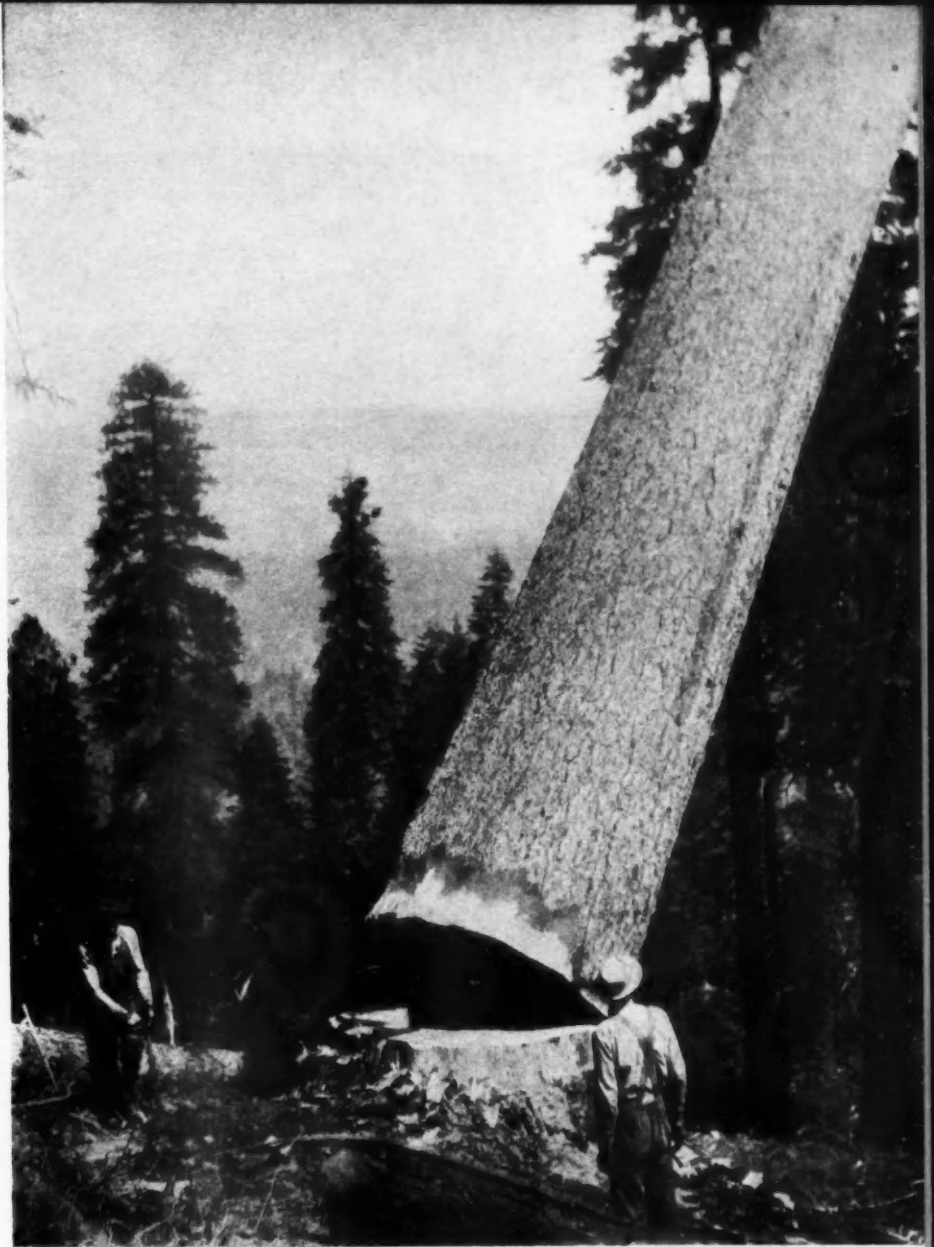


WOOD

The Ever-Modern Building Material

New Ideas and Methods in Wood Construction and Recent Improvements in Lumber; A Condensed and Illustrated Guide to Assist Building Industry Men in the Proper Specification and Use of Lumber

Edited by "American Builder" with the Co-operation of the Official Associations of Lumber Manufacturers



HARVESTING the annual crop of mature trees conserves the nation's natural resources and starts the long and highly developed stream of industry from the logging camps to lumber mills to local dealers' stocks and finally in homes and other useful construction.

TODAY'S trend in home building is to wood—friendly, warm, inviting. Good homes that cost less are demanded, so that more of the population may be better housed. And lumber is solving this low-cost house problem, at the same time maintaining its historic position as the accepted material for the better homes of taste and distinction.

Good lumber is today easily obtained. It is carried in stock by local retail dealers everywhere, standardized in dimensions, grades, patterns and values. It is expertly manufactured, properly seasoned and conveniently stocked for local use. The supply is adequate for all home building needs; and this supply is ever-renewing, our growing and maturing forests being one of America's greatest wealth-resources.

Advances in the technique and skill in logging, in lumber manufacturing, in grading, and in distribution have brought lumber and all wood products into new markets and new uses in the present-day home building drive. Lumbermen, contrary to their former reputation, are now out in front, leading the advance toward better

building and lower costs for contractors and owners.

Experiments now being carried on by the building industry to reduce the cost of homes were described recently to the Building and Loan national convention by Wilson Compton, secretary of the National Lumber Manufacturers' Association. "My own industry has been generally regarded as not very progressive," he said. "Yet this so-called 'sleeping giant' is today experimenting with new ideas which may belie its reputation. With the co-operation of alert dealers and builders in various parts of the country we have been experimenting with all-wood construction, with joistless floors, studless walls, and rafterless roofs. We are developing types which are structurally sound but use perhaps one-fifth less lumber and one-fourth less labor, and which we believe will eventually result in the building of two houses instead of one. This means not only improvement in design but also further substitution of power for perspiration on the job and more standardization."

These new advances in lumber and in lumber use

WELL-SEASONED lumber is obtainable and should be used. Photo shows battery of modern dry kilns in a large Western Pine mill with a kiln capacity of 3½ million feet.

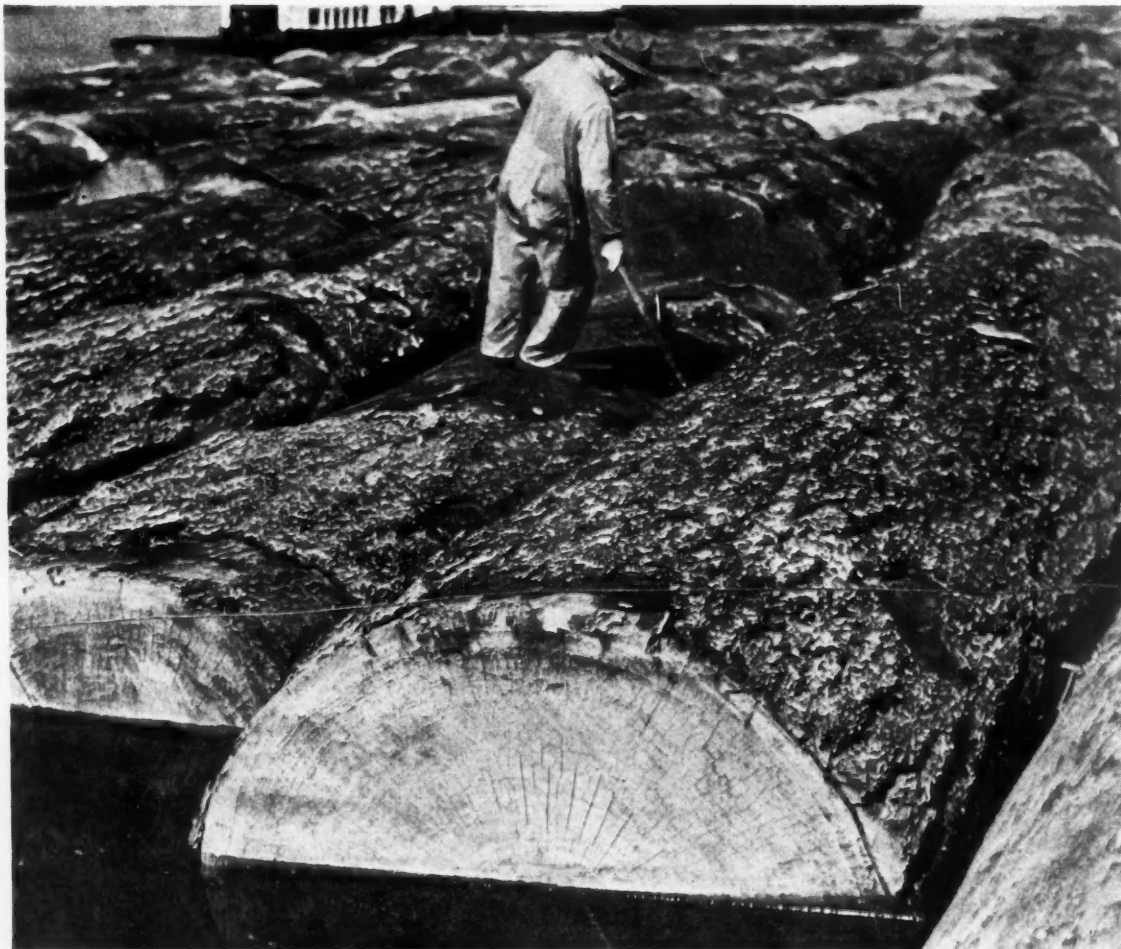


favor closer study of this important building material. Also the new conditions in the building industry, such as FHA rules and approval and other loaning institution rules and approval, play an important part today in home building, and put such a money premium on the proper understanding and use of lumber grades that no builder can afford any longer to neglect this subject.

The maximum mortgage loan on most favorable

terms, under either FHA or Savings & Loan regulations, goes only to those builders who are using the right lumber of the right size and grade for each part of the job. To use *better* lumber than is needed is an extravagance, and to use *less* penalizes the builder, the house and its future owner.

So there is every incentive today for every building industry man to study lumber and lumber grades, and



LOGGING in the Douglas Fir Region; the storage pond.

become a practicing expert on this subject of lumber.

Small home construction is probably the backbone of consumer confidence and community prosperity. The building of a home represents the ambitions and hopes of many American families. It is usually a one-time investment. In no other field is there a greater need for business to give to the consumer—in this instance the home owner—the complete assurance of competent craftsmanship and quality materials. Anything short of this must inevitably result in loss of public confidence in the construction industry and a consequent undermining of consumer belief in the integrity of business.

Since the advent of the Federal Housing Administration, with its regulations, inspections and approvals controlling a large part of all home construction, there has developed new interest in good lumber. Local lumber dealers, contractors, loaning officers and property owners all see added reasons now for being very particular about the lumber that goes into their home construction. While FHA rules vary somewhat by districts, the ruling of last April 15 by the St. Louis area office indicates the growing trend toward quality lumber.

"Framing lumber for joists, sills, girders and rafters shall be No. 1 Dimension (Common) or better.

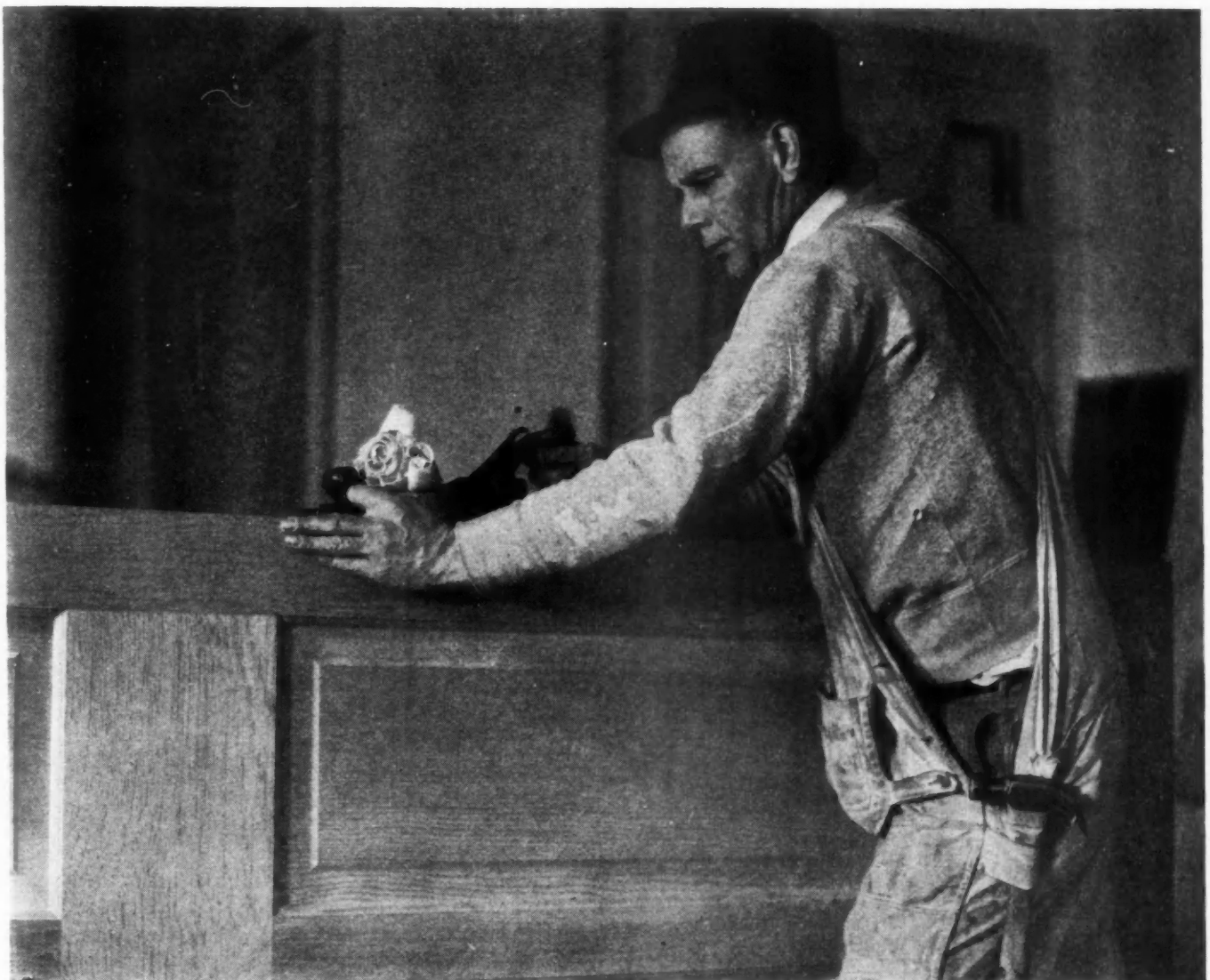
"All other framing lumber, including studs, bridging, bracing and collar beams shall be No. 2 Dimension (Common) or better.

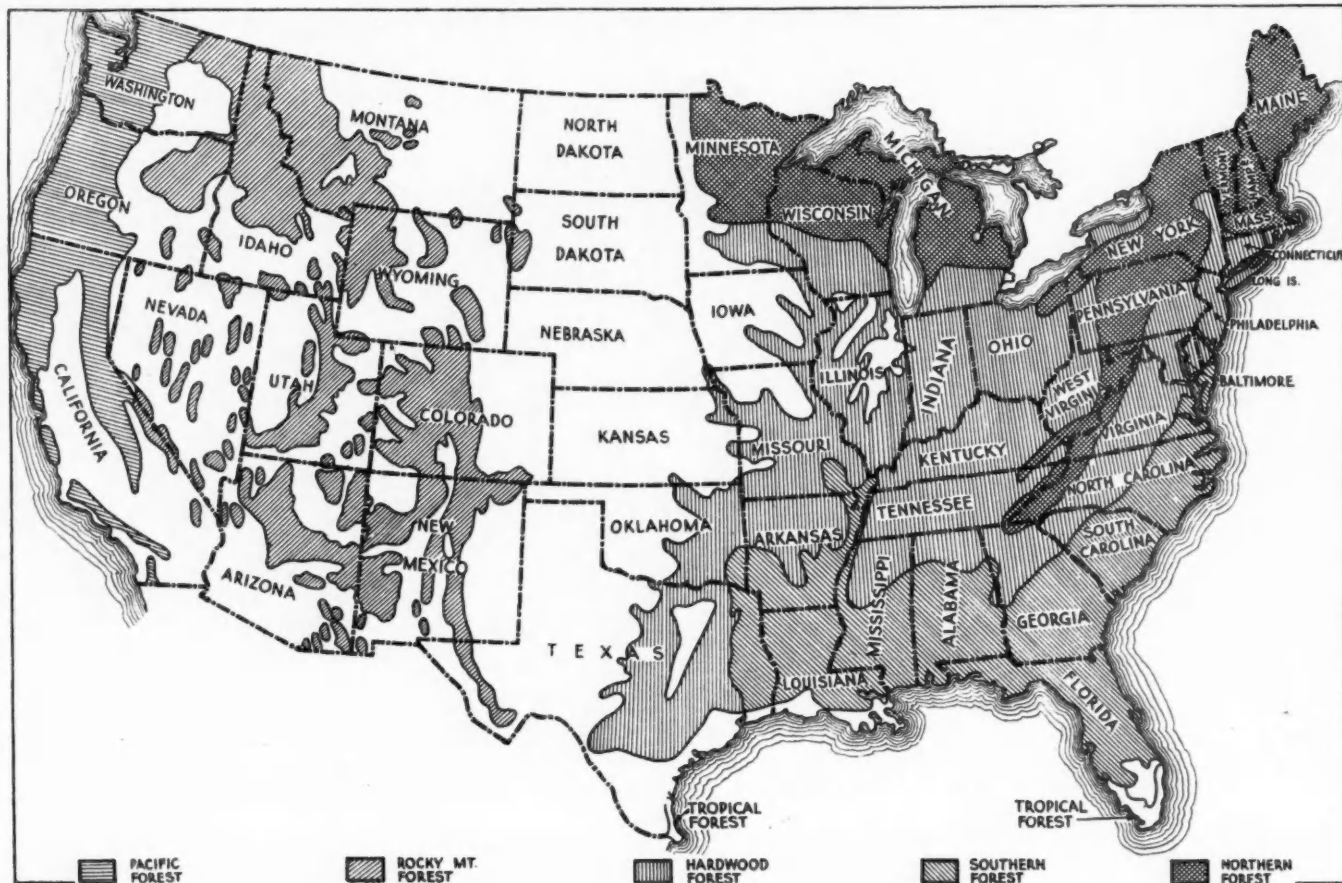
"All board lumber for subflooring, sheathing, roof boarding, shingle lath, etc., shall be No. 2 Common or better."



FACTORY finished block flooring comes in cartons, ready to lay; plank floors and strip flooring continue in popular favor.

BELOW: Carpenters like the easy working qualities of the soft-textured woods for doors, sash and other woodwork.





PRINCIPAL TREES OF THE FOREST REGIONS

NOTE.—The order indicates the relative importance or abundance of the trees. Many of the species listed have no commercial significance at the present time.

PACIFIC COAST FOREST

Northern Portion (Western Washington and Western Oregon):
 Douglas fir
 Western hemlock
 Lowland white, noble, and silver firs
 Western red cedar
 Sitka and Engelmann spruces
 Idaho white pine
 Port Orford and Alaska cedars
 Western and Lyall larches
 Lodgepole pine
 Mountain hemlock
 Oaks, ashes, maples, birches, alders, cottonwood, madrone
Southern Portion (California):
 Ponderosa and Jeffrey pines
 Sugar pine
 Redwood and bigtree
 White, red, lowland white, and Shasta red firs
 Incense cedar
 Douglas fir
 Lodgepole pine
 Knobcone and digger pines
 Bigcone spruce
 Monterey and Gowen cypresses
 Western and California junipers
 Singleleaf piñon
 Oaks, buckeye, laurel, alder, madrone

ALASKA FOREST

Coast Forest:
 Western hemlock (important)
 Sitka spruce (important)

ALASKA FOREST

(Continued)

Western red cedar
 Alaska cedar ("yellow cedar")
 Mountain hemlock
 Lodgepole pine
 Black cottonwood
 Red and Sitka Alders
 Willows
Interior forest:
 White (important) and black spruces
 Alaska white (important) and Kenai birches
 Black cottonwood
 Balsam poplar (Balm-of-Gilead)
 Aspen
 Willows
 Tamarack

ROCKY MOUNTAIN FOREST

Northern Portion:
Northern Idaho and Western Montana:
 Lodgepole pine
 Douglas fir
 Western larch
 Engelmann spruce
 Ponderosa pine
 Idaho white pine
 Western red cedar
 Lowland white and alpine firs
 Western and mountain hemlocks
 Whitebark pine
 Balsam poplar (Balm-of-Gilead)

ROCKY MOUNTAIN FOREST

(Continued)

Eastern Oregon, Central Idaho, and Eastern Washington:
 Ponderosa pine
 Douglas fir
 Lodgepole pine
 Western larch
 Engelmann spruce
 Western red cedar
 Western Hemlock
 White, lowland white, and alpine firs
 Idaho white pine
 Oaks and junipers (in Oregon)
Central Montana, Wyoming, and South Dakota:
 Lodgepole pine
 Douglas fir
 Ponderosa pine
 Engelmann spruce
 Alpine fir
 Limber pine
 Aspen and cottonwood
 Rocky Mountain red cedar
 White spruce
Central Portion (Colorado, Utah, and Nevada):
 Lodgepole pine
 Engelmann and blue spruces
 Alpine and white firs
 Douglas fir
 Ponderosa pine
 Aspens and cottonwoods
 Piñon and singleleaf piñon

ROCKY MOUNTAIN FOREST

(Continued)

Rocky Mountain red cedar and Utah juniper
 Bristlecone and limber pines
 Mountain mahogany
Southern Portion (New Mexico and Arizona):
 Ponderosa pine
 Douglas fir
 White, alpine, and corkbark firs
 Engelmann and blue spruces
 Piñon and Mexican piñon
 One-seeded and alligator junipers and Rocky Mountain red cedar
 Aspen and cottonwoods
 Limber, Mexican white, and Arizona pines
 Oaks, walnut, sycamore, alder, boxelder
 Arizona and smooth cypresses

TROPICAL FOREST

Mangrove
 Royal and thatch palms
 Florida yew
 Wild fig
 Pigeon-plum
 Blolly
 Wild tamarind
 Gumbo-limbo
 Poisonwood
 Inkwood
 Buttonwood
 Mastic ("wild olive")
 Jamaica dogwood
 (Continued to next page)

SOUTHERN FOREST	CENTRAL HARDWOOD FOREST	CENTRAL HARDWOOD FOREST	NORTHERN FOREST
<i>Pine Lands:</i>	<i>Northern Portion:</i>	<i>(Continued)</i>	<i>(Continued)</i>
Longleaf, shortleaf, loblolly, and slash pines	White, black, northern red, scarlet, bur, chestnut, and chinquapin oaks	Shortleaf and Virginia ("scrub") pines	Aspen ("popple") and large-tooth aspen
Southern red, turkey, black, post, laurel, and willow oaks	Shagbark mockernut, pignut, and bitternut hickories	White, blue, and red ashes	Basswoods
Red gum	White, blue, green, and red ashes	Yellow poplar (tulip poplar)	Black cherry
Winged, American, and cedar elms	American, rock, and slippery elms	Black locust	American, rock, and slippery elms
Black, red, sand, and pignut hickories	Red, sugar, and silver maples	Elms	White and black ashes
Eastern and southern red cedars	Beech	Sycamore	Shagbark and pignut hickories
Basswood	Pitch, shortleaf, and Virginia pines	Black walnut	Butternut
Sand pine	Yellow poplar (tulip poplar)	Silver and red maples	Northern white cedar
<i>Alluvial Bottoms and Swamps:</i>	Chestnut	Beech	Tamarack
Red, tupelo, and swamp black gums	Black walnut	Dogwood	<i>Southern Portion (Appalachian Region):</i>
Water, laurel, live, overcup, Texas red, and swamp white oaks	Cottonwood	Persimmon	White, northern red, chestnut, black, and scarlet oaks
Southern cypress	Hackberry	Cottonwoods and willows	Chestnut
Pecan, water, swamp pignut, and hammock hickories	Black cherry	Eastern red cedar	Hemlock
Beech	Basswood	Osage-orange	White, shortleaf, pitch, and Virginia ("scrub") pines
River birch	Ohio buckeye	<i>Texas Portion:</i>	Black, yellow, and river birches
Ashes	Eastern red cedar	Post, southern red, and black-jack oaks	Basswood
Red and silver maples	<i>Southern Portion:</i>	Mountain and other cedars	Sugar and red maples
Cottonwoods and willows	White, post, southern red, black-jack, Shumard red, chestnut, swamp chestnut, and pin oaks	NORTHERN FOREST	Beech
Sycamore	Red and black gums	<i>Northern Portion:</i>	Red spruce
Southern hackberry	Mockernut, pignut, southern shagbark, and bigleaf shagbark hickories	Balsam fir	Southern balsam fir
Honey locust		White, red (Norway), jack, and pitch pines	Yellow poplar (tulip poplar)
Holly		Hemlock	Cucumber magnolia
Red, white, and sweet bays		Sugar and red maples	Black walnut and butternut
Evergreen magnolia		Beech	Black cherry
Pond and spruce pines		Northern red, white, black, and scarlet oaks	Pignut, mockernut, and red hickories
Southern white cedar		Yellow, sweet, paper, black, and grey birches	Black locust
			Black gum
			Buckeye

Lumber Items Usually Carried in Retail Yards

THE small retail yards throughout the United States carry softwoods required for ordinary construction purposes and sometimes small stocks of 1 or 2 hardwoods in the grades suitable for finishing or cabinetwork. Any particular hardwood desired, however, may be obtained by special order through the retail lumber yard. Hardwoods are used in building chiefly for interior trim, cabinets, and flooring. In modern practice, trim items are cut to size in standard pattern at millwork plants and are sold in such form by the retail yards. Cabinets are usually made by the millwork plant ready for installation on the job by the carpenter. Hardwood flooring invariably is a planing-mill product and is available to the buyer only in standard patterns.

The assortment of species in general construction items carried by retail yards depends largely upon geographical location. For instance, in the Pacific Northwest local yards will, as a rule, stock Douglas fir, spruce, ponderosa pine, western hemlock, and western red cedar. An Iowa yard will stock eastern hemlock, northern white pine, ponderosa pine, southern yellow pine, and Douglas fir. For some species, only certain items of various species may be available; for example, southern yellow pine or Douglas fir may be stocked only in the form of dimension or piece items, western red cedar in siding and in shingles, cypress and redwood in finish boards and plank or in siding. A New York market might stock eastern spruce and hemlock, northern white pine, cypress, ponderosa pine, southern yellow pine, and Douglas fir. In the eastern part of the United States lumber from the Pacific coast is readily available because of low-cost water transportation via the Panama Canal.

Wholesalers do not ordinarily stock lumber. However, some large wholesalers located in extensive lumber-consuming districts have yards wherein are stocked many kinds of lumber, both of hardwood and softwood. These wholesalers supply the varied needs of retail yards, wood-using factories, and larger contractors, although purchases are sometimes made directly from the lumber mills.

Points To Consider When Ordering Softwood Lumber or Timber

The following excerpt from a Federal specification lists some of the points to be considered when ordering softwood lumber or timber:

- Quantity:** Feet, board measure, number of pieces if of definite size and length, etc.
- Size:** Thickness in inches—nominal and also actual if surfaced on faces. Width in inches—nominal and also actual if surfaced on edges. Length in feet—may be nominal average length, limiting lengths or a single uniform length.
- Grade:** No. 1 Dimension, B and Better, etc., as indicated in grading rules of lumber manufacturers' associations.
- Species of wood:** Douglas fir, southern cypress, etc.
- Product:** Flooring, siding, timbers, boards, etc.
- Condition of seasoning:** Air-dry, kiln-dry, commercially shipping dry, etc. (Definite interpretation of requirements in this respect necessitates specifying in terms of moisture-content and how it is to be determined.)
- Surfacing:** Indicate whether rough (unplaned) or dressed (surfaced) stock is desired. S1S means surfaced on one side. S2S means surfaced on two sides. S1S1E means surfaced on 1 side and 1 edge. S4S means surfaced on four sides.
- Association rules:** Southern Pine Association, Western Pine Association, etc.

Order Your Lumber by Grade

THE different parts of the tree produce lumber of widely varying qualities.

Long ago rules were agreed upon by the major producers of lumber, whereby boards and framing lumber could be segregated under a uniform system, making it possible for a certain class of material to be called for by a name which is understood everywhere.

Since the grades of lumber vary widely, from perfect material to material which is good only for one or two kinds of work, and since the cost range of lumber varies directly with the quality of these grades, it is important for the builder to have working knowledge of the quality classifications of the material available to him and an understanding of the type of work each grade is intended to perform.

Misunderstandings often arise and lumber is considered of poor quality because an improper grade has been purchased for a given job.

All lumber is divided into three general groups—yard lumber, which is the kind of material sold and stocked in the average retail lumber establishment; shop lumber, which is fabricated into furniture and many other items in factories; and structural lumber, which is used for heavy building such as bridges, wharves, roof trusses, etc.

The average home builder is concerned principally with yard lumber, as all residential material falls into this classification. Yard lumber is subdivided into two general classes—Select material and Common material. Generally speaking, Select material is used in those portions of the house which are exposed to view after the house is completed. This would encompass such items as exterior cornices, porch work, siding, window trim, railings, interior door trim, window trim, baseboards, fireplace mantels, paneling, etc. Common lumber is generally used for the hidden framework of a home. Floor joists, wall studs, roof rafters, sills, plates, sheathing, etc., are usually built of Common grades.

We might say that Select lumber has strength and appearance, while Common lumber is selected for utility rather than looks.

Select lumber is subdivided by letter, while Common lumber is subdivided by number; thus the most important grades with which the home builder is concerned might be listed as shown to right.

An inspection trip around a lumber yard would be time well spent as a means of learning the type of material furnished under these classifications.

It is just as inefficient to use and pay for a higher grade of lumber than necessary for a given job as to permit the use of a grade which is inferior and which will give unsatisfactory results.

Generally speaking, the strength of lumber is in relation to its grade—highest grades having greatest strength; but high strength is of importance only in certain portions of the house. Floor joists, roof rafters and beams take the greatest loads and should be of the highest grade. Wall studs act as a series of columns and a lower grade will often suffice. Sheathing and sub-flooring are both covered and are used primarily to brace and stiffen a building. These pieces are so numerous that high grade material is not necessary. For best appearance on the exterior, all lumber should come from Select grades. B & Btr. is most commonly used, but C Select will often suffice and offer some saving. Exposed interior woodwork, if it is to be finished natural, requires B &



DIFFERENT sections of the log produce different grades of lumber intended for widely varied uses. The "sawyer" must know just how to cut the log to produce the maximum of usable lumber.

Btr., while, if it is to be painted, one of the lower Select grades will probably do just as well.

Within the last 15 years lumber standards and grades at all mills and at all retail establishments have been made uniform under the direction of the U. S. Bureau of Standards. Much lumber now on the market is marked with its grade on the end of each piece.

Products of a log arranged according to quality as determined by appearance

SELECT

Lumber of good appearance and finishing qualities.

Suitable for Natural Finishes

Grade A—Practically free from defects.

Grade B—Allows a few small defects or blemishes.

Suitable for Paint Finishes

Grade C—Allows a limited number of small defects or blemishes that can be covered with paint.

Grade D—Allows any number of defects or blemishes which do not detract from a finished appearance, especially when painted.

COMMON

Lumber containing defects or blemishes which detract from a finished appearance but which is suitable for general utility and construction purposes.

Lumber Suitable for Use Without Waste

No. 1 common—Sound and tight knotted stock. Size of defects and blemishes limited. May be considered water-tight lumber.

No. 2 common—Allows large and coarse defects. May be considered grain-tight lumber.

Lumber Permitting Waste

No. 3 common—Allows larger and coarser defects than No. 2 and occasional knot holes.

No. 4 common—Low quality lumber admitting the coarsest defects, such as decay and holes.

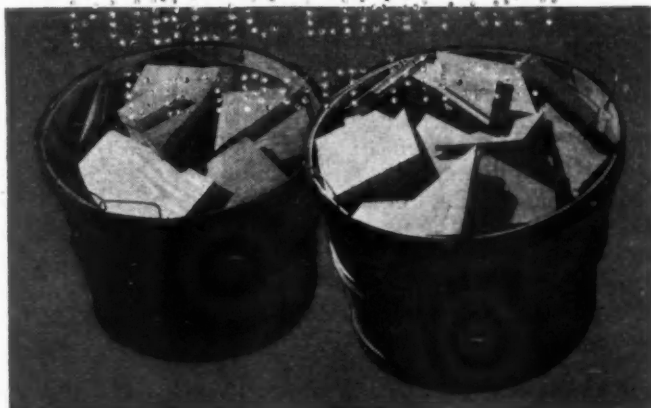
No. 5 common—Must hold together under ordinary handling.

New Ideas in Lumber and Lumber Use

EARLY sawmills, of which the first was built in Jamestown, Va., in 1625, required but a few logs per day to keep busy the water power driven sash-saw and needed but a chain and yoke of oxen to drag them to the mill. As water power gave way to steam, and the sash-saw was replaced in 1814 by the circular saw, more logs were needed to keep the mills busy and more lumber was needed for the upbuilding of the country. Horses, streams and sleighs became the means of transportation of logs to the sawmills. The change in logging methods has been tremendous. Today, the woods operation of a sawmill is an efficient modern business in its own right and the management, manpower, and equipment rank with the best in any industry. The lumberman no longer looks at his stand of timber as so many logs which will last "about as long as the mill," but as a timber farm. Trained foresters, cruisers and engineers watch the serious matter of tree cutting, just as the manager of an industrial plant looks after his stock, purchases and assembly line. Selective logging, efficient forestry management, reforestation, fire safeguards, etc., all are an important part of the lumber business today.

The lumber industry, in a general sense, is more closely allied with agriculture than with industry since timber is a crop and trees, to be useful, must be harvested when they are ripe.

There are, of course, many ways of harvesting a crop of trees. In the big woods operations on the Pacific Coast, where logs are sometimes 8 feet in diameter, 40 feet long and weigh up to 40,000 pounds, heavy equipment is needed. Two-inch steel cables attached to spar trees sometimes 2,000 feet apart are used to bring the logs to the railroad track where they are loaded and carried to the mill in 60 or 70 car trains; 2,000 horsepower steam, electric or Diesel power plants are used to reel in the logs. Where the logs are smaller and the



TWO BUSHELS of waste were all that accrued from the use of end-matched lumber for sheathing the walls and roof of a six-room home.

terrain permits, large caterpillar tractors drag them to the railroad siding. Trucks, flumes, chutes, skids and skylines are also used, depending upon the job to be done. The lumber industry has gone far in modernizing this important job of timber farming.

In the saw and planing mill phase of the industry, progress has been steadily made since the invention of the bandsaw and the introduction of electric power. The automobile industry usually takes credit for being the first mass production industry. The sawmills, however, were producing large quantities of a bulky material by straight line methods long before the first cough was coaxed out of an internal combustion engine. Today, the speed and efficiency of a modern sawmill are amazing to the uninitiated. A few of these modern mills can produce upwards of a million feet of lumber per day, which is enough to fill 40 ordinary box cars. Naturally, all mills are not geared for such a large production, but the fact is that in an up-to-date sawmill one man produces about 1,000 feet of lumber per day.

Formerly a large amount of hand work was necessary in producing a board but today little hand labor is required. The whole operation is geared to high speed production and the lumber is shunted around the mill on sorting chains, live rolls, dead rolls, conveyors, cranes, trucks, straddle buggies and other mechanical conveyors. The first bandsaw was a little continuous six inch strip of steel with teeth cut in one edge. The band saw of today may be up to 16 inches wide, 66 feet long and run over two wheels, each 9 feet in diameter. The teeth of such a saw pass through a log at the rate of 10,000 feet per minute, or 111 miles per hour. One of the machines in the modern planing mill used to surface boards or to run a tongue and groove in flooring or ceiling puts out lumber at the rate of 550 feet per minute. This means that if the 14 men who grade, sort, bundle and tie the lumber behind such a machine were to stop work, and the lumber were permitted to go past them in a straight line, the first piece run would be 50 miles down the road at the end of an 8 hour day.

There has been a remarkable development in the drying of lumber. Some years ago air drying was the only method used to condition lumber for the market. This was a long and expensive effort which required much space and time. Today, a battery of dry kilns will dry lumber in six days that formerly required four months for seasoning.

The lumber industry has also modernized the third phase of its business, namely, the merchandising and



APPLYING end-matched sheathing diagonally, the strong way, is no more costly than putting on ordinary sheathing horizontally. Building authorities recommend diagonal sheathing because of the extra strength and rigidity it adds to the structure.

sale of its products. Originally there were but two kinds of lumber, clear and common. The buyer came to the sawmill and picked out what he wanted. Today, the sawmill operator sends his representative to the buyer and sells him the product of logs which have been sawn into as many as 2,000 items, each having its own grade, length, width, thickness and working. These products are designed to serve the particular requirement of the consumer and the industry endeavors to prepare them so as to give a maximum of service. The sales representative is generally a trained man, selected for his knowledge of the industry and educated in the uses of its products. He is supported by many kinds of merchandising assistance, ranging from consumer advertising to finance plans. Many new products have been developed. Glued laminated construction in the form of rafters, beams, arches and trusses is now commercially available. This process consists of gluing together with a highly water resistant glue a number of layers of wood and bending them into any shape required. This development, which is old in Europe, is just being introduced in this country. It permits the building of large buildings or structures with tremendous spans at very great reductions in cost under prevalent modern methods of construction. Of particular interest to engineers is the type of construction using small metal rings and plates. These modern connectors have simplified the joining of wood to wood and wood to steel. Less lumber, less hardware and a better joint are possible when modern timber connectors are used. Cut-to-size building parts, standardized sizes of millwork, mass production of doors, windows and cabinet work are all a part of an industry program to lower the cost of construction without disrupting existing building methods. Lumber today is better manufactured than ever before. Tremendous amounts of money have been spent for modern machinery to cut it to exact length so it can be used with a minimum of cutting and fitting. It is trade-marked like any other commodity deserving of a name—it is packaged, bundled, tied and labeled as befits an article of merit. It is made in strict accordance with association standards.

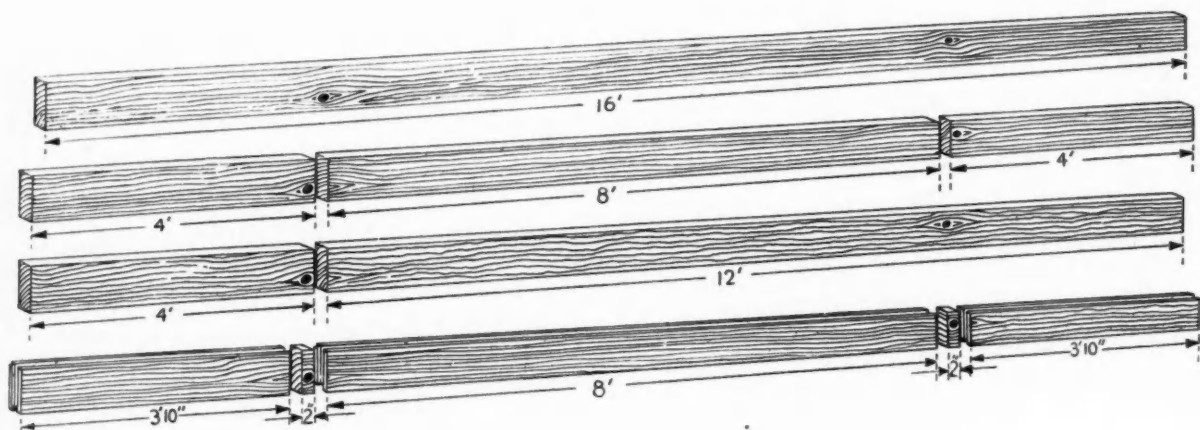
The use of new lumber products and new methods can be of great assistance in reducing construction costs. Instead of planning room sizes to even feet, as is so often done, the layout can be arranged to permit the use of exact length joists without cutting or fitting. Thus waste is eliminated, and no unnecessary overlapping of the joists is allowed. Ceiling heights can be dimensioned so as to provide for the universal use of an eight-foot exact length stud with accurately squared ends. Each stud, as with the joists, may be used just as it comes from the dealer. With the ever increasing popularity of interior

LUMBER INDUSTRY IMPROVEMENTS

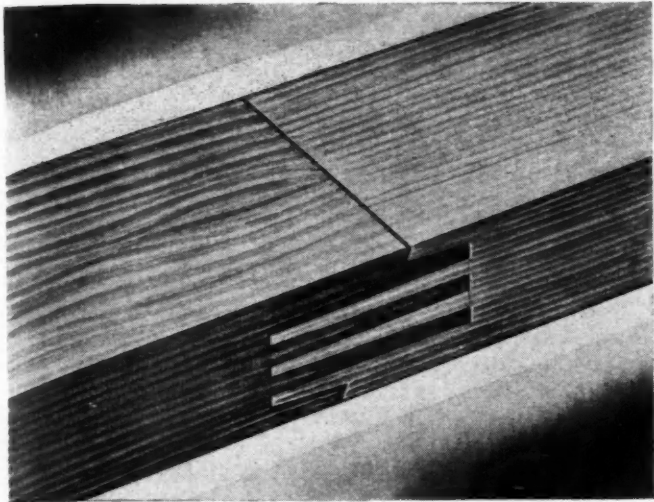
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|---|---|
| 1. Square cut-to-exact-length lumber. | 29. Waste utilization (Pres-to-Logs, hog fuel). |
| 2. End-matched lumber (sheathing, flooring, ceiling, etc.). | 30. Casein glue (exterior doors, arches, plywood). |
| 3. Precut framing. | 31. Improved nails and fastenings. |
| 4. Phenol glued Pine. | 32. Better paints and finishes (2-coat exteriors). |
| 5. Spliced 2x4's—8 feet long. | 33. Better manufacture. |
| 6. Grade use items (sheathing, studs, short cuts). | 34. Increased machine efficiency. |
| 7. Trade-marked lumber. | 35. Reduced shipping time. |
| 8. Grade-marked lumber. | 36. Better car loading (paper tents, clean lumber). |
| 9. Waterproof plywood. | 37. Better cars (tight roofs). |
| 10. Improved and treated plywood. | 38. Timber farming. |
| 11. Hot pressed plywood. | 39. Selective logging. |
| 12. Laminated roof supports. | 40. Reforestation. |
| 13. Improved shingles. | 41. Improved logging methods (cat logging). |
| 14. Clean treated lumber. | 42. Improved small house designs. |
| 15. Fireproofed lumber (at reasonable cost). | 43. Improved plans for farm structures. |
| 16. Treated sash and frames. | 44. Better house and farm plans. |
| 17. Patched knots. | 45. Better relations with agricultural schools and extension divisions. |
| 18. Plank floors. | 46. Lumber research. |
| 19. Kiln dried gutters. | 47. Association activities (codes, small houses, improved products). |
| 20. Packaged lumber. | 48. Unit selling. |
| 21. Cartoned mouldings. | 49. Installment selling (note purchase and Title II). |
| 22. Packaged wood paneling. | 50. Better small house services. |
| 23. Kiln drying improvements (drier lumber). | 51. Improved display and sales rooms. |
| 24. Improved designs in stock millwork. | 52. Improved yard appearance. |
| 25. Improvements in wood engineering (trusses, arches). | |
| 26. Teco ring connectors. | |
| 27. Dri-Wall construction (plywood, Dri-Wall Base, etc.). | |
| 28. Improved veneer cutting and drying. | |

wall finishes other than plaster, this factor is important, because such finishes as plywood and fiber board come in eight-foot lengths, and the eight-foot stud facilitates their use.

Another important item in simplifying and speeding up construction with less waste and less labor time has been the development of end-matched, or "Endless"



WHY end-matched lumber presents a better appearance and makes a tighter job—the natural defects in the lumber have been cut out.



JOINT detail of new built-up studding furnished in 8 foot lengths.

lumber, which, among other things, may be used for sub-floors, wall sheathing, and roof sheathing. Its use offers advantages that contribute to sound, economical construction. Each piece is tongued and grooved on the ends as well as the edges. When applied, it meshes together to form strong, tight walls. The only cutting necessary is at the openings and corners, and there the piece that is cut off may be used to start the next run. Because the ends of the boards interlock in a firm tongue and grooved joint, pieces do not have to be joined over framing members, as is required when plain square end lumber is used. The result is that this sheathing goes on faster, and is easier to apply, requiring no special skill on the part of the user—and there is practically no waste. Nailing time is also substantially reduced because fewer nails are used.

Drop siding, finish flooring, and finish ceiling are also available with the same features of end-matching.

Joists, studding, and sheathing are the three most important framing items and make up the greatest number of board feet on the job. The use of these items as just described is an important factor in keeping the cost of the house down. Accurate checking during the construction of a house which was planned to gain the greatest use out of exact length joists and studs and end-matched sheathing has shown that as much as 67½% of the board feet used was untouched by a hand saw.

Among many of the other improved lumber items should be mentioned packaged bevel siding and exterior finish, packaged mouldings, interior board wall finishes, plywood, wood gutters, stepping, and shingles.

To further utilize short lengths of 2 x 4 stock, one of the Pacific Coast operators is now splicing two pieces of 2 x 4 to make 8 foot lengths. Eight foot lengths are, by all odds, the most popular size of 2 x 4, and enough in the right grade cannot be produced at an ordinary sawmill to satisfy the demand, so a highly satisfactory splice has been developed. The illustration shows how this is done.

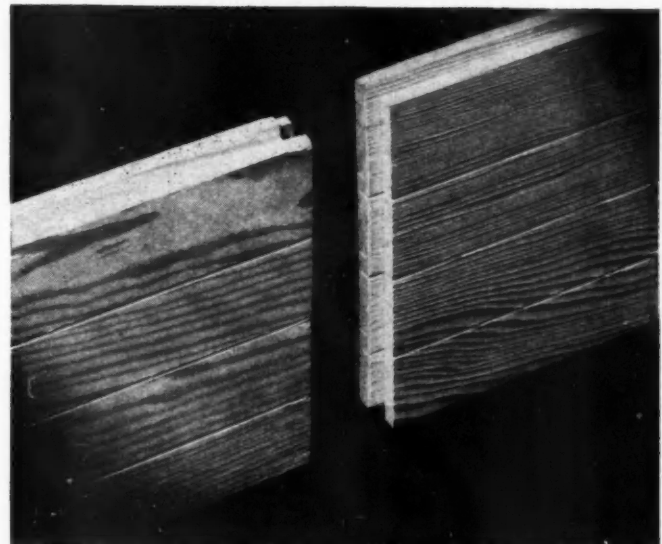
Another burden the lumber manufacturer has to bear is the supplying of lumber in the widths the customers wish. At one of the large Idaho white pine mills, lumber is now being glued with waterproof urea formaldehyde adhesive by the heat and pressure process into pieces 48 inches wide and ripped to the size required by the customer. Because the joint is impervious to moisture, and because the joint is stronger than the wood, the matter of width is now of small concern.

With length and width problems eliminated, the matter of thickness is being disposed of by the use of casein glue in laminated trusses, arches, rafters and beams.

An entirely new item in wood will serve as an interior wall finish, thereby eliminating the use of lath and plaster in house construction. This is called "Dri-Wall Base," and it is another use for the short pieces of stock ordinarily used in end-matched lumber. Four saw kerfs are run in each face; the kerfs are less than 1/16" wide and extend past the center of the piece. The purpose of the kerfs is to permit the piece to act as an accordion when moisture from the air is picked up or given off. The seven-penny nails used to fasten the material to the studs, joists, or rafters are stronger than the small strips between the kerfs; and after installation, a straight, smooth, wall results. The carpenter applies the base and the painter or paperhanger next applies a 1-pound lining felt to the base with ordinary casein base paperhanger's paste, extra thick. After the lining has dried, the wall is ready for paint, paper, or any finish you would ordinarily apply to plaster. The base is dried to an 8 per cent moisture content, and the results to date, after having been used in about 15 houses, are gratifying indeed.

Contractors and builders should exercise care in the selection of the correct lumber species, which is of basic importance in good house construction. There are various species of lumber, such as Douglas fir, hemlock, several kinds of pine, Western red cedar, cypress, and redwood, each having different characteristics. One wood has great strength and rigidity or the ability to support loads; another wood may have these qualities in a lesser degree but be far superior in its ability to resist the elements, or in other words be more satisfactory for exterior use; another wood will take finish better and present a finer appearance when used for interior purposes. Various kinds of lumber in a house have different jobs to do, and the proper species must be selected. The job of matching the correct lumber to the specific building need has been done by building engineers and experienced construction men. Their recommendations, which are the result of years of experience and laboratory tests, are presented in another part of this manual.

Of much importance to the lumber user is the improved drying of lumber. Today there is no reason to be satisfied with lumber which has not been thoroughly processed and dried to a satisfactory moisture content.



NEW "Dri-wall Base" for lining inside walls. The saw kerfs absorb any movement, permitting felt and wall paper application.

Bundled Precut Framing for House Walls

PRECUR framing is one of the newest big things in lumber. A project of the West Coast Lumbermen's Association, it is a means of cutting home building costs and also furnishing a substantial outlet for No. 3 or low-grade dimension lumber, the manufacture of which cannot be avoided entirely, and the marketing of which has been somewhat of a major lumber industry problem.

Old-time carpenters tell us that before the days of lumber grading, lumber was purchased "mill run." The carpenter knew just what to do with his materials. As construction of a house progressed, he selected just the right piece for the purpose intended and worked it into the structure. In the rough frame, a stick which looked good enough and big enough would find its proper place as a girder, joist or rafter. For doors, windows, finish frames and trim, lumber was selected for its appearance and workability, and these items were sized, patterned and finished right on the job. The completed house was a monument to fine craftsmanship.

It is important to note that the entire contents of the log were utilized in this early construction.

Transition into today's construction practices has been gradual but revolutionary. The reasons for this are manifold. Increased competition among builders, change of wage scales, the advent of power equipment, need for more rapid construction—each has contributed to change in lumber requirements and change in carpenter methods. We now have complete and detailed construction regulations—building codes—requirements governing both materials and their use, intended to be minimum standards for the protection of the public. Currently, the entire contents of the log fail to find their places in home construction. Notably, low-grade dimension is practically excluded from the residence frame.

In an effort to determine whether or not low-grade dimension can have a valid use in today's home construction, fully compliant with imposed regulations, experiments and studies carefully made have shown that No. 3 dimension contains a high percentage of higher-grade cuttings between the big knots and other characteristics which cause it to be graded as No. 3. When shop cut into

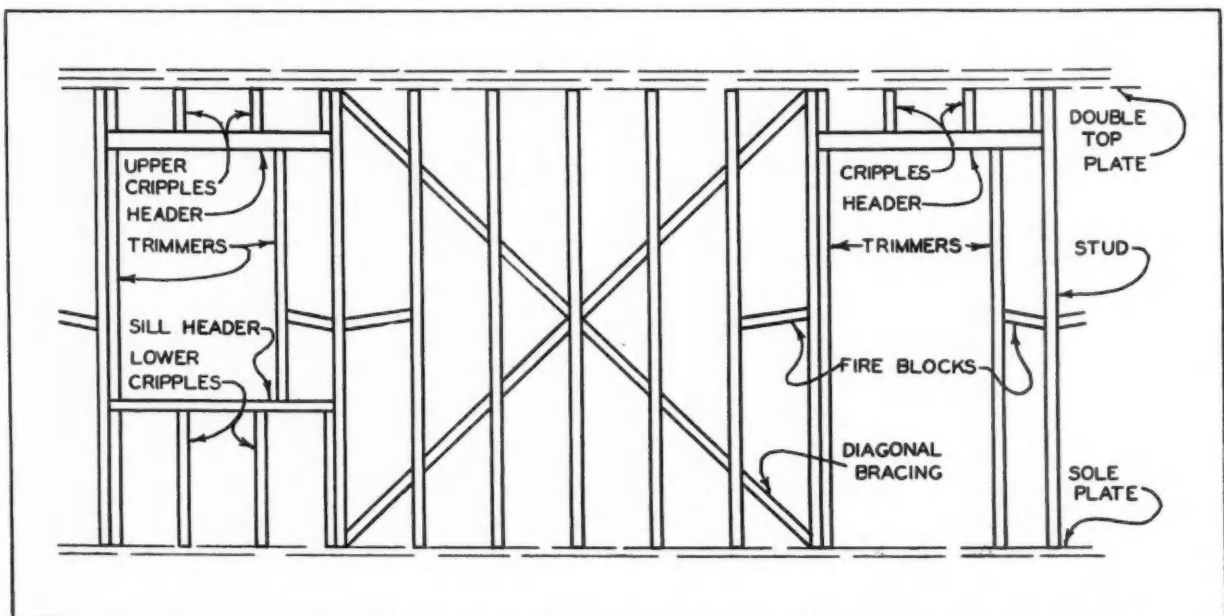
lengths required for trimmers, cripples and other members in residence walls, random length No. 3 dimension has a reclaim of approximately 90 per cent—the resulting members being No. 2 and higher grade required by the building codes.

When completed, the rough frame of an average single-story, five-room house contains over 2,000 pieces of lumber. Well over half of these are short lengths of less than seven feet.

Nearly half of the total length of walls and partitions is interrupted by openings which require on the average some ten pieces each. Adding in fire blocking and bracing and the total of short lengths becomes a sizable quantity. The average length of all short members in the walls—that is, pieces shorter than full-length studs—is always less than 2'6" and is frequently less than 2 feet. This, then, is the basis for precur framing.

By bundling these short lengths into knock-down window and door assemblies, runs of bracing, and convenient parcels of fire blocking, a myriad of separate pieces has been reduced into say twelve windows, twelve doors, twenty-one sets of bracing and seventeen parcels of fire blocking for the average house. These, with full length studs and random length plates, comprise every member in the walls. This gives simpler quantities with which to deal. We have accounted for every piece, which means 100 per cent accuracy in estimating. We have sorted pieces into bundles so that they can be laid down exactly at the point where they are to be used. All this saves costly confusion, saves endless trips to the material pile and eliminates job measuring and intermittent job cutting.

In order to prove the principles of what appeared to be a meritorious system, precur framing was recently subjected to rigorous trial in the Los Angeles area. A variety of jobs was selected in cooperation with builders and retail lumber dealers, and studied from every angle during shop production and job construction. These jobs were successful to a high degree. Materials took their places in the structures with a minimum of effort and without confusion. Detailed costs and man-hour records were kept. These tell a very interesting story.



PRECUR framing utilizing many short lengths is handled like this typical stud wall section.

In the shop, costs of cutting and bundling, together with overhead items, are sufficiently low to fall well within the spread between the value of the cutting stock and the value of pre-cut items. On the job, due to elimination at that point of sorting, measuring, cutting and additional handling, labor costs are reduced by an almost unvarying \$10.00 per thousand board feet.

The production of pre-cut framing consists of two main steps—cutting and bundling. The only equipment needed is a power saw capable of square and miter cutting, a saw table and a series of gauges, all of which are standard.

Cutting and bundling schedules for a job should be prepared as instructions to the sawyer and production man. Simple arithmetical formulas have been worked out by which the lengths of any members can easily be computed for inclusion in the cutting and bundling schedules.

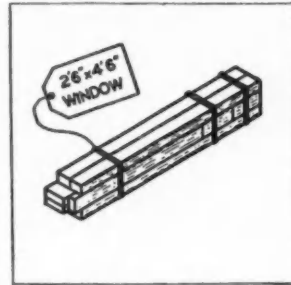
Obviously, standardization of stud lengths, window and door sizes would greatly simplify the operation and permit pre-cut framing to become a stock item rather than a cut-to-order item. This, then, would also make bundled pre-cut framing available to the builder of single house jobs. Working toward this end, a standard stud length of 7'9" which will permit an 8-foot ceiling height, four sizes of doors and eight sizes of windows has been suggested. Based on them, and the formulas for computing lengths, the Association has prepared a chart which provides a complete schedule of lengths and pieces per bundle.

The cutting schedule will call for a range of possibly 15 to 20 different lengths from 7 inches to 7 feet 9 inches. These predetermined lengths should be fixed by a series of selective stops on the saw table. The sawyer-grader can then cut to maximum advantage, taking the longest possible cuttings from the material before him.

Bundling is a simple matter. FHA, building code and specifying agencies, requiring the grade marking of framing lumber, have generally approved the use of one grade mark per bundle for pre-cut framing. It is necessary that door and window bundles be tagged or marked to show the finish size of the opening.

Now what does all this cost? Based on experience during job trials in the Los Angeles area with normal existing mill equipment and on schedules of 10 MBM or less, an average of 4.8 man-hours of labor per M feet was required for complete production of pre-cut framing, including studs for typical jobs.

Expressed in dollars and cents, this meant about \$2.70



BUNDLED assembly of window framing members.

for cutting; \$1.75 for bundling; or a total, including studs, of about \$3.50.

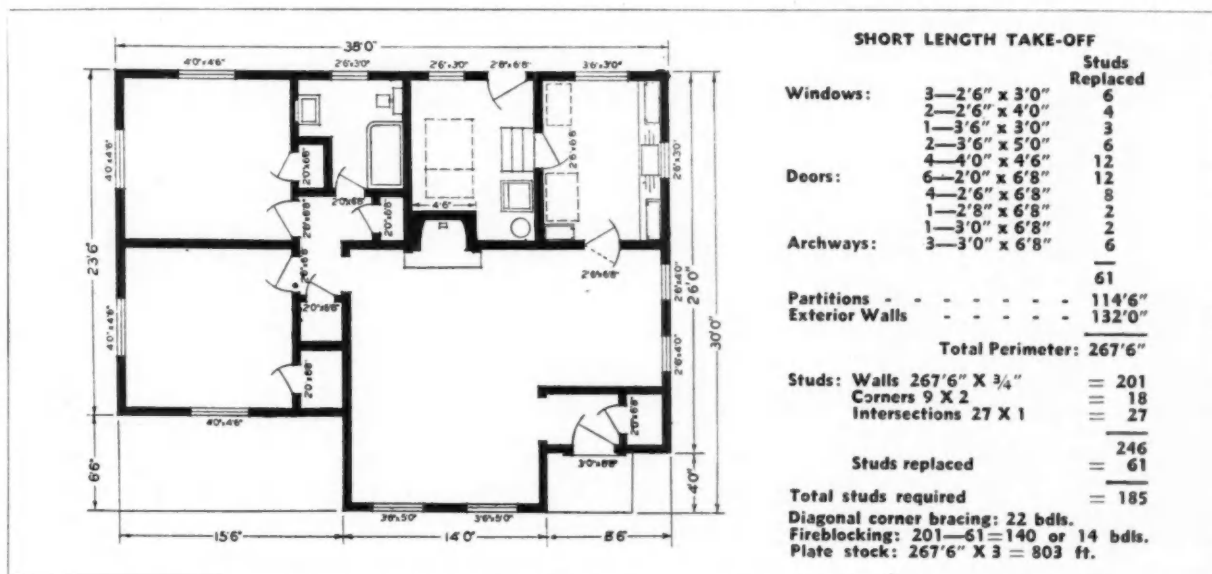
The Central Registration Bureau of the Lumber and Allied Products Institute of Los Angeles in 1939 established sales prices for pre-cut framing. These were set at so much per bundle and at that time were, for example, a 2-0 x 6-8 Door 55c, a 1-6 x 3-0 Window 60c, on up to a 4-0 x 4-6 Window at \$1.03. Bracing (6 pcs. per bundle) 22c, fire blocks (10 pcs. per bundle) 22c. Studs trimmed both ends \$35.00 per M.

Just as the shop production of pre-cut framing embraces two main steps—cutting and bundling—construction with pre-cut framing confronts the builder with but two steps—listing and assembly. Estimating is reduced to a minimum. Since one is dealing in terms of bundled assemblies of framing members, it is only necessary for the contractor to tally the number of doors and windows of each size, count the studs, add in a bundle of diagonal bracing for each run, list a fire block for each spaced stud and he has a complete schedule of framing required between top plate and sole plate.

Assembly and erection are also simple and easy. After the floor structure has been completed ready to receive walls and partitions, bundles of pre-cut framing are distributed to the locations of their respective openings. From that point on, the builder uses whatever method of erection he has found best.

On the trial jobs mentioned previously, some 75 carpenters used bundled pre-cut framing for the first time. Savings in labor averaged \$30.00 to \$35.00 per 5-room house. A minimum of 20 minutes was saved in framing each door or window. The net result: pre-cut studs plus bundled short framing resulted in a 40 per cent reduction in labor cost in wall construction.

In addition to these important cost reductions, the pre-cut frame has a precision of fit which makes every joint full-bearing and uniform, thus eliminating ragged and uneven jointing, which has in many instances resulted in unsightly finish cracks in completed buildings. No special equipment is needed. Among the advantages



ESTIMATING and listing materials for good sized house to be built of pre-cut framing lumber.

of more rapid construction are the tying up of investments for a shorter period of time, getting under cover in advance of a threatened storm, earlier rental returns from income properties, ability of a builder to handle more jobs and, of course, opportunity for the owner who is always impatient to move into his new home just a little earlier.

When to these cost savings and betterments are added the ease and accuracy of estimating, the builder will find this newer practice indispensable to his profits and his progress. It will undoubtedly grow in use as its advantages become known. It has already been used in a number of jobs in Los Angeles. The largest one is the Wyvernwood Project which consists of 142 apartment buildings which will house some 1,100 families. For this job, about 7 million feet of framing was pre-cut in the shops of a local lumber dealer.

ESTIMATING AND LISTING: In preparing the estimate and framing list for a job using pre-cut framing the contractor is concerned with only six items for the walls: studs, windows, doors, fire blocking, bracing and plates. The listing of these, with complete accuracy, is quite simple. In fact, quantities can be taken from the floor plan just as rapidly as they can be written.

First is the take-off of doors and windows. We are now dealing in terms of bundled assemblies of framing members, hence we need merely tally the number of windows and doors of each size, accounting for each opening. While doing this we will also list the number of full-length studs replaced by these openings, for later use. These are:



DIGNITY and charm are expressed in this carved pine corner cup-board and double doors; Tifal, Ltd., Los Angeles, Builder.

Finish Width of Opening	No. Studs Replaced
1'-6"	1
2'-0" to 3'-0", incl.	2
3'-6" to 4'-6", incl.	3
5'-0" to 6'-0", incl.	4

Of several methods usable in counting the number of studs, the following has gained most favor. It is shown in outline form:

1. From the overall dimensions shown on the floor plan, compute the total linear footage of all walls and partitions. Convert this footage to standard 16-inch stud spaces—that is, multiply it by $\frac{12}{16} = 0.75$.
2. Count the number of corners, adding two studs for each corner, to allow for triple-stud framing.
3. Count the number of wall and partition intersections, adding one stud for each intersection, to allow for double-stud framing.
4. Deduct the number of studs replaced by openings.

We have now accounted for every full-length stud required for the normal job.

Diagonal wall bracing is best computed by counting the number of "strings" or "runs" from an examination of the floor plan on which the logical placing of braces can be determined. List one bundle for each run of bracing required.

Fire blocking may be listed on the basis of one block for each full-length stud. Actually, fire blocks will not be required for additional studs at corners and intersections, hence the total may be adjusted accordingly. These blocks will normally be bundled in tens for convenient handling; full bundles should be listed.

Finally, plate stock should be listed. Plates are not pre-cut, hence random lengths are used. Total linear footage is, conservatively, three times the total footage of all walls and partitions for the double top plate and single sole plate.

The foregoing procedure accounts for every framing member in normal wall construction. Incidental spacer blocks placed between pairs of studs, etc., are taken from joist and rafter ends or other scrap. Framing for bay windows or special framing which must be custom-built on the job should, of course, be given separate accounting.

Preservative Treatments

THE protection of wood against damage by decay fungi and termites is a simple matter. Impregnation of the material with creosote oil or a water solution of a preservative salt, using the vacuum-pressure process in closed retorts, results in a dependably protected product.

In general, creosoted wood is suitable for use where its odor, color and inability to take paint are not objectionable. Salt treated wood, when air-seasoned or kiln-dried after treatment, retains the characteristics of untreated material (slight color change is observed in certain brands), and can be used where painting and freedom from odor are required.

Experience has developed economy in the use of treated wood, to the end that the additional cost of the treatment is not carried to all the lumber in a structure. Laboratories and manufacturers of treated lumber recommend use of the material up to and including the first floor subfloor, with special emphasis on treatment of wood used in or near the ground. Porch material (including flooring) is also on the "required" list.

During the past few years a number of preservatives have been developed especially for the treatment of sash and similar products. Generally they consist of an organic toxic chemical carried in a nonaqueous volatile solvent. They are practically colorless and dry quickly upon evaporation of the solvent. The material to be treated is submerged in the solution for three to five minutes.

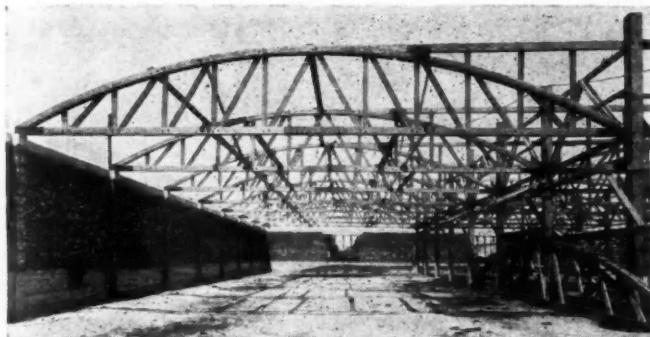
Timber Connectors for Stronger Joints

NO single activity in the entire field of lumber utilization is so indicative of the market extension possibilities inherent in technical research, as the comparatively brief, but important history of the Teco system of construction.

The importation of the original timber connector models from Europe and the subsequent development of new ones in the United States, based on the same principle, have practically revolutionized within the last five years previously accepted engineering principles as they apply to the heavy timber structure.

Through connector research heavy timbers, which had by 1930 lost much of their market for bridges, trusses, towers and similar structures, to steel, regained much of the ground previously lost.

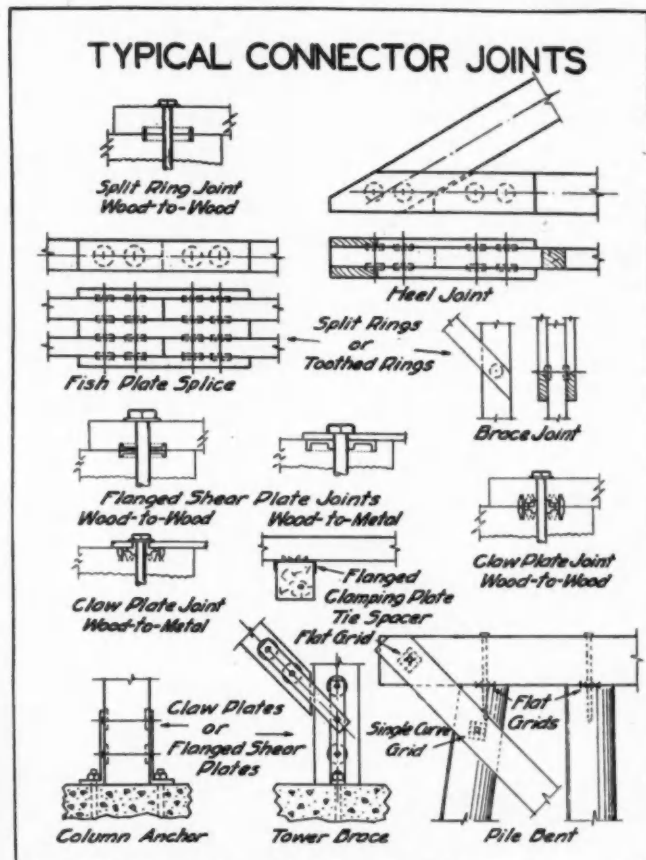
Because they permit a timber joint as strong as the members joined, the connectors have greatly reduced the size of a timber member to do a given job. Previously heavy timber engineering design required over-sized members in order to produce sufficient bulk for a sound joint. The total volume of material needed to construct



MILLIONS of board feet of lumber have gone into roof trusses employing the connector system. This paper warehouse is a typical illustration of the connector-built truss.

a given roof truss or bridge has been considerably reduced with important savings in both material and old-type hardware. Over designing of timber structures is no longer necessary.

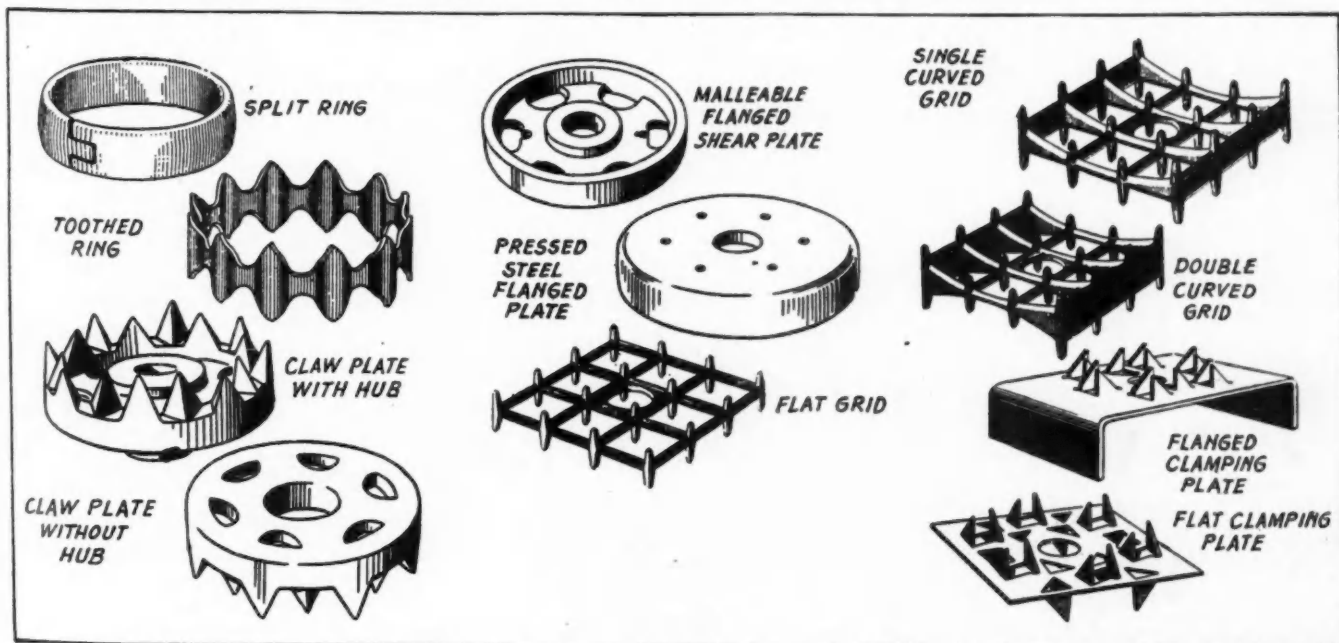
All costs for bringing the original connector designs from Europe and the expense of development and engi-



TYPICAL standard joints illustrating the application of the Teco connector system.

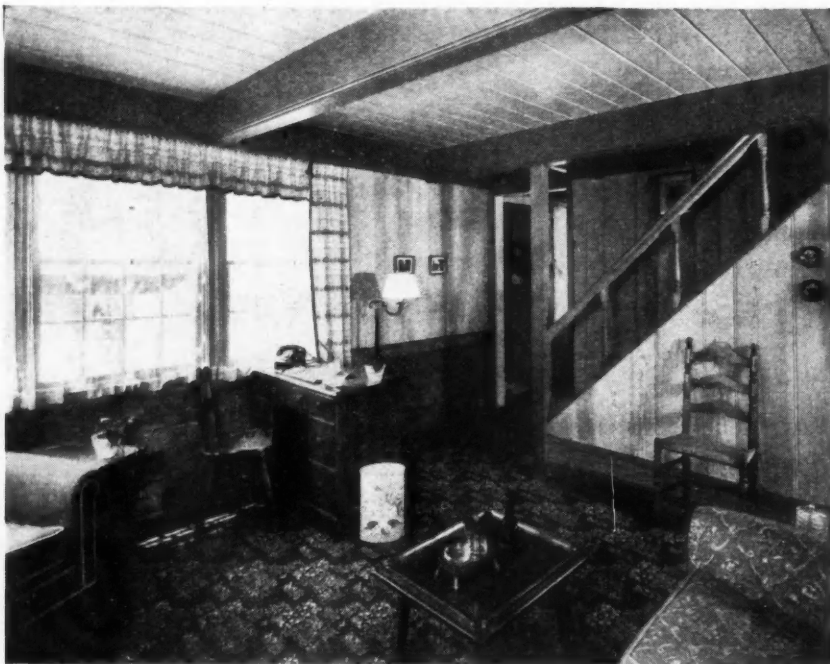
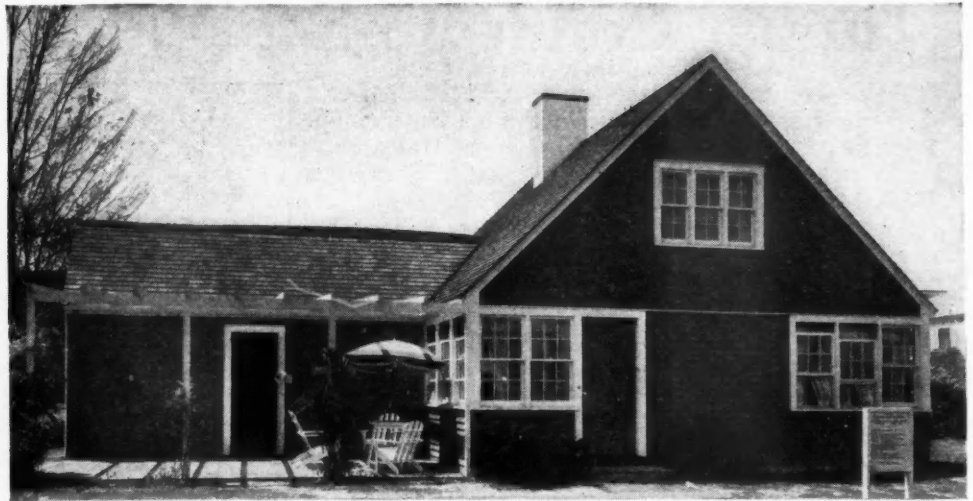
neering in America were shared cooperatively by the lumber industry through the National Lumber Manufacturers Assn.

More than 18,000 structures have employed this system during the past five years and scores of structures have been executed in timber which previously had been lost through the competition of other materials. It is estimated that the connector system has been responsible for the sale of more than 562 million feet of lumber.



New York Fair "Home of Wood"

Demonstrates Plank Floors
and Roof Spanning 7
Feet Between Trusses

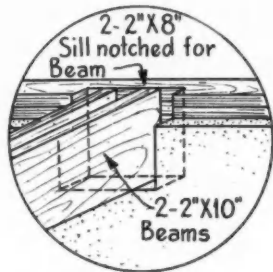
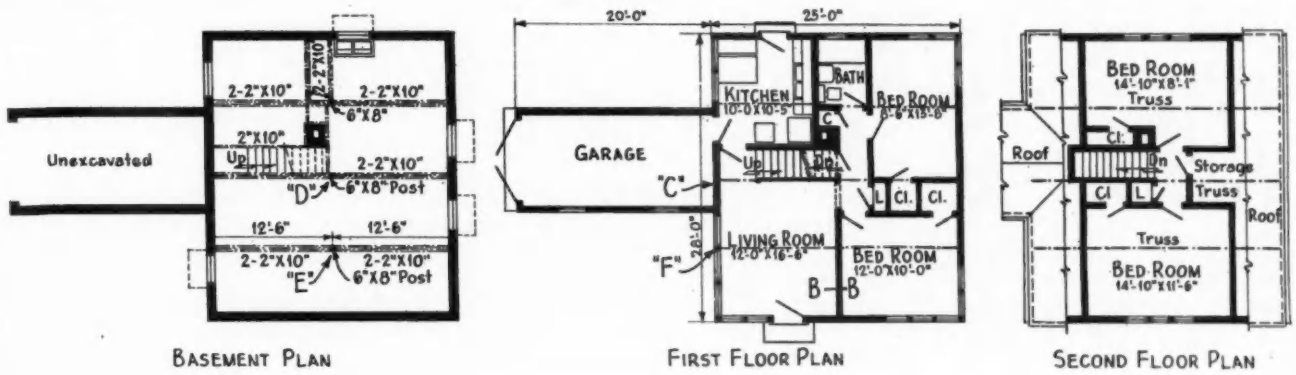


THE "Home of Wood" in the 1939 Town of Tomorrow was exhibited by the National Lumber Manufacturers' Association and the National Retail Lumber Dealers' Association to exemplify an entirely new idea in house construction. Designed by architects Evans, Moore and Woodbridge, it turned out to be the minimum low-cost demonstration home. Outstanding structural features are the 2-inch plank floors with girders and roof trusses on 7-foot centers, as detailed on the opposite page. This economy framing method greatly reduces the number of pieces of lumber that have to be handled, permits use of lower grades, and at the same time gives a more substantial construction.

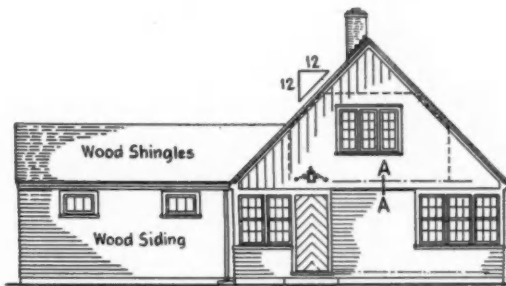
The exterior is of beveled siding, with vertical flush boarding in the gables. The walls are painted deep red with white trim in Scandinavian effect..

This new style all-lumber home used these woods: Studs, plates and walls, Western Hemlock, West Coast Hemlock, Spruce, Norway Pine; floor and roof beams and 2" planking, Douglas Fir; sheathing, Pine, Hemlock, Fir, Spruce; siding and exterior trim, Redwood, Cypress, Southern Pine, Ponderosa Pine, Western Red Cedar; frames and sash, Ponderosa Pine; doors, Ponderosa Pine, Fir; gutters, Redwood; stairs, Oak; floors, Oak, Maple strip, Maple blocks; inside walls, Cypress, Southern Pine, Red Gum, Knotty Idaho White Pine, Birch plywood, Douglas Fir plywood; roofing, Certigrade Red Cedar shingles; roof truss joints, Teco timber connectors; terrace floor and walks, Pecky Cypress blocks.

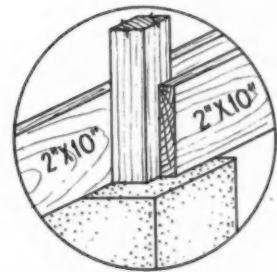
ABOVE: Living room with stair to second floor. Note heavy beams of 2 x 10's, seven feet apart, with 2 inch plank flooring. BELOW: Bedroom shows same construction, also effective wood paneling for walls. OPPOSITE PAGE: Construction details and floor plans.



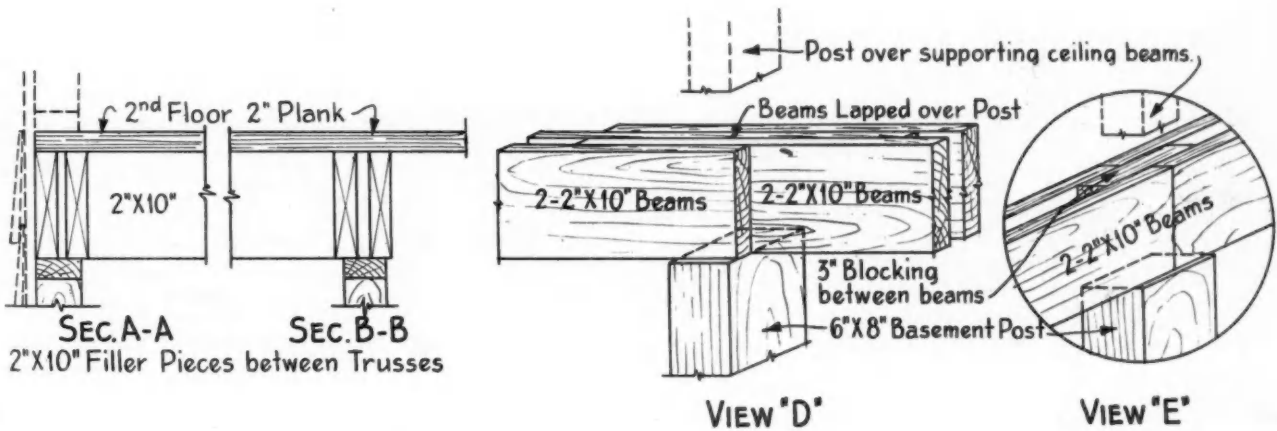
BEAM BEARINGS AT OUTSIDE WALL



FRONT ELEVATION



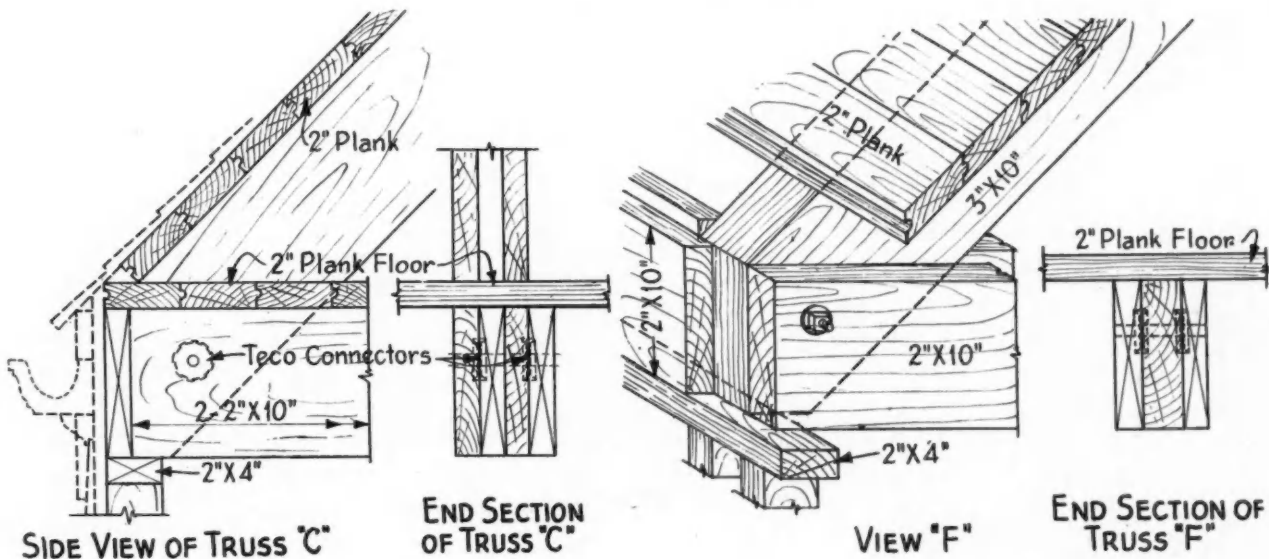
DETAIL OF POST AND BEAM BEARING ON MASONRY



SEC. A-A SEC. B-B
2"x10" Filler Pieces between Trusses

VIEW "D"

VIEW "E"



SIDE VIEW OF TRUSS "C"

END SECTION OF TRUSS "C"

VIEW "F"

END SECTION OF TRUSS "F"

A Good Lumber House— How to Specify and Build It

THESE are two simple reasons why so many American homes of frame construction, erected a century or more ago, are in sound condition today. They were built of thoroughly seasoned lumber and staunchly framed. Since lumber seasoned by improved modern drying equipment is superior to that used by those earlier builders, and with much more known about correct frame construction now than then, a frame house, erected according to present-day standards, may well be permanent. The statement sometimes is made that little lumber is available as good as that used by our earlier builders. On the contrary, there is an abundance of good lumber. Progress in the manufacture and refinement of lumber products has kept step with builders' rightful insistence on better quality and service for each dollar invested in construction. The lumber manufacturer has met this challenge by developing many new refinements through ingenuity and research. And, in this progress, no greater strides have been made than in seasoning and drying.

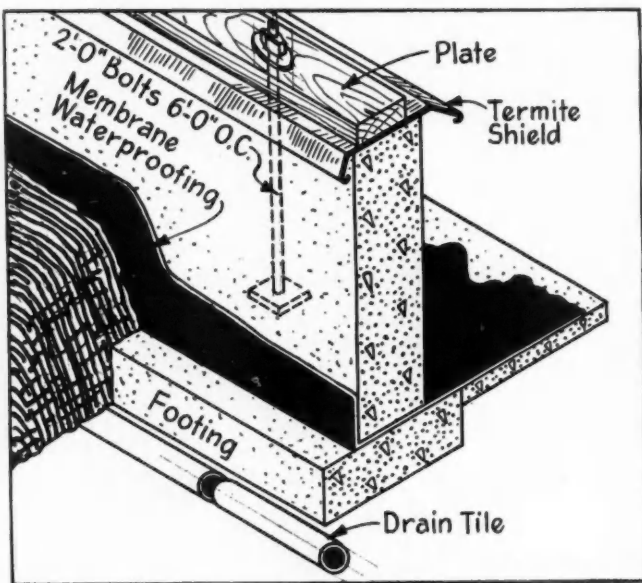
As a business proposition it is cheaper to build a good house than a poor one. The slight additional cost of building a house right is made up many times over by lower repair costs and higher resale value.

As a guide to contractors and builders in handling their construction duties and in making clear to their clients and customers the important details of good house building, a number of points of recommended construction are here illustrated and briefly described. These construction standards should be used along with the correct type and grade of lumber for the given requirement and use as recommended in the "Lumber Grade-Use Guide" for several of the commercially important lumber species, as presented in another chapter of this manual.

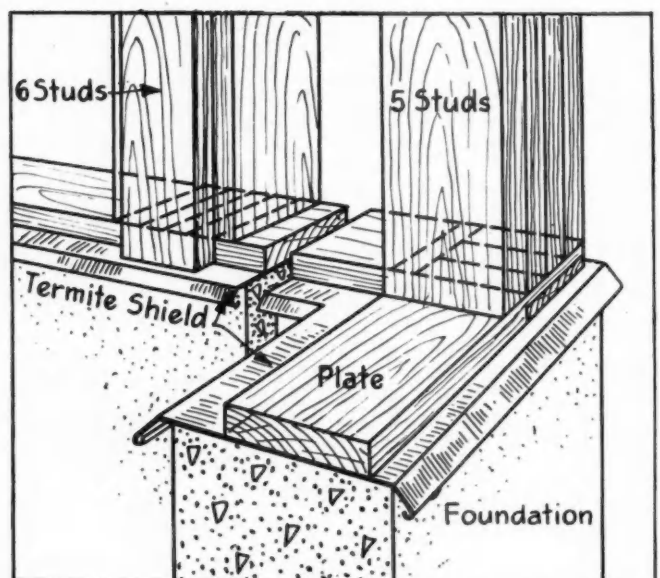
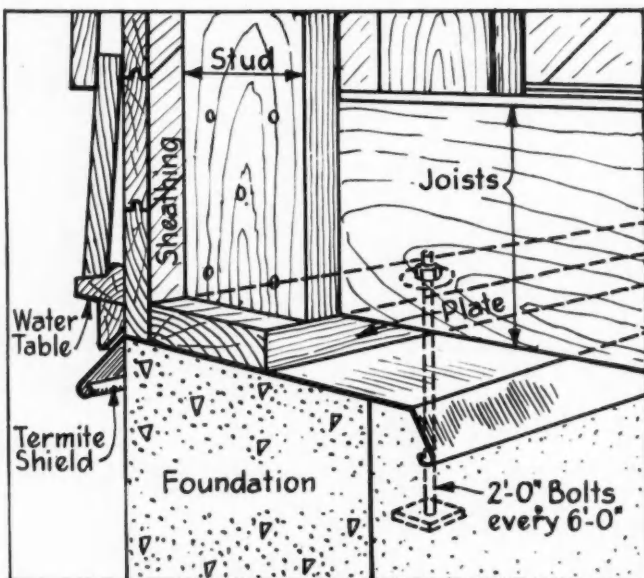
Two systems of framing are covered: (1) the *platform* method and (2) the *balloon* method of framing. Each is detailed as supported on, and solidly fastened to, a masonry foundation wall with adequate footings.

Correct foundation construction begins with concrete footings placed to run continuously with the outside and lateral walls. Footings should be at least 18 inches wide, 10 inches deep and the top surface exactly level. Where basements occur, footings should project at least 6 inches from the vertical line of the wall on both sides. For concrete walls, portland cement should be used at 1 to 3 of sand and 5 of stone. For masonry walls use enough portland cement in the mortar to avoid disintegration under extreme moisture. To insure a dry basement, outside walls and rough concrete floor should be waterproofed with hot tar and pitch applied over several layers of special felt. This membrane should be continuous, running entirely under the walls, over the footings and up the sidewalls to the grade line. The finished cement floor then is flowed on over the membrane.

As the concrete foundation wall is poured (or when



LEFT, Foundation waterproofed and termite protected; BELOW, strong reinforced corner post of 5 studs, nailed together.



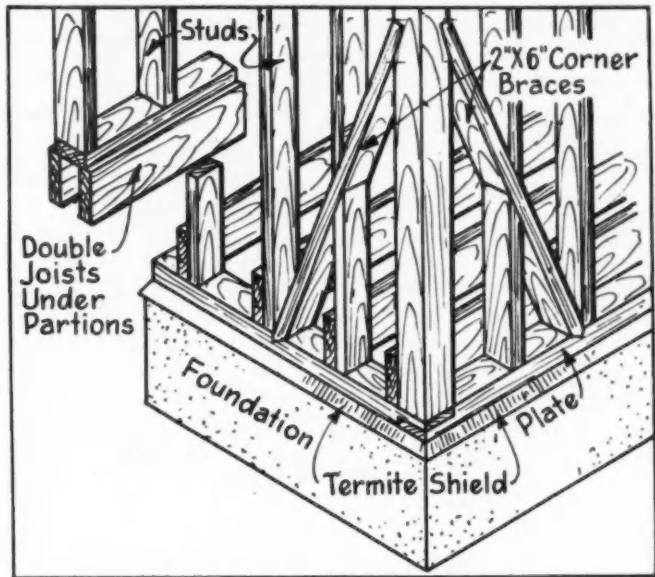
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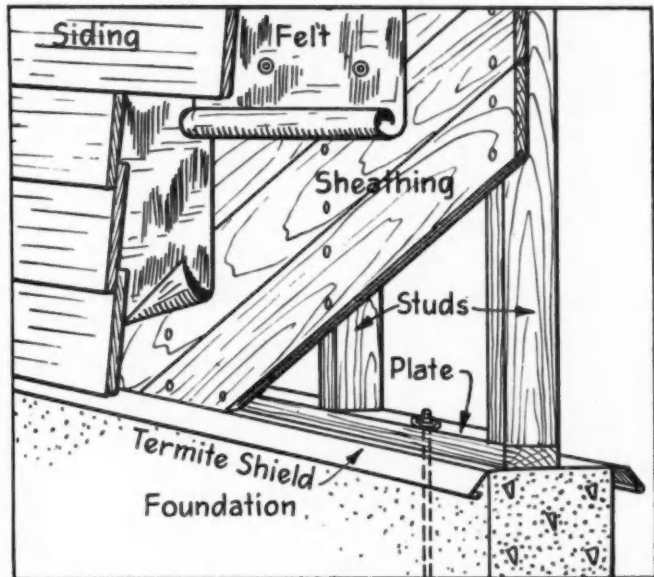
constructed of brick or masonry) place foundation bolts of at least $\frac{3}{4}$ inches diameter at intervals of 6 feet to 8 feet throughout the circuit of the outside wall, but always at each corner. These should be sunk to a depth of 18 inches minimum, with the threaded end protruding above the top surface high enough to extend through the thickness of the wood sills. When the concrete or cement mortar has set, place the metal termite shield in position. Then follow with the sills which are bored to fit over the bolts. Fasten securely with wide flanged gaskets and thick nuts screwed down tightly with a wrench. By this method, foundation and sills become an integral unit, providing proper anchorage for the entire house structure.

In framing, wall studding, joists and rafters are set 16 inches on center. In two story houses the platform or Western type of construction is recommended by many lumber authorities. This provides a platform one story high, built entirely over the first floor. Second story wall studding then are raised above the second floor platform resting solidly on plates spiked into position over the sub-floor. Greater rigidity of framework results from this method, as compared to the balloon type in which studding run continuously from sill to second story ceiling joists . . . because, in the platform type, caps and plates incidental to the second story construction serve as extra bracing.

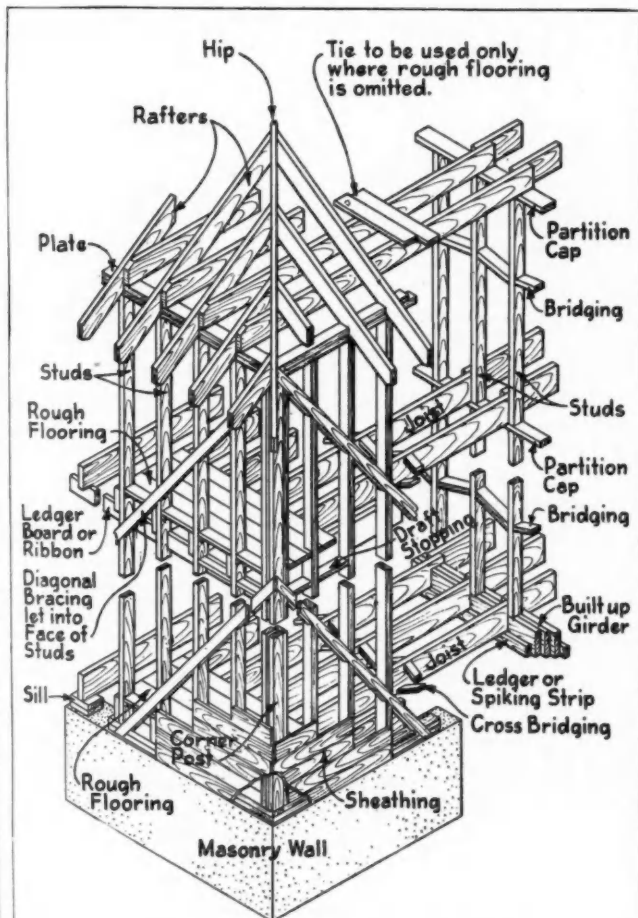
However there are many builders and architects who



ABOVE: Braced corner construction where heavy corner post is used.

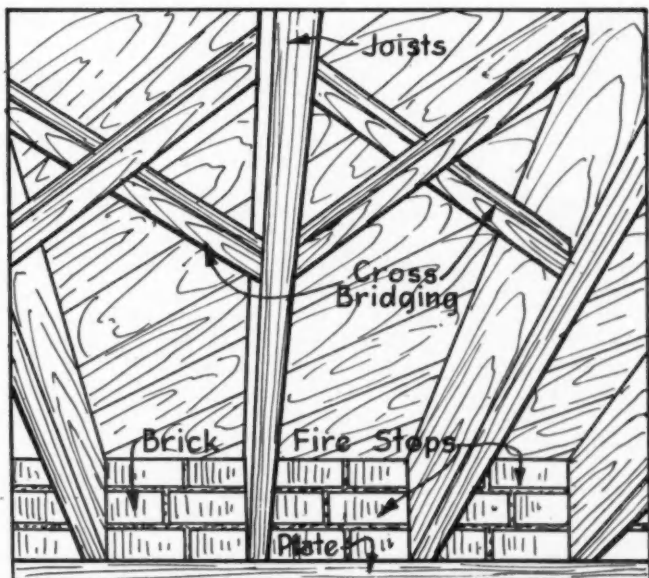


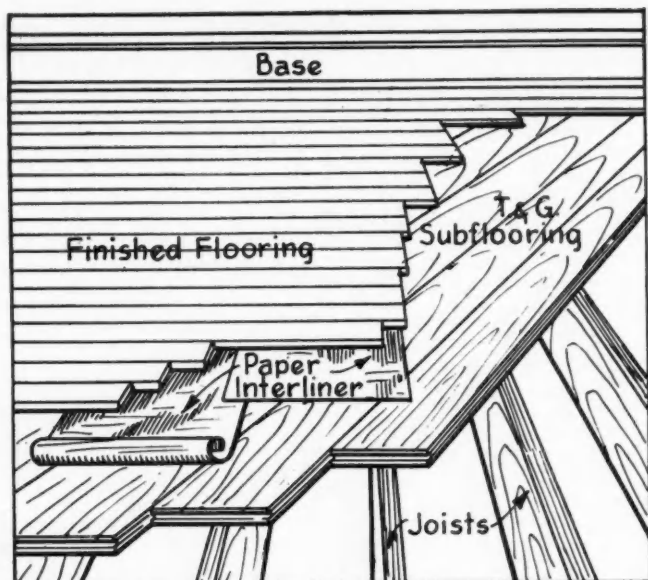
ABOVE: Diagonal sheathing makes a sturdy house; BELOW: Brick fire stops and joist bridging.



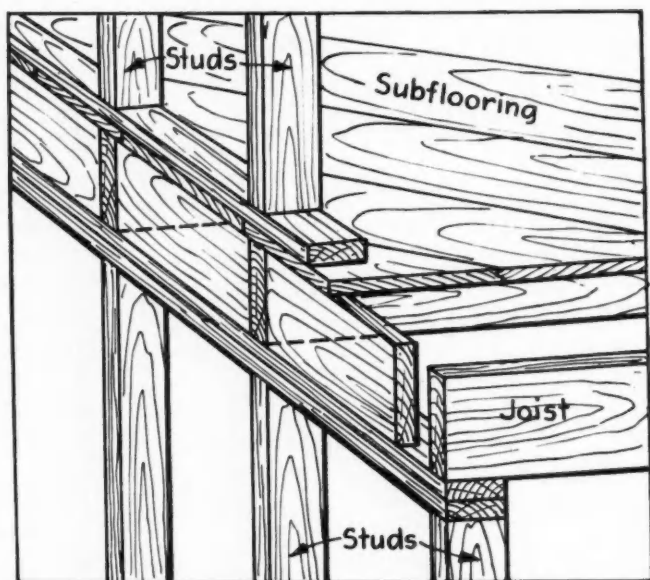
BALLOON FRAME CONSTRUCTION

Note:- Standard spacing for studs should be 16 inches center to center to receive wood lath. Joists are ordinarily spaced similarly unless furring strips or strapping are used. Rough floors when laid diagonally give additional strength to the structure but when laid horizontally economy of materials is obtained. Exterior walls should be braced with diagonal braces for stiffening purposes when horizontal sheathing is used.

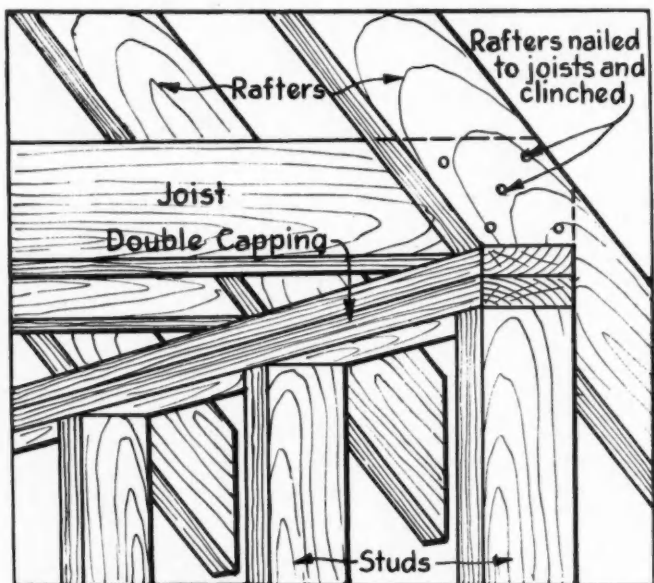




ABOVE: Subfloor is laid diagonally on joists, finish floor at right angle.



ABOVE: Construction at 2nd floor line in platform framing; BELOW: Double cap all studs.



prefer the balloon method; and if properly constructed and braced it makes a thoroughly good house frame. The accompanying detail of "Balloon Frame Construction" shows this method as recommended by the engineers of the National Lumber Manufacturers Association. Notice that it utilizes a 3-stud corner instead of the 5-stud or 6-stud corner construction urged by the Arkansas Soft Pine Bureau in its detail number 3. In explaining this recommendation, the Bureau writes, "Reinforce all corners by using 5 full length studding, extending from sill to rafters. Use 6 studding in the same manner where "T" angles occur."

In further reference to this the Bureau writes, "The authority for this number of members is Old Man Experience, and applies particularly to those regions where structures are subjected to the high winds common to the Middle West. Moreover, while the Southern Pine Association book does not specifically recommend 5-stud corners, it is the belief of the Association's engineers, following their investigations of those structures which withstood the Florida storm of 1935, that the extra members are well worth while.

"The 2 x 6 studding recommendation, which follows, is our own . . . also based on experience. It is worth the difference for the reason explained, particularly so where blown-in or blanket insulation is not used. Also, any woman who loves to decorate her home would much prefer the added width of the window sill afforded by this deeper wall provided by 2 x 6 studs."

At all corners on the main structure add extra bracing by placing stud reinforcements at an angle of 45 degrees from the line of the sill. Studding of 2 x 6 for the outside wall are preferable to 2 x 4's. They provide greater rigidity, more air space between inside and outside sheathing . . . an advantage when inter-wall insulation is used . . . greater depth and consequent more attractive appearance to window frames and interior sills. With either width, always install one tier of blocking between studs, placed at half the height of each story wall. While blocking between studding prevents vibration, it should be supplemented by capping the studding with double plates at the ceiling height of each story. Again, all studs which frame the outside and inside wall openings should be doubled. Floor and ceiling joists should be securely spiked to the wall stud wherever they engage each other, with 4 spikes driven through both members and clinched. Floor and ceiling joists should be braced by cross bridging. Run one series of such bridging for each 10 lineal feet of joist bearings.

Rafters of 2 x 6 for the roof of even the smallest sized house are preferred to 2 x 4's although 2 x 4's are frequently used with good results. As in the case of studding and floor joists, these rafters, where they engage the ends of the ceiling joists, should be securely spiked together and clinched. Use shingle sheathing strips of 1 x 4 kiln dried material. These should be placed 3 inches apart and nailed at each joist with 2 cement coated nails. Over these, lay good edge grain shingles, measuring at least 18 inches in length and not less than 5 shingles to 2 inches of total thickness at the butt. Lay shingles not more than 4 inches to the weather, attaching them with galvanized, monel metal, stainless steel or cut iron nails. When shingles are dipped, be sure the stain extends at least 7 inches from the butt.

Apply outside sheathing at an angle of 45 degrees to the vertical line of the studding. Sheathing material should be of 1 inch x 6 inches or 1 inch x 8 inches kiln dried, surfaced four sides and preferably center and even end-matched. This pattern affords a tight, integrated wall of useful bracing strength. If center-matched stock is not available, kiln dried shiplap is preferable to

square-edged boards. Over the sheathing apply a complete inter-liner of standard building felt, attaching it to the sheathing with short, broad headed nails. Over this apply the clapboard, lap or drop siding exterior wall, using not less than 3 cement-coated nails driven through the face of each piece at each stud. At this stage, the painter should follow close behind the carpenter, applying the priming coat of lead and oil, so that no unpainted surface of the outside finished wall may be exposed to the weather over night.

Lay sub-floors at an angle of 45 degrees to the line of the joists and nail with 2 nails at each joist. While square-edged boards sometimes are specified, center and end-matched kiln dried material is preferable.

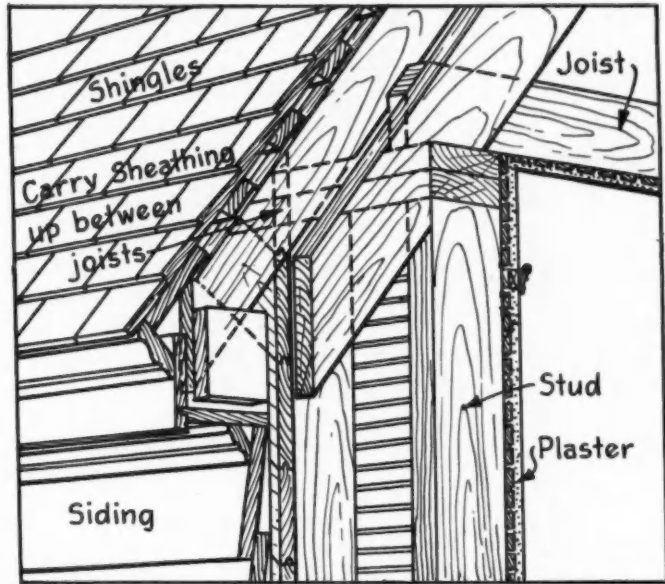
The latter provides a smooth, tight floor, affording a stabilized base for the finished floor, as well as extra cross-bracing for the structure. Installation of the finished floor should be deferred until all other work inside the house has been completed.

With the plumbing roughed in, heating ducts or pipes installed and electric wiring completed, surfacing of the interior walls follows. For plaster walls, whether air or kiln dried lath are used, they should be soaked in water and nailed on wet. Use 2 nails at each stud and break the joints on every tenth course. Use metal lath over all areas which enclose heating or ventilating ducts. Where sash weight boxes occur at window openings, run the lath flush to the jamb covering the boxes. Where the new type of weightless sash is used, the box is dispensed with, but lath run to the jamb in the same way.

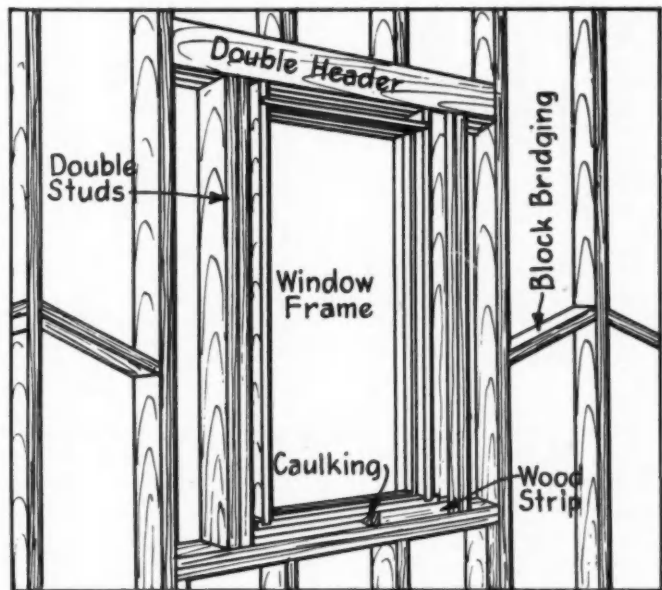
Installation of woodwork and paneling should await the complete drying of the plaster. Drying can be expedited by operating the heating plant a few days . . . a procedure to be followed in any season, but imperative during winter building or extended periods of wet weather. Interior wall panel installations can be made over kiln dried furring strips of 1 inch x 4 inches surfaced four sides nailed horizontally at right angles to the wall stud and spaced at intervals of not more than 2 feet between the flooring and ceiling. A complete sub-wall of kiln dried, center and end-matched sheathing is preferable to these furring strips and, while not essential, does provide a solid sub-wall of greater strength and higher insulation value.

Where partitions carry a load from the second floor or serve as an anchor for the roof bracing in one-story construction, they should be supported by double floor joists and capped by double studding. Where placed over first floor girders, double joists can be omitted. In general, extra members used to insure adequate bracing and rigidity at every point of vertical or horizontal stress, more than justify the small additional cost incurred. Partitions which engage opposite outside walls at or near the center of the structure should be tied securely to both walls as a medium of extra cross-bracing.

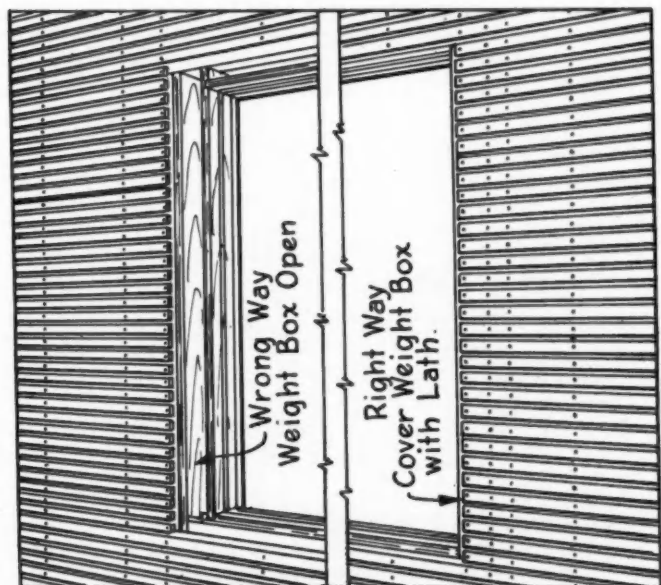
Lay finished floors after woodwork and lighting fixtures have been installed. This provision allows the floor to be laid after all workmen, other than floorlayers, have left the premises and avoids subjecting the flooring to damage when fixtures and heating equipment are moved in. First step is to thoroughly clean the sub-floor of all plaster spots, projecting nailheads and uneven areas, being sure that no moisture is present on the surface. Lay a complete covering of 2 or 3-ply felt of special floor interliner, lapping the seams not less than 1 inch. Finished flooring is tongued and grooved, and usually end-matched. It is blind-nailed into position, 1 nail to each 8 inches of linear strip. Nails should engage the joists below the sub-floor as frequently as possible. Machine sanding of the finished floor is preferable to hand-scraping, after which the final finish is applied.



ABOVE: Proper cornice construction for pitched roofs (Colonial).



ABOVE: Double studs at window openings; BELOW: Proper lathing at windows.



WOOD JOIST AND RAFTER SIZES

MAXIMUM SPANS FOR FLOOR JOISTS No. 1 COMMON

LIVE LOAD FOR RESIDENTIAL USE OF 40 LB. PER SQ. FT. UNIFORMLY DISTRIBUTED WITH PLASTERED CEILING

American Standard Lumber Sizes		Dist. on Center	Maximum Clear Span Between Supports					
Nominal	Net		So. Pine & Douglas Fir		Western Hemlock		Spruce	
			Unplastered	Plastered*	Unplastered	Plastered*	Unplastered	Plastered*
2"x 6"	1 5/8"x 5 5/8"	12"	10'-11"	10'-0"	10'-5"	9'-6"	10'-0"	9'-1"
		16"	9'-6"	9'-1"	9'-1"	8'-8"	8'-8"	8'-3"
3"x 6"	2 5/8"x 5 5/8"	12"	13'-8"	11'-8"	13'-1"	11'-2"	12'-5"	10'-6"
		16"	11'-5"	10'-8"	11'-5"	10'-2"	10'-11"	9'-8"
2"x 8"	1 5/8"x 7 1/2"	12"	14'-5"	13'-3"	13'-10"	12'-8"	13'-2"	12'-0"
		16"	12'-7"	12'-1"	12'-0"	11'-7"	11'-6"	11'-0"
3"x 8"	2 5/8"x 7 1/2"	12"	18'-0"	15'-4"	17'-3"	14'-8"	16'-5"	13'-11"
		16"	15'-9"	14'-0"	15'-1"	13'-5"	14'-5"	12'-9"
2"x10"	1 5/8"x 9 1/2"	12"	18'-2"	16'-8"	17'-4"	16'-0"	16'-7"	15'-2"
		16"	15'-10"	15'-3"	15'-2"	14'-7"	14'-6"	13'-10"
3"x10"	2 5/8"x 9 1/2"	12"	22'-6"	19'-3"	21'-7"	18'-5"	20'-7"	17'-6"
		16"	19'-9"	17'-8"	18'-11"	16'-11"	18'-1"	16'-1"
2"x12"	1 5/8"x11 1/2"	12"	21'-11"	20'-1"	20'-11"	19'-3"	19'-11"	18'-3"
		16"	19'-1"	18'-5"	18'-3"	17'-7"	17'-5"	16'-9"
3"x12"	2 5/8"x11 1/2"	12"	26'-11"	23'-1"	25'-9"	22'-1"	24'-7"	20'-11"
		16"	23'-9"	21'-3"	22'-9"	20'-4"	21'-8"	19'-4"
2"x14"	1 5/8"x13 1/2"	12"	25'-4"	23'-5"	24'-3"	22'-6"	23'-2"	21'-2"
		16"	22'-3"	21'-5"	21'-3"	20'-6"	20'-3"	19'-6"
3"x14"	2 5/8"x13 1/2"	12"	27'-7"	26'-11"	30'-0"	25'-9"	28'-6"	24'-5"
		16"	24'-10"	24'-10"	26'-5"	23'-9"	25'-2"	22'-6"

*Note:—Deflection limited to 1/360th of the span.
Dead load figured to include weight of joists, lath, and plaster ceiling 10 lbs. and sub-floor and finish floor.

NOTE: All sizes here given are based on use of No. 1 Dimension. No. 2 Dimension is extensively used and in many states is the predominant grade for floor joists. In figuring No. 2 use the next shorter span or the next larger size.

MAXIMUM SPAN FOR RAFTERS No. 1 COMMON

ROOF LOAD OF 30 LB. PER SQ. FT. UNIFORMLY DISTRIBUTED FOR SLOPES OF 20 DEGREES OR MORE

American Standard Lumber Sizes		Dist. on Center	Maximum Clear Span — Plate to Ridge					
Nominal	Net		So. Pine & Douglas Fir		Western Hemlock		Spruce	
			Unplastered	Plastered*	Unplastered	Plastered*	Unplastered	Plastered*
2"x 4"	1 5/8"x 3 5/8"	16"	7'-8"	6'-10"	7'-4"	6'-6"	7'-0"	6'-2"
		24"	6'-3"	6'-0"	6'-0"	5'-8"	5'-9"	5'-5"
2"x 6"	1 5/8"x 5 5/8"	16"	11'-9"	10'-6"	11'-3"	10'-1"	10'-9"	9'-7"
		24"	9'-8"	9'-3"	9'-3"	8'-10"	8'-10"	8'-5"
3"x 6"	2 5/8"x 5 5/8"	16"	14'-10"	12'-3"	14'-1"	11'-9"	13'-6"	11'-1"
		24"	12'-3"	10'-10"	11'-9"	10'-4"	11'-1"	9'-10"
2"x 8"	1 5/8"x 7 1/2"	16"	15'-7"	14'-0"	15'-3"	13'-4"	14'-3"	12'-9"
		24"	12'-10"	12'-3"	12'-4"	11'-9"	11'-9"	11'-2"
3"x 8"	2 5/8"x 7 1/2"	16"	19'-5"	16'-1"	18'-7"	15'-5"	17'-9"	14'-7"
		24"	16'-1"	14'-3"	15'-5"	13'-7"	14'-9"	12'-11"
2"x10"	1 5/8"x 9 1/2"	16"	19'-7"	17'-6"	18'-9"	16'-10"	17'-11"	15'-11"
		24"	16'-3"	15'-6"	15'-6"	14'-10"	14'-10"	14'-0"
2"x12"	1 5/8"x11 1/2"	16"	23'-6"	21'-2"	22'-6"	19'-4"	21'-6"	19'-3"
		24"	19'-6"	18'-8"	18'-8"	17'-1"	17'-10"	17'-0"

*Note:—Deflection limited to 1/360th of the span.
Dead load figured to include weight of rafters, roof sheathing, and 2.5 lbs. for wood shingle or 3-ply ready-made roofing. For heavier roof finishes use rafters next size larger
Data supplied by National Lumber Manufacturers Association.

WOOD JOIST SIZES

MAXIMUM SPANS FOR FLOOR JOISTS No. 1 COMMON

LIVE LOAD OF 60 LB. PER SQ. FT. UNIFORMLY DISTRIBUTED WITH PLASTERED CEILING

American Standard Lumber Sizes		Dist. on Center	Maximum Clear Span Between Supports					
Nominal	Net		So. Pine & Douglas Fir		Western Hemlock		Spruce	
			Unplastered	Plastered*	Unplastered	Plastered*	Unplastered	Plastered*
3"x 6"	2 5/8"x 5 5/8"	12"	11'-10"	10'-6"	11'-4"	10'-1"	10'-10"	9'-7"
		16"	10'-4"	9'-7"	9'-10"	9'-3"	9'-5"	8'-9"
2"x 8"	1 5/8"x 7 1/2"	12"	12'-5"	12'-0"	11'-11"	11'-6"	11'-4"	10'-11"
		16"	10'-10"	11'-0"	10'-4"	10'-6"	9'-11"	9'-11"
3"x 8"	2 5/8"x 7 1/2"	12"	15'-7"	14'-0"	14'-11"	13'-4"	14'-3"	12'-9"
		16"	13'-7"	12'-10"	13'-0"	12'-3"	12'-5"	11'-7"
2"x 10"	1 5/8"x 9 1/2"	12"	15'-8"	15'-2"	15'-0"	14'-6"	14'-4"	13'-9"
		16"	13'-8"	13'-10"	13'-1"	13'-3"	12'-6"	12'-7"
4"x 8"	3 5/8"x 7 1/2"	12"	18'-1"	15'-5"	17'-5"	14'-10"	16'-7"	14'-0"
		16"	15'-11"	14'-1"	15'-3"	13'-6"	14'-6"	12'-11"
3"x 10"	2 5/8"x 9 1/2"	12"	19'-7"	17'-7"	18'-10"	16'-10"	17'-11"	15'-11"
		16"	17'-1"	16'-1"	16'-5"	15'-5"	15'-9"	14'-7"
2"x 12"	1 5/8"x 11 1/2"	12"	18'-11"	18'-3"	18'-1"	17'-6"	17'-3"	16'-8"
		16"	16'-6"	16'-8"	15'-9"	16'-0"	15'-1"	15'-2"
3"x 12"	2 5/8"x 11 1/2"	12"	23'-6"	21'-1"	22'-6"	20'-3"	21'-5"	19'-3"
		16"	20'-7"	19'-4"	19'-9"	18'-6"	18'-10"	17'-7"
3"x 14"	2 5/8"x 13 1/2"	12"	27'-4"	24'-7"	26'-3"	23'-7"	25'-0"	22'-5"
		16"	24'-0"	22'-7"	23'-0"	21'-7"	21'-11"	20'-6"

*Note:—Deflection limited to 1/360th of the span.
Dead load figured to include weight of joists, lath, and plaster ceiling 10 lbs. and sub-floor and finish floor.

NOTE: All sizes here given are based on use of No. 1 Dimension. No. 2 Dimension is extensively used and in many states is the predominant grade for floor joists. In figuring No. 2 use the next shorter span or the next larger size.

MAXIMUM SPANS FOR FLOOR JOISTS No. 1 COMMON

LIVE LOAD OF 75 LB. PER SQ. FT. UNIFORMLY DISTRIBUTED WITH PLASTERED CEILING

American Standard Lumber Sizes		Dist. on Center	Maximum Clear Span Between Supports					
Nominal	Net		So. Pine & Douglas Fir		Western Hemlock		Spruce	
			Unplastered	Plastered*	Unplastered	Plastered*	Unplastered	Plastered*
2"x 8"	1 5/8"x 7 1/2"	12"	11'-5"	11'-4"	11'-1"	10'-10"	10'-5"	10'-3"
		16"	9'-11"	10'-4"	9'-6"	9'-10"	9'-1"	9'-5"
3"x 8"	2 5/8"x 7 1/2"	12"	14'-5"	13'-2"	13'-9"	12'-8"	13'-2"	12'-1"
		16"	12'-6"	12'-1"	12'-1"	11'-7"	11'-5"	11'-0"
2"x 10"	1 5/8"x 9 1/2"	12"	14'-5"	14'-3"	13'-10"	13'-8"	13'-2"	12'-11"
		16"	12'-6"	13'-0"	12'-0"	12'-5"	11'-5"	11'-10"
4"x 8"	3 5/8"x 7 1/2"	12"	16'-9"	14'-7"	16'-0"	14'-0"	15'-4"	13'-3"
		16"	14'-8"	13'-4"	14'-0"	12'-9"	13'-3"	12'-2"
3"x 10"	2 5/8"x 9 1/2"	12"	18'-1"	16'-8"	17'-4"	15'-11"	16'-6"	15'-2"
		16"	15'-10"	15'-2"	15'-2"	14'-7"	14'-5"	13'-9"
2"x 12"	1 5/8"x 11 1/2"	12"	17'-4"	17'-2"	16'-6"	16'-5"	15'-11"	15'-8"
		16"	15'-1"	15'-9"	14'-6"	15'-1"	13'-10"	14'-13"
4"x 10"	3 5/8"x 9 1/2"	12"	21'-0"	18'-4"	20'-1"	17'-7"	19'-1"	16'-2"
		16"	18'-5"	16'-10"	17'-7"	16'-2"	16'-10"	15'-3"
3"x 12"	2 5/8"x 11 1/2"	12"	21'-8"	20'-1"	20'-10"	19'-2"	19'-10"	18'-2"
		16"	19'-0"	18'-4"	18'-3"	17'-7"	17'-5"	16'-8"
3"x 14"	2 5/8"x 13 1/2"	12"	25'-3"	23'-5"	24'-3"	22'-3"	23'-1"	21'-3"
		16"	22'-2"	21'-6"	21'-3"	20'-6"	20'-3"	19'-6"

*Note:—Deflection limited to 1/360th of the span.
Dead load figured to include weight of joists, lath, and plaster ceiling 10 lbs. and sub-floor and finish floor
Data supplied by National Lumber Manufacturers Association.

New Effects with Wood Siding

THE wood frame house, when built today in accordance with modern engineering practices, provides beautiful walls which are warm, durable, and which cost the least of any good permanent construction.

Lighter framing has replaced the heavy timbers of the Colonial days, but greater numbers of smaller members now produce walls of equal strength and stiffness at less cost. Two layers of wood with an interlining sheet of building paper have replaced the single clapboards, and the space formerly occupied with the rubble of mud, stones, and brick is now available for a blanket of more scientific insulating material.

The exterior siding is available in numerous pleasing patterns and sizes. Modern siding comes to the builder thoroughly seasoned, carefully machined, and properly graded . . . advantages which the still sturdy old Colonial houses never enjoyed.

Wood siding has ever had the reputation for being a warm, friendly material, so naturally it lends itself best to the informal treatments which are so pleasing in the average sized home. It can give to the outside of a home the same air of genuine hospitality which the wood furniture, floors, and finish give to the inside. Architects appreciate and take advantage of this friendly quality of wood siding.

The beauty of wood siding is that of simple lines and solid colors. Small shadows created by the lapped or moulded edges of individual boards form a pattern of lines on the siding wall. The spacing and character of these lines, their direction, and the color the siding is painted or stained are all factors which influence the effect. These points should be considered in relation to the size and proportions of the wall areas when deciding upon the pattern and width of the siding to be used. For example, very narrow siding loses much of its pleasing effect when applied to a large blank wall, just as indi-

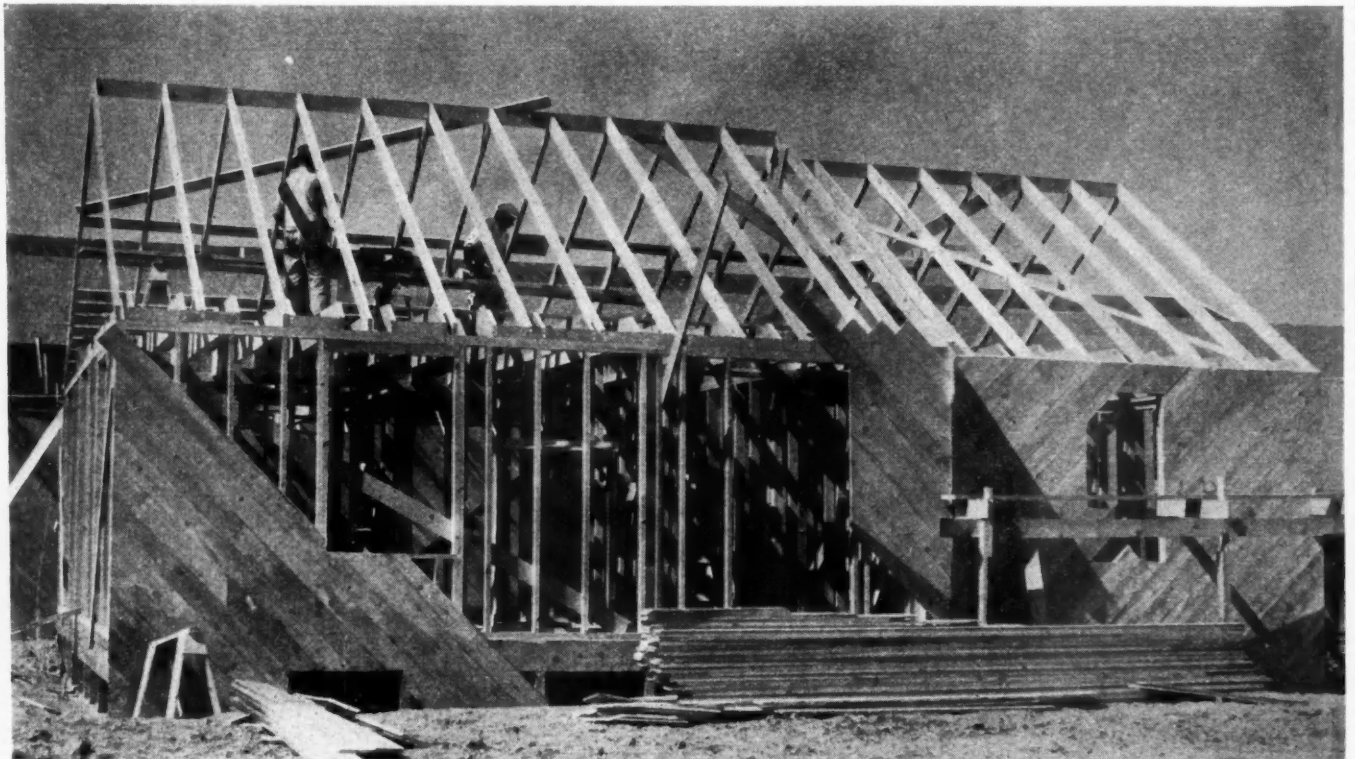
vidual bricks on the side of an office building lose their identity.

The variety of architectural effects to be secured with wood siding is almost as broad as the wishes and originality of the builder. It is true that bevel, or lap siding as it is often called, is characteristic of New England Colonial and Dutch Colonial homes, but the use of some form of wood siding, sometimes in combination with other siding materials, gives pleasing effects on homes showing the influence of many other types of architecture.

That elusive but important factor in achieving enduring beauty in home architecture, "wall texture," can be accomplished with appropriate effect on all types of homes with the varied patterns and methods of application available in wood siding.

The narrow bevel siding and drop siding so much used in the past are still common, but wide bevel siding, various types of rustic sidings, and several kinds of vertical wood siding are also popular. This wide variety of patterns and sizes in which siding is available helps the home designer to achieve original effects and makes it easy to avoid monotony in wood sided walls, even where extreme simplicity is desired.

The height of a home may be emphasized by covering a part of the walls with wide vertical boards, perhaps using battens over the joints. Vertical corner boards break the horizontal lines of the siding and make the wall seem narrower, particularly if the corner boards and other trim are painted with a sharply contrasting color. A rustic appearance is easily obtained by turning the sawn side of wide bevel siding to the weather, or by using special patterns of rustic siding. Various types of siding may often be combined with shingles, or shakes, or rough stonework to give interesting effects. In this chapter are illustrated some of these unusual treatments, as well as the common types of wood siding.



WESTERN Pines Cottage at the San Francisco Fair shows proper use of lumber for such items as house framing, sheathing and sub-flooring. They are light and easy to handle and nail.

Appearance is one of the most important factors to consider in the selection of materials for the walls of homes, but durability, warmth, and reasonable cost should also be required.

The enduring qualities of homes built of wood are well illustrated by the many old Colonial homes which are still common in New England and the Middle Atlantic States. Some of these houses are as much as 250 years old, and still in good condition. Modern methods of lumbering and reforestation assure an adequate supply of the best siding woods; woods which are fully as resistant to decay and weathering as was the lumber used for clapboards on the oldest American homes. Reasonable attention to proper construction and to painting will insure wood sided walls which will retain their beauty and strength for many generations.

The rapidity with which improvements are made in the construction of American homes, particularly the interior conveniences, often renders old homes obsolete long before their structural strength has been impaired. For this reason it is important that materials used in home construction not only be durable but in addition be flexible enough so that changes and improvements can be made conveniently and economically.

The ease with which wood sided walls can be altered or added to is well known. Spaces in frame walls are conveniently and readily accessible for changes in electric light wiring, plumbing and heating systems, telephone and radio wiring, and other accessories of modern homes. Houses, if they are fully to serve their purpose, should be kept as modern as the people who live in them, and walls of frame construction simplify the undertaking considerably.

Wood As an Insulating Material

The excellent insulating qualities of lumber constructed walls, together with their air-tightness, make wood sided homes one of the most economical types to heat. This not only reduces the cost of heating plant installations and fuel to run them, but also means that wood sided walls need no special precautions against dampness as do walls of some other materials.

First cost of wall materials is important but it should be considered only in connection with their beauty, warmth, durability, and cost of maintenance. No material should be selected merely because its first cost is low unless it will make a home which is economical to heat and maintain. Authoritative tests have shown that frame walls with wood siding are, when first cost of walls and radiation and the annual cost of heating and maintenance are considered, the most economical type of walls. This advantage is maintained when special insulating materials are added to wood sided and other walls.

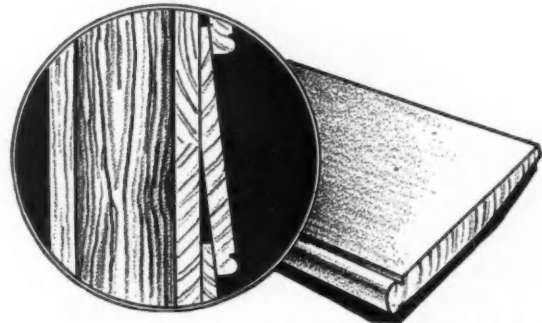
Patterns and Sizes of Wood Siding

The first wood siding was rough hand-sawed boards which were lapped over each other to shed the rain. Planing machines were unknown in those days, so ship-lapped or tongued and grooved joints could not be made. Later these boards, known as clapboards, were sawed with one edge thicker than the other so that they would fit more snugly against the framing. The bevel siding so popular today is, except for refinements in manufacture, almost like the clapboards made nearly three hundred years ago.

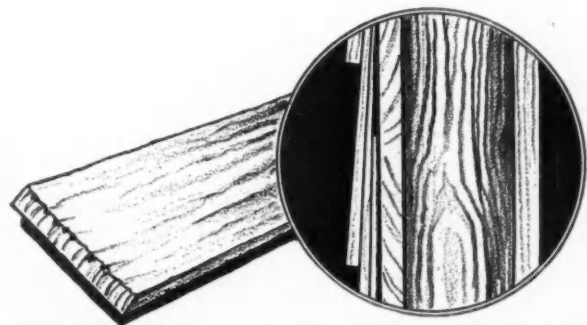
Bevel or lap siding is customarily made in 4, 5, 6, 8, 10 and 12-inch widths. The 8-inch and wider bevel siding is often called bungalow or wide Colonial siding. It is economically manufactured by "resawing" dry square edged surfaced boards diagonally to produce two wedge shaped pieces. These pieces of siding are usually $\frac{3}{16}$ -inch thick on the thin edge and $\frac{1}{2}$ to $\frac{3}{4}$ -inch thick on the other



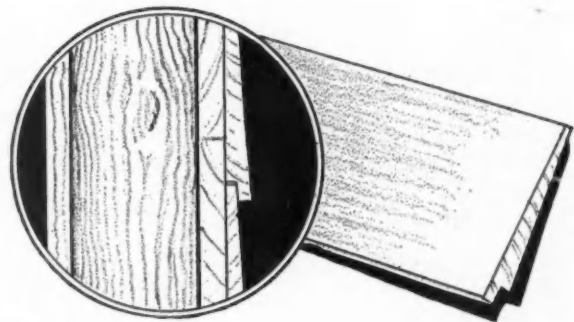
CLAPBOARDS, both square edge and bevel, came into use very early in our Colonial period. The original clapboards of this period still cover many old New England houses.



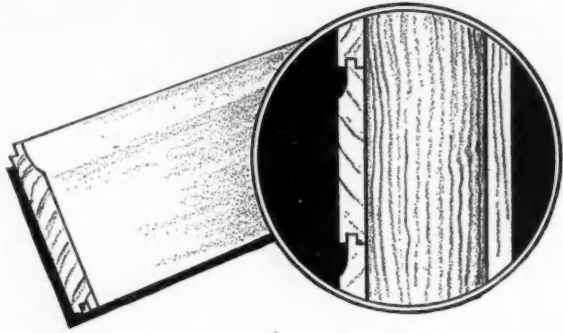
USING hand tools, Colonial carpenters frequently beaded their bevel siding, adding greatly to the softness and refinement of the shadow lines in the wood sided wall.



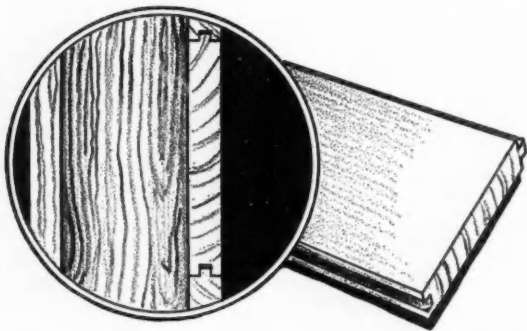
THE MODERN shingle is today's adaptation of the hand-split shake frequently used for siding on the early New England cottage.



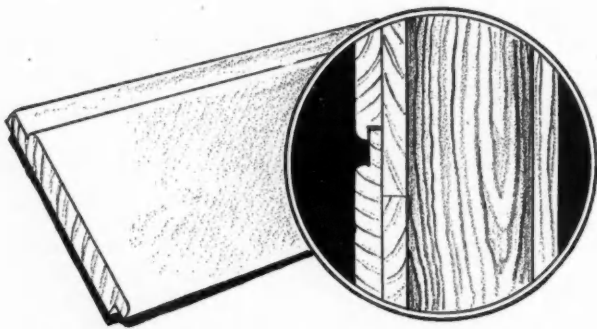
WIDE Colonial shiplap is a popular and economical siding pattern which fits tight against the wall sheathing. Its use produces a simple, straightforward wall pattern.



DROP SIDING, which is usually thicker than bevel siding, makes a strong, tight wall which is, in itself, well insulated against wind and cold.

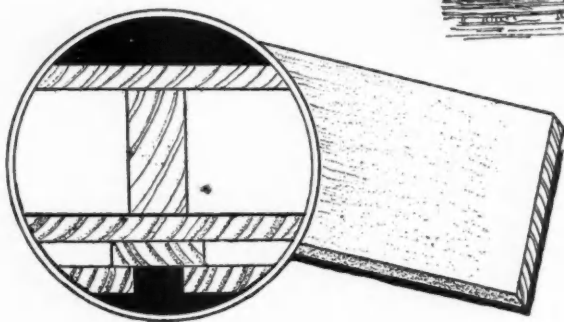


FLUSH SIDING, which produces a flat surface, and which was popular in the period of classic revival, is used to furnish a contrasting accent to patterned side walls.



FORMAL, shiplapped siding is well adapted to formal architecture.

Vertical battens may be placed behind the joints of wide boards used as vertical siding. This system provides a double air space in the wall which improves its insulating value.



edge, depending upon the width of the piece. This method of manufacture gives one planed face suitable for painting and a sawed face which may be stained for rustic effects.

Wide bevel siding often has shiplapped or rabbeted joints so that the siding lies flat against the studding instead of touching it only near the joints as ordinary bevel siding does. This reduces the apparent thickness of the siding by $\frac{1}{4}$ -inch but permits the use of extra nails in wide siding and reduces the chance of warping. It is also economical, as the rabbeted joint requires less lumber than does the lap joint used with plain bevel siding. The rabbet should be deep enough so that where the siding is applied the width of the boards can be varied to meet window sill, head casing and eave lines as desired. Rabbeted joints are not so necessary in the 4 and 6-inch widths of bevel siding. These narrow widths of siding are usually $\frac{1}{2}$ -inch thick.

Rustic and drop siding are usually $\frac{3}{4}$ -inch thick and 6 inches wide, and are machined in a wide variety of patterns. Drop siding has tongued and grooved joints while rustic has shiplapped joints.

Drop siding is heavier, has more structural strength and because of its design has tighter joints than bevel siding, so is often used on garages and barns where there is no sheathing, as well as on homes.

The increasing popularity of the cottage types of architecture is bringing about the more common use of vertical siding, particularly in combination with other types of wood siding. Vertical siding consists of matched boards 10 or 12 inches wide or of random widths, the joints of which may be V-cut or covered with battens. Battens may be placed over every other joint alternating with moulded or flush joints according to the effect desired. Often the vertical siding is run up to the eave line, and shingles or bevel siding are used in the gables.

Various types of unusual sidings are made to secure special rustic effects. One of the commonest of these is a thick siding made to give the appearance of logs. There are several patterns of it to resemble logs of different sizes, and the chinking which goes between the logs. Such special sidings are used principally on summer homes, of course. Log cabin siding, used alone or in combination with other material, and painted rather than stained, may be very satisfactory in the expression of an ultra-modern effect.

Wood shingles and shakes are often used for siding as well as roofing materials. Shingles are usually 16, 18 or 24 inches long, $\frac{2}{5}$ or $\frac{1}{2}$ -inch thick at one end, and $\frac{1}{16}$ -inch at the other. In addition to the types of shingles regularly stocked it is possible to secure shingles of special thicknesses, lengths, and shapes.

Shakes, either split or taper sawed, usually 24 inches or more in length, with thick butts make possible widely spaced, heavy horizontal shadow lines with interesting texture between.



Application of the Siding

Siding is kiln or air dried to the necessary low moisture content by the manufacturer and delivered in that condition by the retail lumber dealer. It should be carefully protected from moisture after it is delivered to the job until the carpenters are ready to lay it. The lumber sheathed frame which is to receive it should also be dry. Then the siding will stay put just as it is laid and will not shrink, warp or split.

The joints in adjacent courses of siding should be stag-

gered as widely as possible. Sometimes on high grade work splice joints are made with a miter saw but usually square cut butt joints are used. End-matched siding also is coming into general use. The corners should be mitered unless there is a vertical piece of trim at the corner against which the ends of the siding are butted.

Plain mitered corners, if they are to look well, must fit closely and stay in place. Open miters are nearly always the result of using siding lumber which has not been properly seasoned or which has been exposed to rain after delivery to the job; so their prevention is easy. An added advantage is to paint the ends of the siding as the siding is laid to prevent the absorption of moisture. This is recommended for corners and also for points where siding meets window and door frames.

Corner boards, which are commonly used with drop siding, should lie flat against the building paper with the siding butting up to them. The practice of nailing corner boards on over the siding is a poor one, as it allows water to run in behind the corner boards and into the ends of the siding.

Nailing

Nails cost little compared with the cost of siding or shingles and labor; but the use of good nails is important. It is poor economy to buy siding which will last for many generations and then fasten it to the sheathing with nails which will rust badly within a few years. Rusty nails, even though they do not rust in two, stain the paint. Copper nails, zinc coated nails, Monel metal or stainless steel nails will hold the siding permanently and will not streak light colored paint surfaces. Their slight added cost is a good investment.

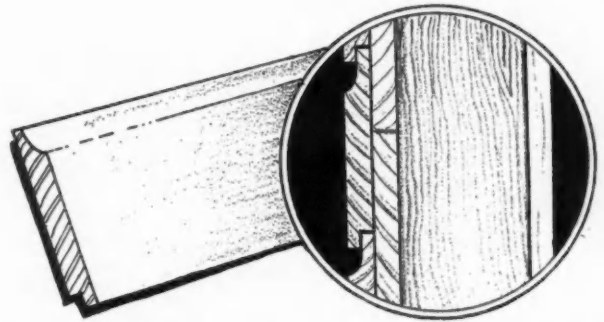
Sometimes siding is applied with finishing nails and the nail holes puttied before painting, but regular siding nails hold better and if rust resistant are not conspicuous. For 1/2-inch bevel siding 6d nails are used and 8d nails for 3/4-inch siding. Ordinary shingles are put on with 3d nails and extra thick shingles and shakes, depending upon their thickness, with larger nails.

Painting and Maintenance

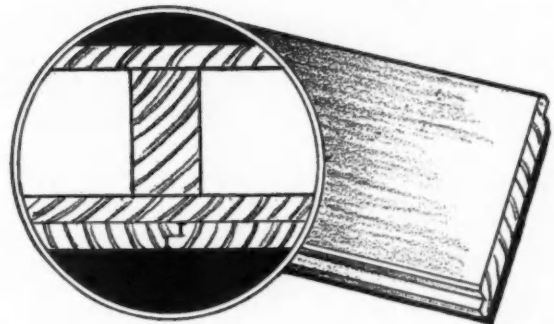
Long exposure to the elements will cause the deterioration of any building material but some materials will, if properly used, last for many generations. Properly applied and protected wood siding is one of the longest lived materials with which walls can be covered.

When wood siding deteriorates it is from but two causes; decay or rot and weathering, neither of which need occur if simple precautions are taken. Decay is the disintegration of wood caused by the growth of fungi. These fungi grow in wood only when the moisture content is higher than that of properly seasoned lumber. If the home is built upon a foundation which has been carried well above the ground and the construction is such that water runs off instead of into the walls, decay will never give trouble. It is when the flashings or drip caps above windows are omitted and the window sills do not drain properly that water seeps in behind the siding and may cause decay even though the home may be well painted.

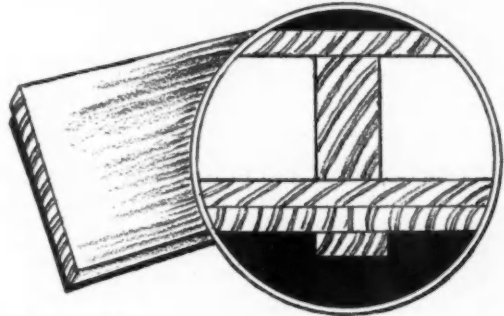
Weathering is the separation of wood fibers on the surface of a board caused by the alternate shrinking and swelling of the surface when it is dry or wet. Painting keeps the moisture content of this surface layer from changing rapidly and so prevents weathering. It is for this purpose, and to improve the appear-



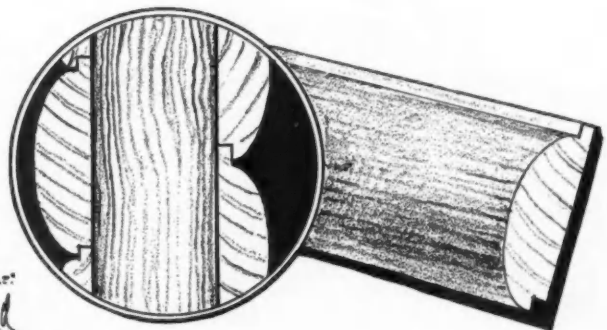
RUSTIC siding, a pattern of narrow boards with wide horizontal joints, is here applied to a Southern Colonial house . . . and the result will be a wall which will repel any storm.



QUOINED corners add interest to this wall of vertically applied V-grooved boards. The quoins may be made by grooving extra wide corner boards horizontally.

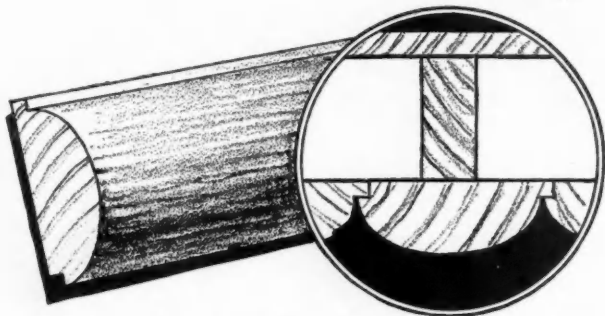


COMBINATION of unmoulded vertical battens, grooved siding and shingles results in a rugged structural wall . . . appropriate for English and Norman type homes.

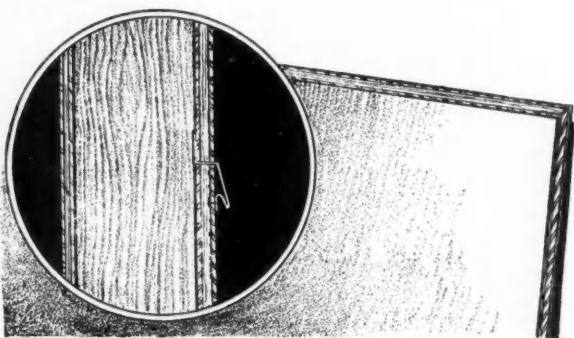


USE of log cabin siding produces the rustic effect of real log walls without attendant structural difficulties. Log siding may be applied to both inside and outside walls.

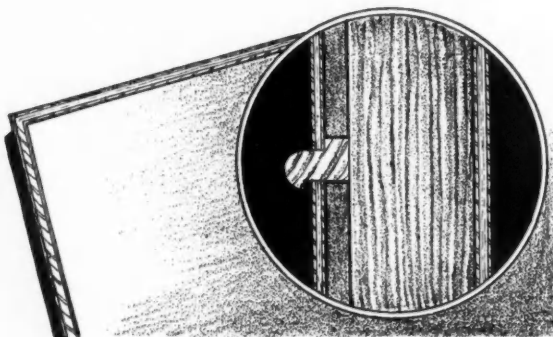




LOG CABIN siding laid vertically recalls vertical pole log houses. This type of siding provides an extra warm tight wall just as well suited to year-around as to summer dwellings.



PLYWOOD is a good sheathing and siding material because of its strength, lightness and the ease with which it may be worked and applied. It may be painted or stained with equal facility. When used for siding, plywood should be made with waterproof glue.



LARGE FLAT areas and curved surfaces of modern designs can be easily expressed with plywood . . . because of the wide range of sheet sizes it is possible to emphasize either vertical or horizontal lines.

ance of a building, that paint is recommended and used. All of the woods commonly used for siding are painted successfully where paint materials of good quality are properly applied.

The priming coat should be put on as soon as possible after the siding has been applied to prevent rapid changes in the moisture content of the surface of the siding. If an unexpected rain should wet the unprimed wood, the first coat of paint should not be applied until all the water has re-evaporated from the siding.

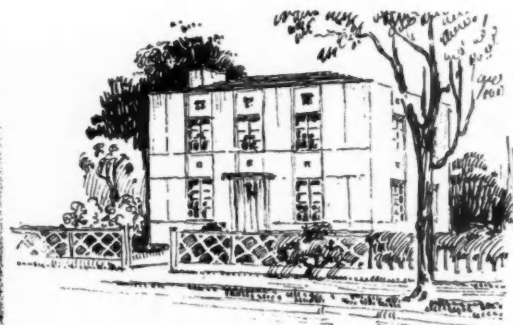
Paint usually fails most rapidly over knots, so if the common grades of siding are used the knots should be given some special treatment before the priming coat is put on. A good treatment is a thin coat of aluminum primer which is allowed to dry firmly before the priming coat is applied. To secure the most durable and satisfactory paint job use pure white lead in oil or the highest grade of mixed paint, selecting a brand sold by a reliable dealer.

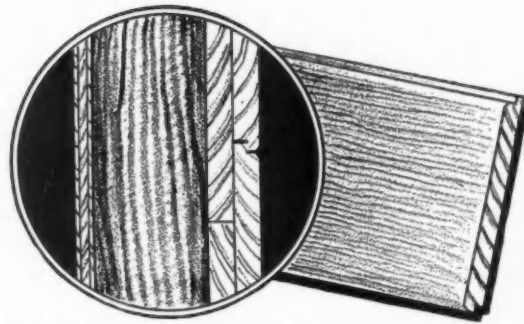
Estimating Quantities

The nominal sizes which are used in computing the footage of lumber are based upon the rough green sizes of boards which are cut from the logs. These rough green boards shrink somewhat in width and thickness as they dry, and their size is further reduced by machining to pattern. In figuring the quantity of siding required for a home it is necessary to increase the square foot area of the walls, omitting openings, by enough to compensate for the machining of joints shiplapped or dressed and matched and the overlap of bevel siding. The following allowances are approximately those usually made:

Bevel siding	1x4 with 3/4" lap	Add 45%
	1x6 1" lap	33
	1x8 1-1/4" lap	33
	1x10 1-1/2" lap	29
	1x12 1-1/2" lap	23
Rustic & drop siding (shiplapped)	1x4	Add 28%
	1x6	19
	1x8	16
Rustic & drop siding (dressed & matched)	1x4	23
	1x6	16
	1x8	14

An additional 3 to 5 per cent should be allowed for cutting and fitting around openings and under the eaves. Siding is graded under rules adopted by the regional association of lumber manufacturers. The lumber dealer can readily advise the interested siding user concerning the grades and species available locally. A wide selection of siding suitable for any purpose can be readily purchased from the lumber dealer.





WIDE horizontal boards are also well suited to the modern home and particularly suit the long, low type of house. The pattern here illustrated was used on the Lumber Industries exhibit house at "A Century of Progress."

Protect Lumber on the Job

There are a number of faults against which simple precautions should be taken in order to realize the maximum benefits from good lumber and good paint.

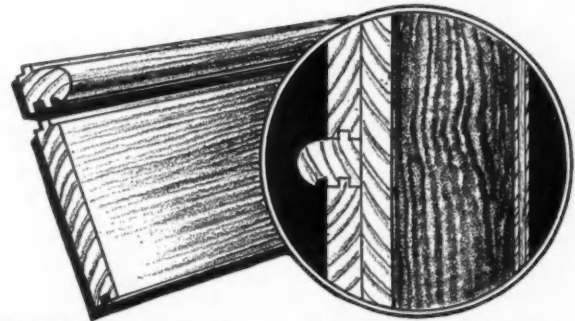
1. Improper protection of lumber after delivery to the building site and before it is used; allowing siding to lie directly on the ground and to be rained or snowed on will naturally cause it to absorb moisture. Siding should always be protected from the weather and kept dry.
2. Painting too soon after a rain.
3. Closing up a newly plastered house and heating it to dry the plaster. The moisture from the plaster is vaporized and, in cold weather, condenses on the inside of the siding since it cannot escape. More ventilation and slower drying of plaster will correct this condition.
4. Faulty construction, particularly inadequate flashings and drip caps, which allows water to run in behind the siding.
5. Damp basements, siding carried too close to the ground, and poor ventilation under porches or other parts of homes under which basements do not extend.

All of the above sources of excessive moisture can easily be avoided. The observance of suitable precautions should be considered a part of good construction practice, regardless of the siding material used. Neglect means trouble with other materials just as often as it does with siding, so good construction practices are always worthwhile.

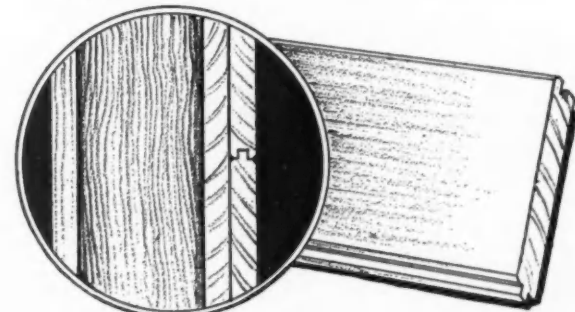
Build "Dry" and Save Trouble

Hundreds of gallons of water are introduced into a building during plastering operations. Following the completion of a newly plastered home there is a period of so-called "drying out." This continues until the general moisture content of the structure is reduced to a more or less static dry state at which it will remain, subject to the minor fluctuations of the seasons, during the life of the building.

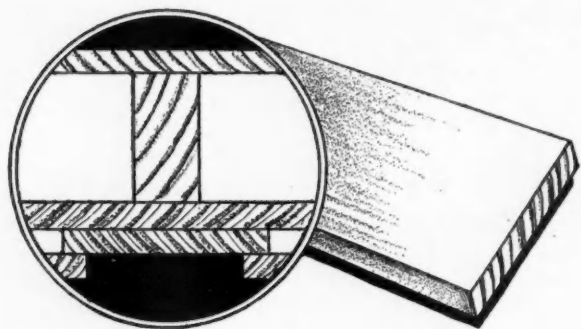
Built of good materials the average house is not particularly damp until the entire structure is soaked under a blanket of wet plaster. Most lumber delivered by a good lumber dealer to a building site is already dry . . . the result of kiln or air drying. Moisture from the wet plaster is absorbed in part by the dry wood. Time should be given for the wood to re-dry and for the plaster to become thoroughly dry before final woodwork in the form of finish, flooring, trim, cabinets and other items usually kiln dried are installed in the building. Poorly fitting mitres, open floor joints, cracks and similar unsightly conditions which detract from the beauty of an otherwise perfect home usually result from too much moisture in the building at the time of the installation. Wood will not shrink unless it is subject to a marked variation in moisture content. When thoroughly dry



HORIZONTAL tongue and grooved boards separated by a moulded insert offer extreme emphasis to horizontals needed to reduce the apparent height of a narrow house.



DIAGONAL tongued and grooved siding produces a novel effect suitable for small areas . . . and restrained use. Here it adds texture interest to a small Dutch Colonial home.



WIDE un-moulded boards used as patterns produce heavy vertical shadows and an exterior panel effect well suited to many modern designs. This type of wall is extra warm because of added air space. Sketch shows fresh, modern effect in use.

wood is applied to wet plaster it absorbs some moisture with consequent swelling and then shrinkage occurs as the wood changes back from a wet to a dry condition.

Most of the unsightly defects resulting from the plaster-introduced moisture can be eliminated entirely if the house can be built "dry" without the trouble-making water which goes with plastering. Exterior painting difficulties previously mentioned as resulting from water in plaster being driven out through the exterior walls can be entirely eliminated if a "dry" finish is used instead of wet plaster.

All-wood interiors composed of the various types of wood paneled walls in both sawn material and in the plywood-veneer group are an excellent "dry" interior wall finish, and a welcome relief from plaster. The many new forms of wood, specifically developed for interior work, make the job of producing an all-wood interior of any period an easy one. The result is a dry home from the very beginning, with none of the blemishes which mark the average new home at the end of its first heating season.

Wood for Friendly, Beautiful Interiors

BECAUSE wood paneled walls have for generations been the favored medium for the expression of costly examples of the woodworker's art, the thought is often expressed that wood walls in general are too costly for inclusion in the average small residence.

Wood walls are luxurious, but they can be an inexpensive luxury. There exist today many beautiful and practical forms of wood paneling which, for all the beauty they impart to any home, can be installed for

little if any more than the wall treatment generally given good homes.

The rich, warm beauty of genuine wood walls is within the reach of any home owner or builder . . . and wood walls may be as quickly and inexpensively installed over old broken plaster walls as in the new home under construction.

Wood paneled interiors can cost from ten cents to five dollars per square foot depending upon the material employed and the form in which it is used. Some of



MODERNISM expressed in horizontal planking of redwood for an all-wood interior in the home of Robert M. Brown, Architect, Philadelphia.

the most beautiful forms of wood paneling are the most inexpensive because of their simplicity.

The actual material used in wood paneling is relatively inexpensive. . . . The amount of additional cost added to a bill for paneling depends on the elaborateness of the millworking or processing required by the design used. Paneling costs may be doubled and re-doubled without adding to the natural beauty of the wood which imparts to wood paneling its character.

The use of simple boards with moulded edges or battens or the employment of plywood sheets in the scores of attractive forms possible can produce wood paneled walls no more expensive than ordinary plaster walls.

Sheathing type of paneling is applicable to any room—old or new—can express any theme—costs no more than ordinary walls—often less. There are almost limitless opportunities for the expression of period, modern, or individualistic interiors with the inexpensive common board in any number of interesting species of American woods.

Moulded, plain, or batten joints may be used; the material may be finished natural, stained, painted, or antiqued. Knotty material may be employed or clear material in either hardwood or softwood can be given a more formal treatment.

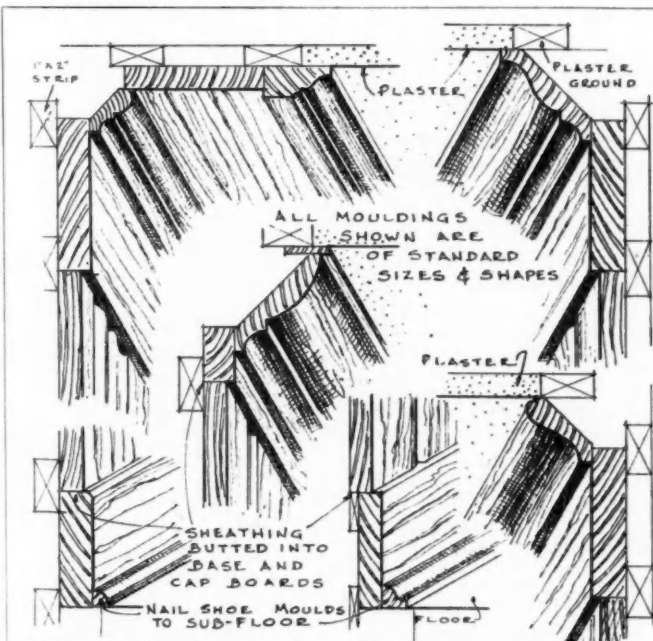
Board or "sheathing" types of wood panel walls are inexpensive because they use lumber in the form which requires the least processing and the least amount of carpenter labor for installation on the job.

Wood sheathed walls are peculiarly American in tradition. Many of the finest examples of Colonial architecture, particularly in New England, are attractive today chiefly through the richness of their time-mellowed wood walls.

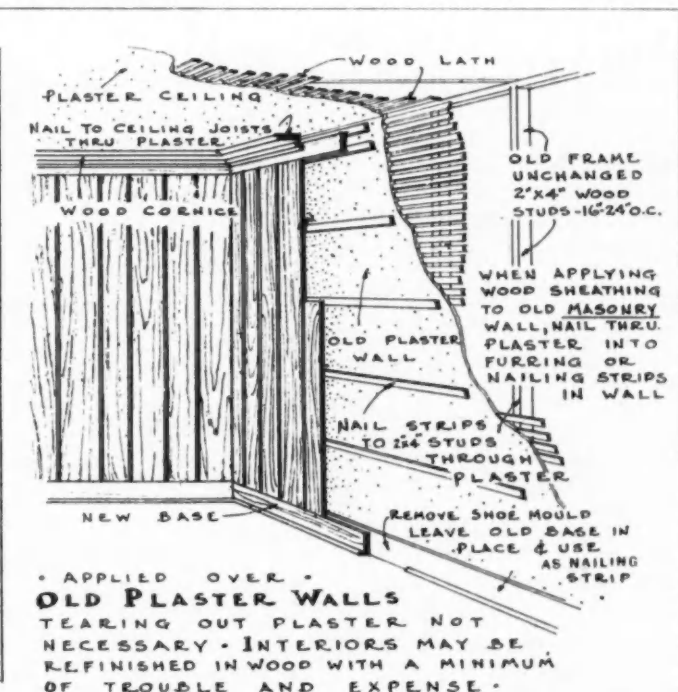


BEAUTIFUL cypress paneling in Yacht Club at Clearwater Beach, Fla., Roy W. Wakeling, Architect.

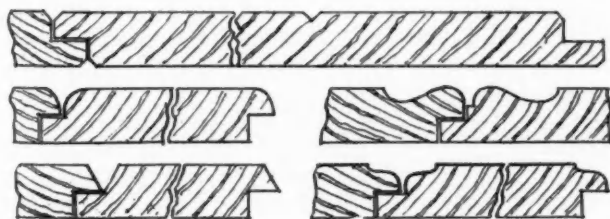
Interior sheathing requires nothing more than ordinary boards which may be used in practically the full range of lumber grades and in any commercial species. The only special treatment given material for this purpose is the moulded edge used to "dress up" joints between boards.



BASE & CORNICE TREATMENTS.
NO BLOCKING USED EXCEPT FURRING STRIPS & PLASTER GROUNDS



APPLIED OVER OLD PLASTER WALLS
TEARING OUT PLASTER NOT NECESSARY - INTERIORS MAY BE REFINISHED IN WOOD WITH A MINIMUM OF TROUBLE AND EXPENSE.



TYPICAL SHEATHING PATTERNS

LUMBER GRADE-USE GUIDE

HOMES of the proper quality for safe long-term mortgages and yet reasonable as to cost result from selecting and using the right species and grade of lumber for each part of the structure. A wide choice is now available through retail lumber dealers in every locality.

This "Lumber Grade-Use Guide" has been prepared

by the National Lumber Manufacturers Association in co-operation with its affiliated regional manufacturers associations. The information it contains is based on years of experience and study of records of satisfactory service of different kinds and qualities of lumber for given uses under different conditions.

Buildings, Light Framed or Light Joisted Construction

Recommended Grades of Longleaf and Shortleaf Southern Pine

(Graded under Rules of Southern Pine Association)

USE-ITEM	GRADES RECOMMENDED
Posts and Columns	No. 1 Longleaf, or No. 1 Dense Shortleaf
Sills on foundation walls	No. 2 Longleaf, or No. 2 Medium Grain-900F Shortleaf
Sills on piers*	No. 1 Longleaf, or No. 1 Dense Shortleaf
Beams, Girders, Purlins	No. 1 Longleaf, or No. 1 Dense Shortleaf
Joists, Rafters, Headers	No. 1 Shortleaf, No. 2 Longleaf—1050F, No. 2 Longleaf, No. 2 Medium Grain-900F Shortleaf
Studs, Plates, Caps, Bucks	No. 2 Medium Grain-900F Shortleaf or No. 2 Longleaf
Ribbon Boards, Collar Beams, Ridge Boards	No. 2 boards
Furring, Grounds	No. 2 boards
Sub-flooring	No. 2 boards, or No. 3 boards
Wall sheathing	No. 2 boards, or No. 3 boards
Roof sheathing, Pitched	No. 2 boards, or No. 3 boards
Roof decking, Flat, Covered	No. 2 Longleaf, or No. 2 Medium Grain-900F
Lath, Wall and Ceiling	No. 1 Lath, or No. 2 Lath
Stair Stringers or Carriage	No. 1 Longleaf, or No. 1 Shortleaf
Cellar and Attic Stair Treads and Risers	No. 2 boards
Finish Flooring	B & Better, or C or B & Better Vertical grain, or C Vertical Grain

(* Where floor within 18" above ground use all heart or preservative treatment.)

USE-ITEM	GRADES RECOMMENDED
Beveled	B Bevel Siding, or C Bevel Siding
Drop	B Drop Siding, or C Drop Siding
Square Edged (Vertical or Horizontal)	C Finish, or No. 1 boards
Battens	B & Better Mouldings

USE-ITEM	GRADES RECOMMENDED
Cornice	C Finish, or C Ceiling
Mouldings, Drip Cap, Water Table	B & Better Mouldings
Trim and Corner Boards	C Finish, or No. 1 Boards
Half Timbering	C Finish, or No. 1 Boards
Store Fronts, Painted	C Finish, or No. 1 Boards
Store Fronts, Metal Covered	No. 2 Boards

USE-ITEM	GRADES RECOMMENDED
Frames	B & Better, or C Finish, Sill all heart or preservative treated
Sash, Window and Storm	Quality as Specified
Doors, Standard	Quality as Specified
Doors, Garages, Residential	No. 1 Boards, or No. 2 Boards

Shutters and Blinds	Quality as Specified
Screens	Quality as Specified

Porch

Ceiling	C Ceiling, or D Ceiling
Flooring	B & Better, or C or C Edge Grain (Heart or preservative treatment may be added)
Stair Stringers	No. 1 Dimension
Stair Treads and Risers	C Finish, or No. 1 Boards
Columns, Built Up	Quality as specified
Newel Posts, Railings, Balustrades	B & Better

Grades of Arkansas Soft Pine to Specify

USE-ITEM	GRADES RECOMMENDED
Sills on foundation wall, floor more than 18" above ground	No. 1 Arkansas Dimension
Sills on foundation wall, floor within 18" of ground	No. 1 Dense Arkansas Dimension (+) or (†)
Sills on posts or piers, floor more than 18" above ground	No. 1 Dense Arkansas Timbers
Sills on posts or piers, floor within 18" above ground	No. 1 Dense Arkansas Timbers (+) or (†)
Basement posts or columns	No. 1 Dense Arkansas Timbers
Girders	No. 1 Dense Arkansas Timbers No. 1 Dense Arkansas Dimension, or No. 1 Dense Arkansas Laminated
Floor joists over 18" above ground	No. 1 Dense Arkansas Timbers,
Floor joists within 18" of ground	No. 1 Dense Arkansas Dimension
Roof rafters and ceiling joists	No. 1 Arkansas Dimension
Studding	No. 1 Dense Arkansas, No. 1 or No. 2 Arkansas Dimension
Lath	No. 1 Lath
Sub-flooring and sheathing	Arkansas Center-Matched in End-Matched or Plain-end, No. 2 or No. 3 Grade
Finish flooring exposed	B & Better Edge Grain End-matched or Random length Plain end
Finish flooring to receive linoleum or carpet	No. 1 Common or No. 2 Common Flat Grain End-matched or Plain end
Porch flooring	B & Better Heart Edge Grain Plain End or B & Better Flat Grain Plain End, treated
Drop siding, interior trim, exterior trim, window and door frames	B & Better
Exterior trim	B & Better (Back-primed with whitelead or aluminum paint)

*Preservative treated
†All Heart

Recommended Grades of Douglas Fir, West Coast Hemlock, Western Red Cedar, Sitka Spruce

(Graded under Rules of the West Coast Lumbermen's Association)

ITEM GRADE

Walls and Partitions

Douglas Fir or West Coast Hemlock

Sills: Wide (width of foundation)	No. 1 Dimension
Sills: Narrow (width of studs)	No. 2 Dimension
Studs, Plates, Caps, Bucks, Headers,	
Bridging	No. 2 Dimension or No. 3 Dimension
Ribbon Boards, Bracing	No. 1 Boards
Furring, Grounds	No. 2 Strips, or No. 3 Strips
Sheathing	No. 2 Boards or Shiplap, or No. 3 Boards or Shiplap

Floors and Roofs

Douglas Fir or West Coast Hemlock

Posts	No. 1 Timbers
Girders: Solid	No. 1 Timbers
Girders: Laminated	No. 1 Dimension
Joists, Rafters, Headers	No. 1 Dimen. with slope of grain not more than 1 in 10 No. 2 Dimen. on spans not exceeding two-thirds those for No. 1 Dimen. of same size
Bridging	No. 2 Dimension or No. 3 Dimension
Collar Beams, Ridge Boards	No. 1 Boards
Furring, Grounds	No. 2 Strips, or No. 3 Strips
Sub-flooring and Roof Sheathing	No. 1 Boards or Shiplap, or No. 2 Boards or Shiplap
Roof Decking, Flat Covered	No. 1 Boards or Shiplap, or No. 2 Boards or Shiplap, or No. 1 Dimension, or No. 2 Dimension
Stair Stringers or Carriages	No. 1 Dimension
Cellar and Attic Treads and Risers	No. 1 Boards, or No. 1 Dimension

Lath

Douglas Fir or West Coast Hemlock	No. 1 Lath, or No. 2 Lath
Sitka Spruce	No. 1 Lath, or No. 2 Lath
Western Red Cedar	No. 1 Lath, or No. 2 Lath

Shingles, Western Red Cedar

Grading and Packing Rules April	
30 1936 Red Cedar Shingle Bureau	
Roof	No. 1, 16"-5/2; 18"-5/2 3/4; or 24"-4/2
Walls	No. 1, 16"-5/2; 18"-5/2 3/4; or 24"-4/2; or No. 2, 16"-5/2; 18"-5/2 3/4; or 24"-4/2

Beveled Siding

Western Red Cedar	Clear Bevel Siding, or A Bevel Siding
Sitka Spruce	A Bevel Siding, or B Bevel Siding
West Coast Hemlock	B & Better Bevel Siding, or C Bevel Siding

Bungalow or Colonial Siding, Face rough or dressed

Western Red Cedar	Clear Bungalow Siding, or A Bungalow Siding
Sitka Spruce	B & Better Bungalow Siding
West Coast Hemlock	B & Better Bungalow Siding

Drop Siding or Rustic

Douglas Fir or West Coast Hemlock B & Better Drop Sid. or Rustic, or C Drop Sid. or Rustic

Vertical or Horizontal Wide Siding, Square Edged or Patterned

Western Red Cedar	B & Better VG Finish, or Sound Knotted Paneling
Sitka Spruce	B & Better Finish, or Selected Knotty No. 1 Boards
Douglas Fir or West Coast Hemlock	B & Better VG Fin., or Selected Knotty No. 1 Boards

Trim, Exterior

Trim Corner Boards, Cornice, Half Timbering, Store Fronts.	
Douglas Fir or West Coast Hemlock	B & Better VG Finish, or C Finish
Sitka Spruce	B & Better Finish, or C Finish
Western Red Cedar	B & Better VG Finish, or C Finish

Ceiling

Douglas Fir or West Coast Hemlock	B & Better Ceiling, or C Ceiling
Sitka Spruce	B & Better Ceiling
Western Red Cedar	B & Better Ceiling, or C Ceiling

Mouldings and Gutter

Douglas Fir, Sitka Spruce or West Coast Hemlock	
Coast Hemlock	B & Better Moulding
Western Red Cedar	B & Better Moulding

Windows and Doors

Frames

Douglas Fir—	
Sills and Pulley Stiles	B & Better VG Finish
Other Parts	C Finish
Sitka Spruce—	
Sills and Pulley Stiles	B & Better Finish
Other Parts	C Finish
Western Red Cedar—	
Sills and Pulley Stiles	B & Better VG Finish
Other Parts	C Finish

Sash

Douglas Fir	B & Better VG Finish
Sitka Spruce	B & Better Finish
Western Red Cedar	B & Better VG Finish
Doors	No. 1 Stock, or as Detailed

Doors, Garage

Douglas Fir	B & Better VG Finish
Sitka Spruce	B & Better Finish

Shutters, Blinds and Screens

Douglas Fir	B & Better VG Finish
Sitka Spruce	B & Better Finish
Western Red Cedar	B & Better VG Finish

Porch Ceiling

Douglas Fir or West Coast Hemlock	B & Better Ceiling, or C Ceiling
Sitka Spruce	B & Better Ceiling
Western Red Cedar	B & Better Ceiling, or C Ceiling

Porch Flooring

Douglas Fir	B & Better VG Flooring, or C VG Flooring
Western Red Cedar	B & Better VG Flooring, or C VG Flooring

Stepping, Exterior

Douglas Fir	B & Better VG Stepping, or C Stepping
Western Red Cedar	B & Better VG Stepping, or C Stepping

Step Risers and Skirting

Douglas Fir	B & Better VG Finish, or C Finish
Western Red Cedar	B & Better VG Finish, or C Finish

Step Stringers or Carriages

Douglas Fir	No. 1 Dimension
Columns	Stock, or as Detailed
Newel Posts, Railings, and Balustrades	B & Better Grade, or Stock as Detailed

Finished or Top Flooring

Douglas Fir or West Coast Hemlock	
Natural Stained or Painted Finish	B VG Flooring or C VG Flooring
Covered Floors	B & Better FG Flooring or C FG Flooring
Inside Stair Treads or Stepping	Douglas Fir or West Coast Hemlock B & Better VG Stepping or C VG Stepping

Recommended Grades of Tidewater Red Cypress

(Graded under Rules of Southern Cypress Manufacturers Association)

USE-ITEM GRADES RECOMMENDED

	High Cost	Medium Cost	Low Cost
Sleepers (Foundation Timbers)	1200/c Struc. Heart Posts & Timbers	1000/c Struc. Heart Posts & Timbers	1000/c Struc. Posts & Timbers
Posts and Columns	1000/c Struc. Heart Posts & Timbers	1000/c Struc. Posts & Timbers	1000/c Struc. Posts & Timbers
Sills, Narrow	1100/f Struc. Heart Joist & Plank	No. 1 Dimension	No. 2 Dimension
Sills, Wide	1100/f Struc. Heart Joist & Plank	No. 1 Dimension	No. 2 Dimension
Beams, Girders, Purlins, 4" and Thinner	1400/f Struc. Joist & Plank	No. 1 Dimension	No. 2 Dimension
Beams, Girders, Purlins, 5" and Thicker	1400/f Structural Beams & Stringers	1100/f Structural Beams & Stringers	1100/f Structural Beams & Stringers
Joists' Rafters, Headers	No. 1 Dimension	No. 1 Dimension	No. 2 Dimension
Studs, Plates, Caps, Bucks	No. 2 Dimension	No. 2 Dimension	No. 3 Dimension
Ribbon, Boards, Collar Beams, Ridge Boards, Bracing	No. 1 Boards	No. 2 Boards	No. 3 Boards
Furring, Grounds	No. 2 Boards	No. 2 Boards	No. 3 Boards
Subflooring	No. 2 Boards	No. 3 Boards	No. 3 Boards
Screeds	No. 2 Dimension	No. 2 Dimension	No. 3 Dimension
Wall Sheathing	No. 2 Boards	No. 3 Boards	No. 3 Boards
Roof Sheathing, Pitched	No. 2 Boards	No. 3 Boards	No. 3 Boards
Roof Decking, Flat Covered	No. 1 Dimension	No. 2 Dimension	No. 2 Dimension
Roof Decking, Flat Exposed	No. 1 Heart Dimen.	No. 1 Heart Dimen.	No. 2 Heart Dimen.
Lath, Wall and Ceiling	No. 1 Lath	No. 1 Lath	No. 2 Lath
Stair Stringers or Carriages	No. 1 Dimension	No. 1 Dimension	No. 2 Dimension
Cellar and Attic Stair Treads and Risers	No. 1 Boards	No. 1 Boards	No. 2 Boards
Shingles, Roof	No. 1 Shingles	Bests	Primes

Siding

Bevel	A Bevel Siding	C Bevel Siding	D Bevel Siding
Colonial or Bungalow	Clear Heart Siding	C Bungalow Siding	D Bungalow Siding
Drop	A Drop Siding	C Drop Siding	No. 1 Drop Siding
Square Edged	A Finish	C Finish	No. 1 Boards
Vertical	A Finish	C Finish	No. 1 Boards
Battens	B & Better Mldgs.	B & Better Mldgs.	No. 1 Battens
Log Cabin Siding	Pecky Cypress for antique or drift-wood effect		No. 2 or No. 3 Grade
Shingles, Sidewall	Bests	Bests	Primes

Trim, Exterior

Cornice	A Finish	C Finish	No. 1 Boards
Mouldings, Drip Cap, Water Table	B & Better Mldgs.	B & Better Mldgs.	D Finish
Trim and Corner Boards	A Finish	C Finish	No. 1 Boards
Half Timbering	A Finish, or Pecky Cypress	C Finish, or Pecky Cypress	No. 1 Boards, or Pecky Cypress
Gutters	A Finish	No. 1 Heart Bds. or No. 1 Heart Dimen.	No. 2 Heart Bds., or No. 2 Heart Dimen.

Window and Door

Frames, Special	Clear Heart Faces, All Heart Sill	Clear Faces, All Heart Sill	No. 1 Faces, No. 1 Sill
Frames, Stock**	Superior Frames	Clear Frames	No. 1 Frames
Sash	Clear Heart	Clear	D Finish
Doors, Standard	Clear Heart Finish	C Finish	D Finish
Doors, Garage, Residential	Clear Heart Finish	No. 1 Heart Bds.	No. 2 Boards
Shutters and Blinds	Clear Heart Finish	C Finish, or No. 1 Heart Boards	No. 1 Boards
Screens	Clear Heart Finish	C Finish, or No. 1 Heart Boards	No. 1 Boards

Porch

Ceiling	A Ceiling	C Ceiling	D Ceiling
Flooring	A Flooring	C Flooring	No. 1 Board Grade

**Stock Cypress Frame; may be purchased under the trade name of "Superior" (all exposed parts clear and all heart faces); "Clear" (all exposed parts clear with no sapwood restriction); "No. 1 Frames" (stiles and sills will permit 1 1/2" knots, otherwise clear with no sapwood restriction).

Recommended Grades of California Redwood

(Graded under Rules of California Redwood Association)

USE-ITEM GRADES RECOMMENDED

Sleepers (Foundation Timbers)	No. 1 Heart Dimension, or No. 1 Heart Small Timbers
Posts and Columns	No. 2 Dimension, or No. 2 Small Timbers
Sills, Narrow or Wide	No. 1 Heart Dimension, or No. 1 Heart Small Timbers
Beams, Girders, Purlins, 4" and Thinner	No. 1 Heart Dimension, or No. 1 Heart Heavy Joists
Beams, Girders, Purlins, 5" and Thicker	No. 1 Heart Timbers
Joists, Rafters, Headers	No. 1 Heart Dimension
Studs, Plates, Caps, Bucks, Headers	No. 2 Dimension
Ribbon Boards, Collar Beams, Ridge Boards, Bracing, Furring, Grounds, Bridging	No. 2 Boards, or No. 2 Dimensions
Subflooring	No. 2 Boards, or No. 3 Boards
Screeds	No. 2 Dimension
Wall Sheathing	No. 2 Boards
Roof Sheathing, Pitched	No. 2 Boards
Roof Decking, Flat	No. 1 Heart Dimension, or No. 2 Dimension
Lath, Wall and Ceiling	No. 1 Lath
Stair Stringers or Carriages	No. 1 Heart Dimension
Cellar, Attic Stair Treads and Risers	No. 1 Heart Boards
Shingles, Roof	No. 1 Grade, 5/2" or thicker

Siding

Beveled	Clear Heart Beveled Siding, or A Beveled Siding
Drop	Clear Heart Drop Siding, or A Drop Siding
Square Edged	Clear Heart Finish, or A Finish
Vertical	Clear Heart Finish, or A Finish
Battens	Clear Heart or A & Better Mouldings
Log Cabin Siding	Clear, or No. 1 Heart Dimension, or No. 2 Dimension
Shingles, Sidewall	No. 1 Grade Shingles

Trim, Exterior

Cornice	Clear Heart Finish
Crown and Bed Mouldings	Clear Heart or A & Better Mouldings
Drip Cap and Water Table	Clear Heart or A & Better Mouldings
Trim and Corner Boards	Clear Heart Finish
Half Timbering	Clear Heart Finish
Gutters	Clear Heart Gutters

Window and Door

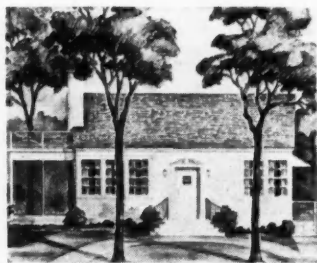
Frames	Clear Heart or A Frames
Sash, Window and Storm	Clear Heart Sash
Doors, Standard	Clear Heart Doors
Doors, Residential Garage	Clear Heart Finish, or A Finish
Shutters and Blinds	Clear Heart Shutters and Blinds
Screens	Clear Heart Screen Frames

Porch

Ceiling	A Ceiling, or B Ceiling
Flooring	Edge Grain Clear Heart Flooring
Stair Stringers or Carriages	No. 1 Heart Boards, or No. 1 Heart Dimensions
Stair Treads and Risers	Clear Heart Finish
Columns, Built-Up and Solid	Clear Heart or A Columns
Newel Posts, Railings, Balustrades	Clear Heart or A & Better Mouldings

Southern Pine—Longleaf and Shortleaf

SOUTHERN pine occupies a place of importance in all kinds of construction—for homes, commercial, industrial and public buildings. It is unexcelled as a framing material. Southern pine is extensively used for framework, siding, flooring, sheathing, wall panels, sash and doors, rails, newel posts and every variety of dressed or turned exterior and interior finish in homes and commercial buildings. It is approved for all types of heavy construction—such as warehouses, factories,



Southern Pine for Homes

office buildings, grandstands, speedways, boardwalks, oil derricks, bridges—for beams, girders, posts, columns, joists, rafters, roof trusses, battleship decking, car lining, piling, factory flooring, planking, etc. It is frequently characterized as "The Wood of a Thousand Uses."

Chief characteristics of Southern pine are its unusual strength, durability, hardness, toughness, stiffness, resilience, nail and screw-holding power, varied and attractive texture, grain and natural figures. It takes stains, varnishes, hard oil and paint excellently and holds its finish well.

There are nine species of Southern pine growing in 19 states from New Jersey and Pennsylvania on the East, to Texas and Oklahoma on the West, Missouri, Kentucky and West Virginia on the North, to the Gulf of Mexico and the Atlantic Ocean. Principal production, however, is from eleven states—Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Texas and Virginia. Of the nine botanical species of Southern pine, only four—Longleaf, Shortleaf, Loblolly and Slash—are recognized as of chief commercial importance because of their plentiful supply, inherent properties and adaptability to a wide variety of uses. These four species are commonly considered by the trade as Longleaf and Shortleaf. The general physical properties of the wood of all four species are so nearly similar that their lumber is graded and classified under the same grade specifications and rules, with certain exceptions noted for stress values in structural material.

Except for the year 1931, production of Southern pine lumber has exceeded that of any other American species in every year since 1899. Recent compilations from surveys of the timber resources of the South, made by the United States Forest Service, disclose that in 14 Southern states there is a total stand of 620 million cords (equivalent to about 310 billion board feet) of Southern pine timber 5 inches in diameter or larger, of which there are 196 billion board feet of Southern pine of saw-timber size standing. Natural regrowth of Southern pine is very rapid, and considering the measures being taken by private timber owners and State and Federal forest services for protection, improved logging methods, selective cutting, reforestation, forest management, utilization and conservation, there is every reason

to expect an adequate supply of Southern pine for the needs of future generations for all time.

The United States east of the Rocky Mountains is the chief marketing, or consuming, area for Southern pine, although considerable quantities are exported to virtually all civilized countries on the globe.

Southern pine lumber is graded and classified with reference to its suitability for general use. Each piece is considered and its grade determined by its general character, including the location and sum of all imperfections. In formulating the grade specifications and rules consideration is given to factors of strength, durability, appearance and utility. Southern Pine Association grading rules conform to American Lumber Standards. A recent revision of the SPA grading rules provided for closer segregation of qualities, for definite stress ratings on certain grades of Dimension, clarified confusing definitions and removed ambiguities in the rules. Following is a brief outline of official Southern pine grades:

FINISH: "A"—Highest grade of Southern pine finishing lumber, practically clear-faced. Marketing practice is to combine "A" and "B" grades into a grade designated as "B&Better." "B"—This grade is of high quality, generally clear and suitable for natural finishes. "C"—Although frequently used for medium-priced natural finishes, this grade is suitable for good quality paint finishes.

FLOORING, CEILING, PARTITION, DROP SIDING, BEVEL SIDING: "A"—Conforms to grade description of "A" Finish. Marketing practice is to combine "A" and "B" grades into "B&Better." "B"—Conforms generally to grade description of "B" Finish; for superior wearing surface flooring may be specified to be edge-grain (vertical). "C"—While partaking somewhat of the general characteristics of "B," this grade is less restricted in quality and is rated as high utility grade for medium-priced uses; edge-grain flooring may be specified under this grade. "D"—Less restricted in quality for appearance and high utility value than "C"; commonly used for less expensive structures.



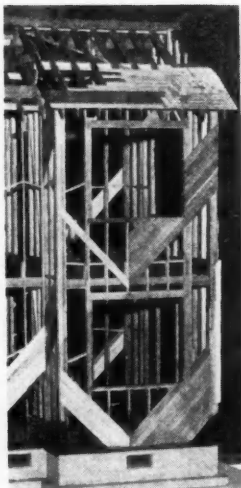
Beautiful Pine Interiors

No. 2—Graded for utility value without regard to appearance.

STRIPS AND BOARDS: No. 1—A "grain-tight" grade for high utility and construction uses. Although not recommended, it is frequently used for cheap interior and exterior trim. No. 2—Suitable for use without waste, but less restricted in quality than No. 1; generally used for sub-flooring, sheathing and similar purposes. No. 3—Lower in quality than No. 2; must be suitable for cheap sheathing. No. 4—Lowest recognized grade, limited to a few uses.

DIMENSION: No. 1—This grade provides high strength, carrying a 1200#F stress rating; widely used in highest quality residences and other construction. Greater strength properties may be obtained by specifying No. 1 Longleaf (1400#F) or No. 1 Dense (1400#F). No. 2—Somewhat less restricted than No. 1, but of same general character and suitable for average construction requirements. When specified No. 2 Medium Grain (900#F), No. 2 Dense (1050#F), or No. 2 Longleaf (1050#F) additional grade limitations apply. No. 3—Intended for use as cheap utility material.

As a protection against grade substitution and to assure delivery of lumber meeting all requirements of the official grading rules, including proper seasoning to a prescribed moisture content, accurate manufacture and uniformity in size, width and thickness of the lumber, and correct grading, specifiers and consumers when ordering Southern pine should specify that it be officially "SPA" grade-marked. This mark is applied by expert mill graders under the supervision of the Southern Pine Association.



Strong Framing Lumber

Arkansas Soft Pine

WHAT IS ARKANSAS SOFT PINE? In the family of species comprising the commercial pines of the South, its four leading members are shortleaf, longleaf, loblolly and slash. Arkansas soft pine is a trade name for certain shortleaf (*pinus echinata*), with qualities peculiar to its physical make-up which distinguish it from shortleaf in general.

These qualities are: extraordinary soft texture, close fibre, light weight, bright color and freedom from heavy pitch . . . all of which are notably pronounced in shortleaf timber growing in the mountains and hilly regions of Arkansas, located generally in its south and west central areas. In no shortleaf timber elsewhere are these characteristics so fully developed. It is presumed that the soil properties, rainfall and drainage prevailing in this region contribute to such natural characteristics during the period of timber growth.

In the lumber products converted from this particular timber, it is these qualifications which account for the high favor with which it is said to be regarded by carpenters, builders, architects and home owners. This preference has resulted in wide use of the upper grades for

BUNDLED stock is identified by the registered trade-mark tag.



interior woodwork, paneling, window jamb, exterior trim, etc.; and of the common classifications, for framing and construction where extra heavy loads are not a factor.

The United States Forestry Service, too, recognizes the wood's unique comparative position in the Department's Official Bulletin No. 106 which says that: "Shortleaf pine in Arkansas is of a higher grade than the same species growing in other regions. It is soft, of good quality and the annual rings show well in the grain."

Thirty years ago a group of representative Arkansas lumber manufacturers, operating in this particular shortleaf timber, inaugurated an educational program to acquaint the lumber distributing trade, building profession and the public with these special advantages inherent in their products. To distinguish their group output from competing woods, they coined the descriptive term, "Arkansas Soft Pine," and adopted an identifying trademark which they applied to all their products by rubber stamp and tags, later registering this mark in the United States Patent Office. From that time to the present, this group has maintained its program without interruption. As a result, Arkansas soft pine producers assert it has long been firmly established and recognized as a separate and individual wood species of pedigreed quality in the field of building lumber, trim, mouldings and cabinet woods, as well as for many industrial uses.

A prominent manufacturer of Arkansas soft pine, recently discussing species and production methods with a member of the *American Builder's* editorial staff, made the following comment as reflecting his own views, as well as those of his fellow Arkansas group manufacturers:

"Progress in the manufacture of lumber products has kept step with homebuilders' rightful insistence on better quality and longer service for each dollar invested in a modern home. We lumber manufacturers have met this challenge by developing new refinements. In this progress, great strides have been made, particularly in sea-

soning and drying. For instance, it now is customary for many of our orders to arrive, specifying lumber dried to a definite moisture content that will meet the atmospheric conditions in which the material is to be used. By this means, shrinking and swelling after installation have been thoroughly discounted. Such seasoning is accomplished in thermostatically controlled steam kilns, unknown in earlier days, wherein the surplus water, present in all lumber as it comes from the saw, is removed by the scientific application of steam, humidity and forced circulation of air.

"In applying these refinements, the manufacturers of Arkansas soft pine have been thoroughgoing. And having been so, they have gone a step farther and identified their products as to species, grade and individual maker, for the protection and benefit of the dealer and ultimate consumer. This is done by marking the "Arkansas Soft Pine" registered trade-mark on every piece and bundle, as well as incorporating it in our group grade-mark, stamped on all grades of stock. Grading and designation of grades in this way comprise a certification of quality standards underwritten by the Arkansas soft pine manufacturers, as well as the representative lumber industry as a whole. These standards are maintained by constant checking and rechecking, conducted by a staff of authorized field inspectors operating under direction of the lumber manufacturers' association.

"In addition to these practices, intended as an earnest of dependable value to the homebuilder and other users, there are the natural qualities inherent in Arkansas soft pine as a wood species. Its soft texture is both tough and resilient and reduces splitting by nails and screws. Tight, firm joints in the framework and mirror-smooth surfaces on paneling and woodwork are provided by these characteristics."

Arkansas soft pine products include all standard items in lineal trim, "TrimPak," finish, mouldings, ceiling, siding, jambs, flooring, etc., common lumber, small and medium timbers. They are graded and sold under Grading Rules published by the Arkansas Soft Pine Bureau which conform to American Lumber Standards. All lumber products identified by the Arkansas soft pine trade and grade marks are said to be produced exclusively in large capacity plants of the first class. Their equipment is reported to include advanced types of saw and planing mill machinery, modern dry kilns, etc., such as will produce uniform, big-mill quality which these manufacturers assert is assured under the "Arkansas Soft Pine" symbols.



MOISTURE content is checked frequently during the seasoning process.

West Coast Woods of the Douglas Fir Region

Douglas Fir, West Coast Hemlock, Sitka Spruce, Western Red Cedar

THE Douglas Fir Region of western Oregon and Washington is 500 miles long and 70 to 170 miles wide, embracing 54,000 square miles of timber land. According to the latest report of the U. S. Forest Service, this region has 602 billion board feet of standing timber, or approximately 34 per cent of the total stand in the United States.

Of this astronomical total, 60 per cent is in Douglas fir alone; while more than 20 per cent is in the distinctive species of hemlock known officially as West Coast hemlock. Western red cedar and Sitka spruce make up a substantial portion of the remaining 20 per cent.

So much for the geography and timber resources of the Douglas Fir Region. When it comes to manufacturing facilities, the area not only has plants of unequalled size and efficiency, it has a greater productive capacity than any other lumber region in the world.

When the first sawmills were erected in Oregon and Washington, lumber was sold only to users within a small surrounding trade area. Today, West Coast lumber is used in every state in the Union, in every American possession, and, in times of peace, is exported to some 120 different countries of the world.

According to use, the principal (domestic) markets for West Coast lumber can be divided approximately as follows: home building, including farm homes, 43 per cent of the total production; railroads, 16 per cent; farm utility building, 13 per cent; industrial building, 12 per cent; other industrial uses, 6 per cent; and export, 10 per cent.

DOUGLAS FIR, dominant forest tree of the West Coast Region, is the sole commercial representative of its botanical genus. Because of its unequalled versatility, it is adapted to more different uses than any other species.

Its key quality can be expressed in two words: *structural utility*. It is practically all heartwood, which is more durable than sapwood, is free from blue stain, and has little tendency to warp or twist. Its large heartwood content makes it second only in decay-resistance to the most durable cedars, cypresses and redwoods, giving it rank with white oak and long leaf pine. In color the wood varies, with conditions of growth, from yellow to a reddish brown.

The U. S. Forest Service says: "Probably no other wood is made into a greater variety of sawmill and planing mill products. It is extensively used in the building trades; it erects industrial as well as commercial buildings. Its rapid and extensive growth, its wide distribution, and the great variety of uses to which it can be put, place Douglas fir first among important American woods."

This wood is made into all forms of dimension sizes for house construction. It is used not only for framing and sheathing but for flooring, doors, finish, siding, studding, joists and lath. It meets every item in government requirements for framing lumber: "high stiffness, good bending strength, good nail-holding power, hardness, durability, freedom from pronounced warp."

WEST COAST HEMLOCK grows only in the Pacific Northwest from Oregon to Alaska, reaching its best development on the western slopes of the Cascade Mountains. An item of special interest regarding its growth is that West Coast loggers are now reaching and tapping the higher altitudes—where this species thrives—and are harvesting better hemlock than has ever been brought to the mills before.

West Coast hemlock is a wood with a wide range of uses, as well as unique characteristics. This wood is different from and superior to all other hemlock in its intrinsic qualities, being less brittle, stronger, stiffer, and free from shake as a characteristic.

It has a very attractive, straight, even grain, formed of long, tough fibers. It is free from pitch and gum, light in weight when dry, naturally light in color, highly paintable, a tenacious nail-holder—a wood of all-around utility but excellent for general construction because of its stiffness and strength-for-weight.

For studding and framing, its small knots and uniformity of texture make West Coast hemlock interchangeable



AN EXCEPTIONALLY fine picture of what is known as the gang saw. This machine is equipped with from 40 to 50 uniformly-spaced blades mounted on a reciprocating frame. These saws are run at 250 up-and-down strokes per minute so as to cut the cants into lumber which is the most uniform in size of all sawn wood.

in strength with Douglas fir. It is excellent for exterior siding and interior finish—and especially for flooring. Because of the tendency of its fibers to “weld” together under hard mechanical wear, rather than “toothpick” or splinter, this wood provides a floor of enduring beauty as well as economy—witness the 800,000 square feet of West Coast hemlock flooring at the San Francisco World's Fair.

It is capable of either high polish or a satiny finish. Machined West Coast hemlock is beautifully light and bright in its natural state. It not only gets harder with age but is one of the few woods that does not darken as time wears on. No other softwood is so akin to the hardwoods—in color, texture, aging, and finishing qualities.

SITKA SPRUCE, largest of any spruces in the world, grows only in the so-called “fog belt” along the Coast of the Pacific Northwest from Northern California to Alaska. The best grades are found near the Coast in Oregon and Washington, where it grows even more rapidly than the Douglas fir. Sitka spruces of the Region are noted for their straightness as well as their great size. The mature tree is nearly all heartwood.

The wood is exceptionally light in weight, of moderate hardness, and because of its long fibers, possesses great toughness and strength in proportion to its weight. These characteristics make Sitka spruce a preferred wood for scaffolding and ladders. This spruce has been called “the lightweight hickory of the conifers.”

Its key quality is *resiliency*, the ability to take shock and to bend and recover after carrying a load. This fact, combined with its lightness, stiffness, and workability, is why it ranks as the standard wood in airplane construction.

Because of these factors also, Sitka spruce is popular for house construction. It makes good finish, although it does not have so many distinctive features of appearance as fir, cedar or western hemlock. It is a good wood for siding, and an easy wood to paint. Proof that it will stand water and wetting exceptionally well is found in its extensive use for drainboards. It is rapidly attaining a preferred place as a material for large doors of garages, residences, clubs, warehouses and freight sheds.

On account of its small, tight knots, its freedom from pitch and odor, and its ability to take nails without splitting, Sitka spruce is widely used for refrigerators and built-in fixtures and for the highest type of crating boxes and food containers of all sorts.

WESTERN RED CEDAR is the largest and finest of the cedars grown anywhere in the world. It is frequently called “The Enduring Wood of the Ages” because its durability under decay-producing conditions is not surpassed by any other softwood. This species grows principally in the moist region of Washington and Oregon. No other wood is so light, so evenly grained, and so fortified by nature against decay. Its uniform structure and light cell walls provide a larger percentage of air spaces which give the wood exceptional insulating qualities.

Besides being the premier shingle wood of the world, Western red cedar is also universally recognized as a superior wood for siding purposes. Indeed it is the predominant wood for bevel siding. It has little tendency to warp, buckle, shrink, swell or check. It possesses an attractive grain and figure for natural finishes and also takes paint and enamel remarkably well, so is extensively used for both clear and knotty paneling, interior as well as exterior finish, sash, doors and frames, in addition to siding.

It is particularly well adapted to uses where mitered corners and tight joints are required; its fiber permits it to be machined with remarkable precision. It is easy to work; takes a very smooth finish; cuts to sharp, true

edges; fits accurately, and maintains its position and shape—faculties which make it particularly valuable for specialized uses such as for patterns, or moulds, for metal castings.

It is unexcelled for roof plank, for such structures as paper mills and textile plants where conditions of humidity are high, for boat and racing shell construction, and for trellises, garden furniture, greenhouses and equipment, posts and other items usually in contact with the soil or in damp locations.

The Right Use of Lumber Grades in Home Construction

Many kinds of lumber are cut from the same tree. They range from light, soft and fine-grained to heavy, hard and coarse-grained. Some parts of the tree are clear; some contain knots and pitch streaks. They vary greatly in strength, beauty and finish, and in fitness for different parts of a building.

Lumber manufacturers, from long experience with the service given by many kinds of wood, have developed rules for grading lumber according to its use. These rules are to protect the home builder. They enable him to *choose the right grade of lumber for the right place.*

To enable home builders to make sure that the grades of lumber used are the same as those specified, the West Coast Association has adopted official grade marks. They label correctly the grade of each piece or bundle of lumber. And they identify its manufacturer by the company name or number.

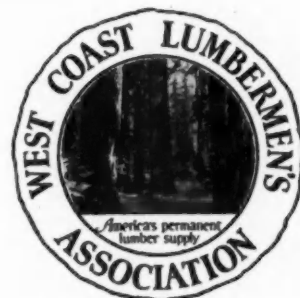
Whenever this grade mark appears on a board or joist, it means either that the lumber was graded by an Association inspector, or by a sawmill or distributor whose grading is under constant supervision of the Association.

To aid builders in the right use of lumber manufactured in the Douglas fir region of Oregon and Washington, the West Coast Lumbermen's Association shows on the next page grade use guides for two types of home construction; standard and lower cost.

The most economical construction is that which uses the lowest grade *which is suitable for the purpose.* Utilization of all the log produces, for purposes for which the various grades are suitable, will lessen the cost of all grades.

A choice between grades turns sometimes on strength, sometimes on appearance. Stronger studding is required in a two-story wall than in a one-story wall. A lower grade can be used in the non-bearing walls of a two-story building than in the bearing walls, but the same grade may be desired for uniformity. If studding and ceiling joists or rafters are exposed, a higher grade may be desired for appearance.

In joists and rafters, a higher grade will carry a longer span than a lower grade of the same dimensions; or a smaller piece will carry the same span. Stiffness, however, is determined by size rather than grade, and on any span a larger piece of a lower grade will be stiffer than a smaller piece of a higher grade.



How to Specify West Coast Woods

SEE that the following is included in your written specifications: "All grades shall conform to the grades as published in the Official Grading and Dressing Rules of the West Coast Lumbermen's Association."

West Coast woods are graded at the mills under the Standard Grading and Dressing Rules of the West Coast Lumbermen's Association, and in conformity with American Lumber Standards. They are of two general grade classes:

(1) Lumber for finished use or appearance, as flooring, siding, ceiling, and interior finish and trim. These grades are denoted by letters.

(2) Lumber for framing, and boards for subordinate uses, such as sheathing and underflooring. These grades are denoted by figures.

FINISH "B and Better"—For highest quality interior and exterior woodwork, interior trim and cabinet work requiring a high quality of finish in enamel, natural finish or stain. May be specified in vertical grain or flat grain, if desired. If not so specified, will usually be furnished in flat grain.

"C"—For more economical construction, especially for painted or enameled finishes, or for less important portions of a house.

FLOORING "Clear, All Heart, VG"—The highest quality flooring, for natural or stained finish, where appearance warrants the premium which the grade commands.

"B" Vertical Grain—For high quality natural or stained finish.

"C" Vertical Grain—For dark stained or painted finish, covered floors, closets and less important rooms, or for lower cost.

"B and Better" FG—For covered floors or where better wearing qualities of vertical grain not required.

"C" Flat Grain—For covered or painted floors.

DROP SIDING AND RUSTIC "B and Better"—For high quality siding in residences and primary buildings.

"C"—Suitable for garages and low cost construction. With cut-outs will make higher grade, shorter length siding.

COLONIAL OR BUNGALOW SIDING "Clear" cedar—Highest quality cedar siding, entirely vertical grain and practically free from all defects.

"A" cedar, "B and Better" spruce and hemlock—For high quality construction, usable without waste and containing no defects that will not cover with paint.

"B" cedar—Adaptable to use by cutting not more than ten per cent of the length of some pieces. An economical grade for medium or low-cost construction.

BEVEL SIDING "Clear" cedar—Highest quality cedar siding, vertical grain and practically free from all defects.

"A" spruce, "B and Better" hemlock—For high quality construction, vertical grain and containing no defects that will not cover with paint.

"A" cedar—Suitable for use without waste for first class construction and containing no defect that will not cover with paint.

"B" spruce, "C" hemlock—Suitable for use without waste. An economical grade for medium quality construction.

"B" cedar—Adaptable to use by cutting not more than ten per cent of the length of some pieces. An economical grade for medium class construction.

"C" spruce, "D" hemlock—For low cost construction. Permits some manufacturing faults, and defects which can be cut out with waste not exceeding one-third length of piece.

BOARDS No. 1 Boards—For sub-floors or exposed sheathing in high quality construction, or for any purpose where a high quality board is necessary.

No. 2 Boards—Ample strength and satisfactory coverage for sub-floors, wall sheathing and roof boarding in usual permanent construction.

No. 3 Boards—Suitable for wall sheathing and roof boarding in low-cost construction, and often used for concrete form work.

STUDDING No. 1 Studs—For high quality exposed use.

No. 2 Studs—Ample strength for all load bearing studding in wood framed walls and partitions.

No. 3 Studs—For one-story walls and nonbearing partitions.

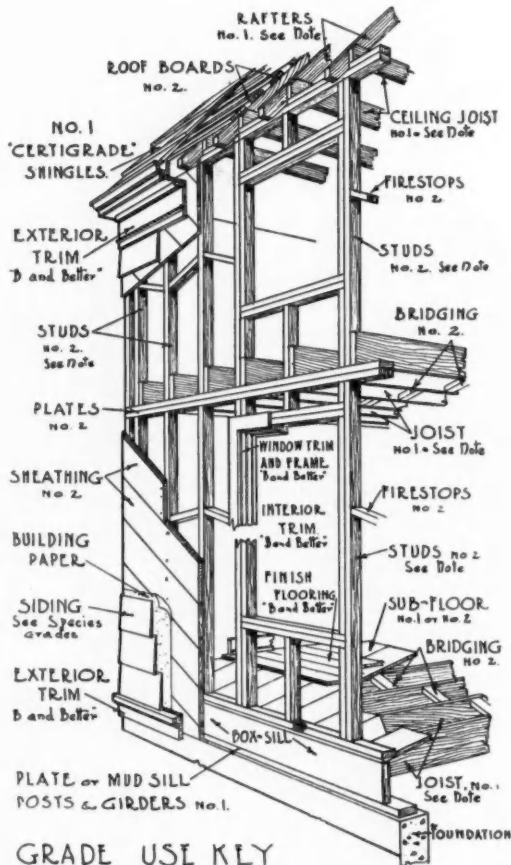
JOISTS AND RAFTERS No. 1 Dimension—The most widely used grade of framing lumber for joists, rafters, plank and similar horizontal load bearing members in wood framed construction.

No. 2 Dimension—For joists, rafters and plank on spans not exceeding two-thirds the maximum allowable spans for No. 1 Dimension of the same size.

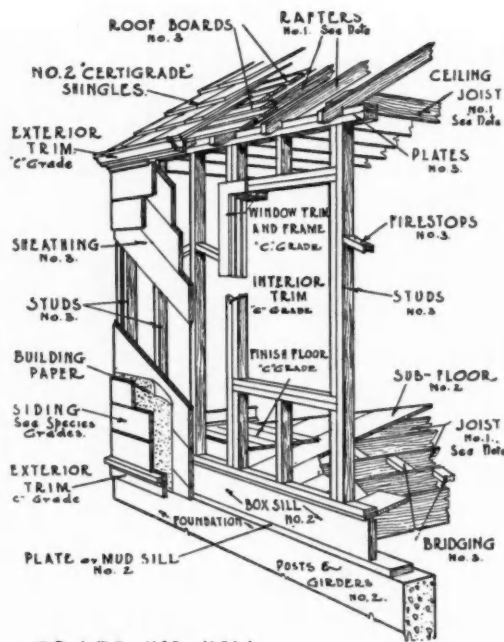
POSTS AND TIMBERS Select Merchantable—For exposed posts and beams where a better appearance than No. 1 is desired.

No. 1 Timbers—For usual posts and beams.

ALL GRADES REFER TO STANDARD GRADES OF THE WEST COAST LUMBERMEN'S ASSOCIATION



GRADE USE KEY FOR STANDARD CONSTRUCTION



GRADE USE KEY FOR LOW COST CONSTRUCTION

NOTE—STUDS

No. 3 Studs may be used for walls and partitions in one-story structures, and for non-bearing or minor partitions in other structures.

NOTE—JOISTS AND RAFTERS

No. 2 Douglas Fir Joists and Rafters can be used conservatively on spans not exceeding two-thirds the maximum allowable spans for No. 1 Joists and Rafters of the same thickness and depth.

CONSTRUCTION methods recommended by the West Coast Lumbermen's Assn. for two grades of home building.

California Redwood

REDWOOD (*Sequoia sempervirens*) is produced on the Northern California coast under a long-range selective logging program. Its primary market is naturally in its home state, which in 1938 accounted for over one-fourth of the entire country's FHA insured loans.

Redwood lumber is distributed in considerable volume in all parts of the nation, with highest concentration in the Midwest, North Central, Middle Atlantic, and New England states.

Known chiefly for its durability, redwood lumber finds greatest use where this quality is important. A special grade is maintained for foundation and substructure use. Its exceptionally low shrinkage (lowest in volume of any U.S. wood, according to the Forest Products Laboratory), and high paint retention values have led to its widespread use for siding and exterior trim.

Because of its variety of suitable characteristics, the wood also enjoys a large industrial market, largely for tanks, vats, and mill roofs. It is interesting to note that over 90 per cent of all wine produced in this country is made in redwood tanks.

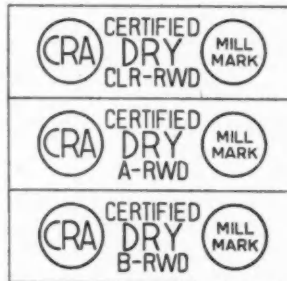
For many years the wood has had a world-wide export trade for both residential and industrial uses.

As may be expected from the size of the tree, redwood lumber is available in a great variety of sizes and is exceptionally free from imperfections. Its Clear All Heart grade, as a consequence, is higher than any called for in American Lumber Standards.

Recent uses of note are the Contemporary Arts building and the interiors of the Bride's House at the New York Fair, and many structures, including of course the Redwood Building, at San Francisco.

REDWOOD GRADES—FOR ARCHITECTURAL USE

How to correctly specify and identify them:

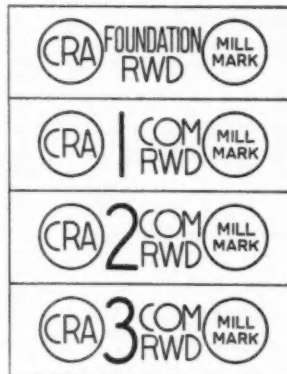


Certified Dry Clear All Heart Redwood: The supergrade available only in Redwood; most satisfactory for highest class woodwork and natural finish.

Certified Dry "A Grade" Redwood: The second quality of Redwood finish grades.

Certified Dry "B Grade" Redwood: The lowest Redwood finish grade. Permits considerable sapwood. Satisfactory for low-cost jobs.

There are Four Grades for Framing, Sheathing & Other Uses Not Requiring Finish Lumber

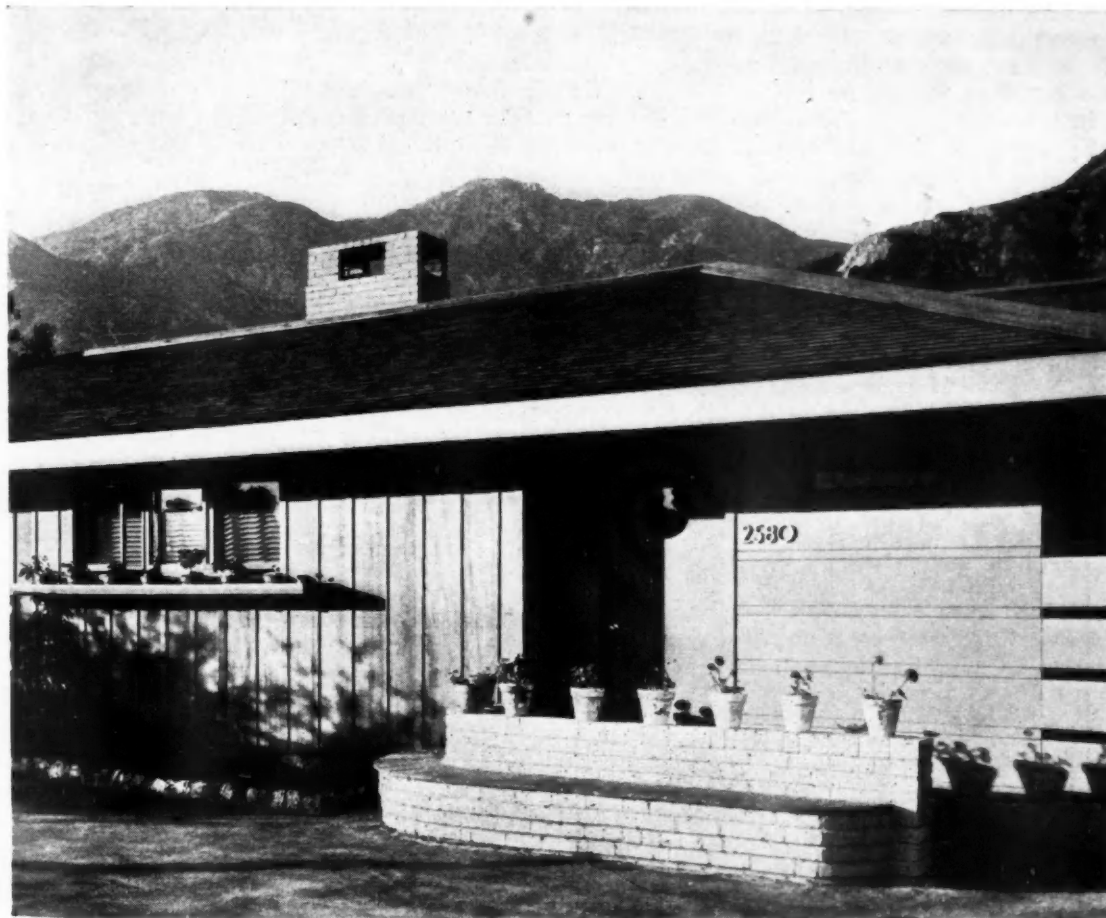


Foundation Redwood: A special selection for the purpose, governed by Building Code requirements.

No. 1 Heart Com. Redwood: The recognized grade where quality and durability are the essential characteristics desired.

No. 2 Common Redwood: A satisfactory grade for general use, permits some sapwood.

No. 3 Common Redwood: Lowest grade of Redwood "Commons." Suitable for temporary or low cost construction.



THIS Pasadena home, first prize winner in the recent American Gas Association competition, uses Redwood for its entire exterior, unpainted boards and battens at the left and painted siding at the entry.

Tidewater Red Cypress

ALL woods commercially designated as cypress do not have the same inherent values. The U. S. Department of Commerce in its publication, "Lumber, Fourth Edition, Simplified Practice Recommendation R16-29," classifies southern cypress into three separate types, as follows:

- Red cypress (coast type)
- Yellow cypress (inland type)
- White cypress (inland type)

Red cypress (coast type) is the cypress grown in the deep swamps of the coastal plains of the southeastern states, and along the Gulf of Mexico adjacent to tidewater, and is the true species, *Taxodium distichum*. The inland variety of the species has for centuries past gradually changed certain of its characteristics and is probably more truly *Taxodium adscendens*.

Red cypress (coast type) is now commercially classified as tidewater red cypress to distinguish it from the inland or upland cypress (commercially classified as yellow cypress) which is lighter in color, contains more sapwood, is usually of coarser texture and not as durable as red cypress.

Tidewater red cypress is famous for its fine texture, beautiful figure and grain. Its natural color is neither too light nor too dark, hence for natural finishes it presents a very pleasing appearance.

Its strength lies between the light and heavy pines and is available in structural grades of known strength and stiffness.

Tidewater red cypress is a natural decay-resisting wood. The heartwood is classified by the U. S. Department of Agriculture, in all publications issued by the Forest Products Laboratory, as very high in decay resistance, even under conditions favorable to decay. It has been used from the time of the very first settlers in this country down to the present day by those builders seeking a wood for use under conditions where resistance to decay is the primary consideration.

The natural oil in tidewater red cypress has been given the name of Cypressene. It is highly antiseptic and toxic in preventing the development of fungi which cause decay. Nature has done for tidewater red cypress what man tries to do when he attempts to force preservatives into wood to prevent decay. Tidewater red cypress is fully and completely impregnated by nature with antiseptic or toxic oils.

The resistance of tidewater red cypress heartwood

to termite attack is recognized by the U. S. Bureau of Entomology and other U. S. Government departments. In Spanish structures in the South, over 300 years old, tidewater red cypress has been entirely immune to termite attack even though adjoining timbers of other species were completely destroyed by termites.

The Forest Products Laboratory has separated all the commercial softwoods of the country into four general groups as to the ability of each species to take paint and the length of time each species will retain paint. Cypress has been placed in the first or highest group. The same oils have the faculty of preserving paint on cypress.

Tidewater red cypress is highly resistant to a great many chemical solutions used in industrial plants. For this reason it is a preferred material for tanks, vats, pipe, troughs, and conveyors in many industrial plants.

Being chemically inert, it imparts neither color, taste nor odor to products coming in contact with it. Food manufacturers use it largely for tanks, vats and tubs. It has long been used in corn products refineries, breweries, wineries and by others wishing to avoid contamination, and preserve the delicate flavor and value of their products.

In California many years ago, the highest award was given to tidewater red cypress over many other species of wood, for its perfect performance in not affecting the color, taste, or the delicate bouquet of wines. A beautiful silver trophy was awarded the Southern Cypress Manufacturers' Association as a result of that test.

Tidewater red cypress has been shipped to 53 foreign countries. Its use has been demanded for purposes where its unsurpassed qualities create a preference.

Tidewater red cypress is regularly manufactured under the rules and strict supervision of trained inspectors of the Southern Cypress Manufacturers' Association. Its grades and sizes conform with the American Lumber Standards.

In order to secure genuine tidewater red cypress, it is recommended that specifications and orders require that each piece bear the registered trade and species mark of the Southern Cypress Manufacturers' Association. To insure that the grade as specified and ordered is actually furnished, it is recommended that each piece be required to bear the official grade mark of this association, or of the member mill shipping the stock, or that each shipment be accompanied by an official certificate of inspection, issued by the Association.

DIAGRAMMATIC SUMMARY

Showing relationship of various Cypress Yard Grades to each other

Total products of a typical log arranged in series according to quality as determined by appearance.	SELECT Lumber of good appearance and finishing qualities.	Suitable for natural finishes.	{	Grade A —Practically free from defects. Grade B —Allows a few small defects or blemishes.
		Suitable for paint finishes.		Grade C —Allows a limited number of small defects or blemishes that can be covered with paint. Grade D —Allows any number of defects or blemishes which do not detract from a finish appearance, especially when painted.
	COMMON Lumber containing defects or blemishes which detract from a finish appearance but which is suitable for general utility and construction purposes.	Lumber suitable for use without waste.	{	No. 1 Common —Sound and tight knotted stock. Size of defects and blemishes limited. No. 2 Common —Allows large and coarse defects. May be considered grain tight lumber.
		Lumber permitting waste.		No. 3 Common —Allows larger and coarser defects than No. 2 Common and occasional knot holes. No. 4 Common —Low quality lumber admitting coarsest defects such as decay and holes.



KNOTTY Idaho White Pine paneling in dining room. William Martin Pareis, New Jersey, architect.

THE production of Idaho white pine lumber is larger than that of the other two genuine white pine species which grow commercially in the United States, so naturally Idaho White Pine to that extent, at least, is responsible for the continued high esteem in which "white pine" is held by softwood users. Both its natural qualities and the generally high level of its manufacture, seasoning and grading have helped to enhance the white pine reputation.

The heaviest stands of this genuine white pine are in north Idaho and the adjoining parts of Washington and Montana. There the dense stands of Idaho white pine and its associated species are logged selectively and carefully protected from fire so that as the mature trees are removed the young trees grow to take their places.

Idaho white pine lumber is light in color, distinctly straight-grained and soft. The wood is so even-textured that the figure of the grain is not at all conspicuous. Though soft and light in weight, the wood is unusually resistant to splitting and can safely be nailed right up to the ends of the pieces, a quality which long has endeared the white pines to carpenters.

The clear wood is so much like that of Northern white pine from New England and the Lake States that the two cannot positively be separated microscopically. The knotted board grades are much used for interior paneling, exterior trim, cornice lumber, shelving and siding, purposes for which it would be necessary to use select grades of most other softwoods.

Since the wood is so valued by the trade, it is but natural that sawmills producing Idaho white pine lumber should exercise the greatest care in its manufacture. Quality rather than volume of production is stressed by all operators. Every board is thoroughly seasoned before surfacing so there is practically no subsequent shrinkage which might cause cracks or looseness in tightly matched or fitted joints. High speed planing, matching and moulding machines not only mill the dry lumber to precise dimensions but do the job so smoothly that little subsequent sanding is necessary, even for interior trim and finish. The same care is used in loading the lumber into tight boxcars for shipment to retail dealers and industrial users. None of the lumber is subjected to the rough handling and high humidities which necessarily occur when lumber is shipped to the East Coast by boat.

Nearly all Idaho white pine lumber is graded under the close supervision of Western Pine Association's inspectors. A constantly increasing percentage is stamped at the time of shipment with the Association's official grade marks as a protection to consumers and to comply with

Idaho White Pine

(*Pinus monticola*)

the requirement of such marks by the FHA and other government agencies. Most mills, whether grade marked stock is requested or not, are proud to stamp each piece, "Genuine White Pine."

The grades of Idaho white pine, along with sugar pine, Ponderosa pine and Northern white pine, follow closely the basic provisions of American Lumber Standards, of three select and five board, or common, grades. Each grade has a distinctive grade name. The three grades into which the select portion of the log is divided range from the almost flawless "Supreme" grade through the "Choice" and "Quality" grades, this latter grade, when used for finish, requiring an occasional cut to remove a defect.

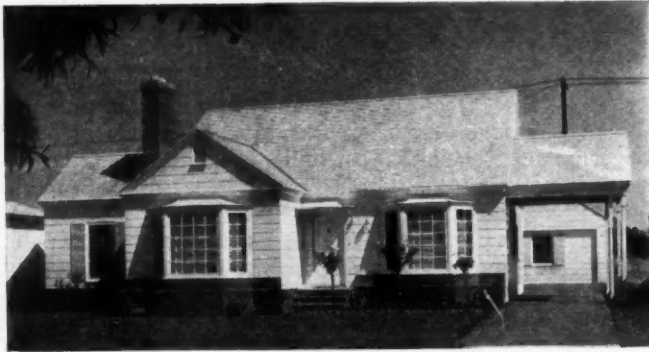
In all of the soft pines the board, or common, portion of the log is divided into five grades instead of the three or four divisions made in other softwood species. The names of these five grades, in Idaho white pine, are "Colonial," "Sterling," "Standard," "Utility" and "Industrial." Colonial and Sterling grades both are characterized by small, tight, smooth knots and are used for flush siding, paneling, and other finish and similar purposes requiring a very high type of board. This class of material is comparatively rare in species other than the soft pines. Standard is the best grade ever used for sheathing and subfloors, while millions of feet of Utility give satisfactory service when used for these items. Because of this situation, users not familiar with soft pine grades should be careful not to order the correspondingly numbered grade of boards in any of the Western pines that they do in most other species. To do so often will involve paying for a better grade than is necessary.

New England homes built of white pine, some of them now three centuries old, give ample testimony to the long life of white pine construction. All of the white pines, including Idaho white pine, of course, are, because of their soft, even texture, exceptionally resistant to weathering. Paint adheres to them firmly. Even the Colonial and Sterling grades, which have numerous smooth knots, make excellent siding, window frames, and exterior trim if knots are sealed with aluminum house paint or shellac before the finish coats of paint are applied.

The wide popularity of knotty pine paneling has greatly increased the consumption of Idaho white pine for that purpose. This species is especially apt to be used where small round tight knots are desired for the most formal, built-up jobs, material for such paneling being selected from the Colonial and Sterling grades. Coarser and more conspicuous knots suitable for less formal work are found in the Standard grade.



STERLING grade Idaho White Pine siding and Choice grade IWP columns in store and general offices of Standard Lumber Co., Spokane.



No. 2 Common Ponderosa Pine siding in California Colonial type home of Chas. E. Metz, Van Nuys, Calif.

THE commercial timber stands of Ponderosa pine in the United States are approximately equal to those of all the other pines combined, including the southern yellow pines, and of all woods are second only to the volume of Douglas fir. These immense timber reserves, together with the advanced forest practices now employed by the Western Pine industry, insure a perpetual supply of timber at the present, or even an increased rate of lumber production. The annual production is about three billion board feet.

Ponderosa pine grows in suitable localities, mostly at altitudes of 2,000 to 6,000 feet, throughout the twelve western states, except in a relatively narrow Coastal strip in Washington, Oregon and California. The open forests of large trees, with their rich cinnamon brown bark, add much to the West's beautiful scenery.

Ponderosa pine, one of the soft-textured pines, as distinguished from the so-called hard pines, is probably the easiest of all North American softwoods to season. Either air seasoning or kiln drying proceeds rapidly and with a minimum of cupping, checking or other defects which are apt to occur during the seasoning process. Like the other two Western pine species, Ponderosa pine is always well seasoned before surfacing and shipment. Its close, even texture and remarkable toughness for such a light weight wood has made Ponderosa pine valuable for heavy duty flooring, grain chutes, and auto truck beds which are subject to heavy abrasive wear.

The three select grades of Ponderosa pine are known as "1&2 Clear" (B&Btr), "C Select" and "D Select." The five board grades are numbered from one to five. There are three grades of Dimension which should never be confused with the board grades. Boards are graded primarily on the basis of appearance, while for dimension lumber strength is more important. Clear cuttings from the "Factory" grades are used in large volume by manufacturers of millwork and other items.

For many years Ponderosa pine has been the leading wood used for doors, sash, window frames, screens, and most other stock millwork items. The tremendous volume used for these exacting purposes, amounting, as it does, to over a third of the total Ponderosa pine produc-

Ponderosa Pine

(*Pinus ponderosa*)

tion, is eloquent testimony to the high esteem in which this wood is held by users. The normal consumption of over a billion board feet a year of Ponderosa pine for sash, doors, and millwork is greater than the combined total sales for all purposes of any other two softwoods, except Douglas fir and southern pine, and is approximately half the consumption of all woods for sash, doors and millwork.

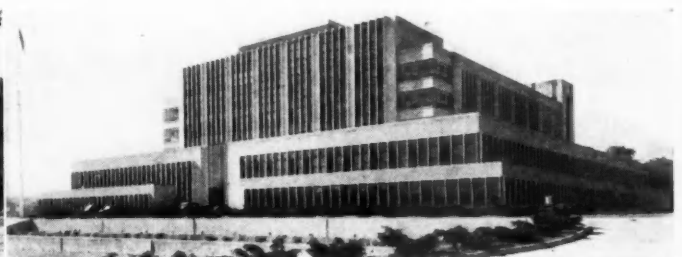
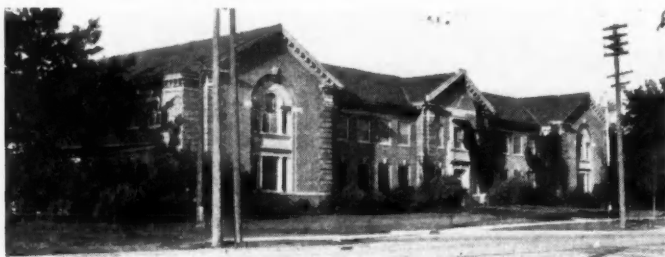
Ponderosa pine is used not only for a majority of the softwood doors produced but, also, because of its light weight, its freedom from warping and twisting, and its excellent gluing qualities, is used for the cores of most hardwood veneered doors. The ease with which the soft pines may be cut and fitted is attested by the fact that carpenters can hang several more pine doors a day than they can doors of heavier woods.

The proportion of Ponderosa pine is even greater for sash than it is for doors, partly because hardwoods rarely are used for sash. The light weight, tight joints, absence of slivering and fine painting qualities of Ponderosa pine sash are among the reasons for their very general use. The ease with which they take preservatives also is helpful if the sash are to be used under unusually damp conditions and an inexpensive treatment is desired to preclude any possibility of decay. For ordinary residential construction, decay is rare in either Ponderosa pine or the other woods which are used in smaller quantities for sash.

Millwork factories also use Ponderosa pine for the bulk of their stock millwork items, particularly for cabinets, drawers, cupboard doors, shelving and other items which are to be painted or enameled. Interior trim and mouldings, particularly small mouldings which might be difficult to nail without splitting in harder woods, are used in large volume.

Although not so dominant for siding and exterior trim as for the more exacting sash, door and millwork uses, Ponderosa pine, nevertheless, is used in large volume for all kinds of exterior trim, mouldings and siding of various patterns. These finish items usually are furnished in the select grades, though in some districts part of the siding is No. 2 Board grade in 8, 10 or even 12-inch widths. These widths of "Economy Sidings" being readily available in this species are very effective architecturally in several flush siding patterns.

Much of the yard lumber of this species is used for rough carpentry items, like sheathing, sub-flooring and roof boards. The knotted material which usually goes into the upper board grades makes fine shelving. Selected No. 2 or even No. 3, is much used for knotty pine paneling. The knotty boards leaving the high speed planing machines are surfaced so smoothly that they have almost a polished appearance, and they are easily machined accurately in a variety of patterns.



LEFT: Old U. S. Forest Products Laboratory, Madison, Wisconsin, built in 1914, using Ponderosa Pine Sash; and RIGHT: New U. S. Forest Products Laboratory at Madison, built in 1932, also using Ponderosa Pine sash.



CLEAR Sugar Pine paneling in library, home of McDaniel Lewis at Greensboro, North Carolina. Wm. C. Holleyman, Jr., architect.

SUGAR pine is the largest of all the pines, occasionally reaching a diameter of 12 feet and a height of 250 feet. It is not at all uncommon for lumber operators to cut trees six or seven feet thick and which are 75 feet or more from the ground to the first limb. Since these immense trees usually are overmature, it is desirable to remove them and make way for the sturdy young growth which takes their places. The graceful branches of Sugar pine trees are frequently tipped with huge pendant cones. These cones are unusually large, generally from 12 to 18 inches long, but sometimes as much as 20 to 24 inches.

Although the range of sugar pine is restricted to the Sierra Nevada of California and parts of Southern Oregon, the stands often are heavy. There is ample virgin timber available to continue for over a hundred years the present annual production of approximately 300 million board feet. Long before that time much of the reproduction now growing will have reached commercial size.

Sugar pine, like Idaho white pine and Northern white pine, is botanically classified as a true white pine. The wood cannot be distinguished with certainty from the other two genuine white pines. It is a beautiful creamy white, which darkens to a pale brown sometimes tinged with pink, as it ages. It is light in weight and has a uniformly soft, even texture which makes the wood firm, yet exceptionally easy to cut smoothly in any direction. Its corky texture is a joy to pattern makers, wood carvers and others who must do precise work with hand tools. The wood fibers seem to be unusually strong and tough for a species which is so light in weight and which cuts so smoothly and easily.

Sugar pine has one of the very lowest and most uniform rates of shrinkage, and that is the main reason sugar pine piano keys, organ pipes, foundry patterns, sash and other fabricated products hold their size and shape so well. The thorough seasoning of sugar pine lumber before shipment also is a factor.

Since the trees are so large and the wood develops few defects in seasoning, sugar pine is unequalled for the production of wide and thick clear lumber. Selects up to 22 and 24 inches wide and 3, 4 or occasionally even 6 inches in thickness are regularly produced and thoroughly seasoned by the mills. Clear pieces up to 48 inches in width are obtainable for special purposes, though

Sugar Pine

(*Pinus lambertiana*)

ordinarily it is preferable for users to glue up such widths from several pieces.

Mills producing sugar pine, knowing that it is to their advantage to cut the huge logs carefully and having a high regard for the fine qualities of the lumber they are making, watch each step in their operations to see that carelessness does not impair the value of their product. As many industrial consumers require lumber which has been air seasoned for as much as a year or more, huge stocks of all grades and thicknesses are carried by the mills to serve such needs. Scientifically kiln dried sugar pine also is available to users who desire lumber dried in that manner to a low moisture content.

Much of the sugar pine production goes to industrial consumers. Foundries use large quantities for the wood patterns around which is shaped the sand for the moulds into which molten metal is poured. Light weight, absolute cutting or shaping precision, freedom from warping and the ability to take a smooth finish are exacting requirements which must be met by sugar pine patterns.

The automotive industry uses sugar pine to make full scale models of its new cars. Each detail is so accurately reproduced in wood and the surfaces so smooth when enameled that one standing a few feet away can hardly realize that it is a wood model rather than a real car that could be driven away under its own power.

The United States Navy uses many carloads of sugar pine annually for purposes ranging from the large floors on which naval designers lay out their plans for warships, to the construction of the small whaleboats in which the sailors from the different battleships and cruisers race each other when "the fleet is in" every year at the principal ports on both the Atlantic and Pacific coasts.

Among the more important construction uses are doors, sash, window frames, millwork, drainboards, mouldings, exterior trim and siding. In most parts of the country sugar pine, though not used as much for stock millwork, is very often specified by architects for special doors, sash, built-ins and enameled interior trim on high class jobs. In some localities, notably in southern California where high temperatures and low humidities put the wood to a severe test, sugar pine is quite generally used in most doors and sash. In wall paneling it may be of knotty material, but sugar pine offers even greater decorative values when rooms are paneled with clear stock in large built-up, raised panels or in vertical or horizontal boarding.



SUGAR Pine carving 20" wide by 26" long from one piece 2" thick. Carved by E. B. Quigley, of Portland, Oregon.

White Oak and Red Oak Flooring

HARDWOOD floors, as used generally in America's homes, include four well known commercial species . . . oak, beech, birch and hard maple. With these, too, must now be mentioned a fifth—pecan . . . because of the rapidity with which it recently has gained approval of the building profession and home owners. Possessing all the characteristics which provide enduring wear, its natural rich color and figure are attracting consideration from the decorative viewpoint as well.

While each of the four long familiar species has a definite and well established economic position within the range of commercial usage, it is oak which always has been and doubtless always will be the predominating favorite. There is more than tradition to account for this preference. For while its use as flooring antedates all other species by whole centuries, the underlying reasons for that record are the sum of the advantages inherent in oak itself.

These advantages, embodied in standard and square edge strip, block, parquetry and oak plank flooring, are so well known to the building trades as to require no detailed explanation here. Builders and owners do, however, frequently ask as to the difference and relative merits between red and white oak. No better answer is to be found than the following paragraphs from "American Hardwood Flooring and Its Uses," published by the United States Department of Commerce, which says:

"There are 9 species of domestic white oak and 11 of red oak commonly used in the production of American oak flooring. In prevailing manufacture and trade practices, however, they are classed in two groups (1) white oak and (2) red oak.

"There is little difference between the two groups of oak in the properties of hardness or strength, so from a utility standpoint both are about equally suitable for flooring. However, in the consideration of color and grain there is notable distinction. In general, white oak flooring is light in color with a brownish tinge, while red oak, although also light in color, has a natural pink cast which usually turns to a reddish brown under finishes commonly applied to flooring. Both white and red oak are ring-porous woods—which means that there are larger, more prominent pores in the springwood of each year's growth than in the summerwood. This fact accounts for the characteristic figure prominent in plain sawn-oak flooring. However, the pores of white oak heartwood are usually plugged with a minute bubble-like growth called tyloses which make the grain less open than in red oak.

"Both white and red oak also are characterized by prominent wood rays, which are strips of cells extending radially in the tree, sometimes 4 inches or more in height. When quarter-sawn flooring is produced these wood rays are frequently cut through so as to expose a large flake figure on the surface, often seen on oak furniture. Thus, both white and red oak flooring is procurable in quarter-sawn grain."

From the foregoing, it is evident that the use of one or the other is a matter of personal preference, and either will outlast the life of the house in which it is installed.

There is a suitable quality of oak flooring for practically every use in commercial, industrial, public building and residential construction. Within the limits of this article, there is not room to elaborate on these, but they are described in comprehensive detail for the building profession in specifications, master work sheets and general instructions prepared by the National Oak Flooring Manufacturers' Association.



NOFMA Oak Floors as installed in a Mott Home Project, Garden City, Long Island. Real Estate builders regard oak floors as adding to sales appeal in the marketing of new homes.

The Association is referred to in "American Hardwood Flooring and Its Uses," as follows:

"Its members are composed of firms manufacturing flooring in the South, the Appalachian region, and a few in Pennsylvania, Maryland, and other states. The function of the association is to furnish its members with grading and manufacturing standards and to provide other information which is of value in producing hardwood floors. Through the association the consumer is given information pertaining to floor finishes, architectural-design practices, care of floors, and information as to how he can specify so as to obtain a floor of the type he wants, even though he be a layman with no previous experience.

"The National Bureau of Standards of the U. S. Department of Commerce has prepared, in cooperation with the oak flooring industry, a Commercial Standard. All members of the National Oak Flooring Manufacturers' Association conform to this standard, and on every four or five bundles of flooring produced, a copyrighted association label is affixed, stating that the 'oak flooring is guaranteed and marked for grade by the manufacturer; is inspected and certified by the National Oak Flooring Manufacturers' Association to meet all requirements of the Commercial Standard. (C. S. 56/36, Oak Flooring.)"

"In addition to the Commercial Standard label, each piece of flooring has the initials of the association impressed on the back (NOFMA), and usually the firm's name and mill mark identification is included.

"The association also provides inspection service for hard maple, beech and birch flooring produced by its members, particularly for those firms located in the southern and Appalachian regions."

Association grades as approved under the Commercial Standard are: Quarter Sawn-Clear, Sap Clear and Select. Plain Sawn—Clear, Select, No. 1 Common, No. 2 Common.

NOFMA oak flooring, as well as beech, birch, hard maple and pecan, produced by Association members is immediately available from responsible local distributors throughout the United States, Canada and many points in Mexico, and through customary trade channels in the British Isles, and Continental Europe. NOFMA birch, beech and hard maple have been accorded parity rating by the Executive Committee on Lumber Specifications at Washington with the same products of the North.

Northern Hard Maple Flooring

BACK in Colonial days one of the most popular of flooring materials, superseded by other woods with the invention of planing machines, "rediscovered" for heavy service with the development of the flooring matcher, and now coming into "home favor" again because of the trend of modern design—this is the interesting history of hard maple flooring.

In Colonial days, when hardwood had to be hewn and smoothed with the old hand jack-plane, hard maple's unusual durability and fine texture made it popular for floors. It was, in fact, the original "Colonial floor."

Although labor costs were low those days, hard maple was superseded by other woods which could readily be worked through planing machines and it was not until the development of the flooring matcher, specially built to give a smooth finish to hardwoods, that hard maple flooring again came into vogue.

For with the flooring matcher, hard maple could not only be given a fine smooth finish, but could be tongued and grooved on sides to insure a perfect joint—(and later, end-matched) making it possible to lay this flooring over joists and sleepers without support of a sub-floor.

With this advantage of low cost manufacturing methods, and its known durability and ability to resist pointed pressure without abrasion, hard maple flooring again regained popularity and entered on a period of wide use in schools, churches, homes and commercial and industrial buildings, which has continued for over 50 years to the present date.

CHARACTERISTICS—Northern hard maple is slow growth and is dense, tough, heavy, strong and very hard. The wood is diffuse-porous, the minute, evenly scattered pores resulting in a fine and uniform textured wood. It does not shell, splinter or disintegrate from ordinary uses, but wears evenly and exceptionally well under abrasion. The color of the heartwood is brownish, the sapwood lighter. It takes a high polish and attractive finishes. The smooth, fine grained simplicity of hard maple harmonizes well with the simple design of modern furniture and with finely woven fabrics.

COLOR POSSIBILITIES—Research work during the past decade has resulted in the development of heavy duty finishes. This type finish seals the pores of hard maple, keeps out dirt, resists soil stains, marring and scratching. The finish is easy to clean and maintain at low cost. A hard maple floor finished natural, as with this finish, shows an attractive golden hue. It is literally a "floor of captive sunlight," whose cheerful color mellows and ripens with passing years. For those desiring deeper color, there are improved acid stains by which this fine textured hardwood is made to take a variety of delightful, transparent, permanent color finishes. The application of these finishes brings out the delicate grain of the wood and enhances the pleasing effect of birdseyes, burls, etc., thus creating a distinctive type of beauty in wood floors.

MFMA GRADING RULES—Northern hard maple, also beech and birch floorings, are kiln-dried products sold in standard grades, described in accurate detail in a book of Grading Rules of the Maple Flooring Manufacturers Association. The standard lengths, in 25/32" and thicker, are as follows:

- MFMA First Grade: 2 to 16 feet, may contain up to 25% of 2 to 3½ feet, inclusive.
- MFMA Second Grade: 1½ to 16 feet, may contain up to 40% of 1½ to 3½ feet, inclusive.
- MFMA Third Grade: 1 to 16 feet, may contain up to 60% of 1 to 3½ feet, inclusive.

Hard maple stock is a rigid requirement of the MFMA Grading Rules for Maple Flooring. There are also special grades, selected for color uniformity, in northern hard maple, beech and birch.

STANDARDIZATION—MFMA flooring is made to accurate specifications standardized by the Maple Flooring Manufacturers Association. The Association maintains supervision over the products of its members through regular grade inspection at mills and through its reinspection service. Competent inspectors are employed for this purpose.

GRADE AND THICKNESS USES—MFMA First Grade is the highest standard grade and makes the most durable and desirable floor for any building,—particularly suited for fine homes, churches, schools, clubs, recreational buildings, etc.

MFMA Second Grade is practically as serviceable as First Grade and can be used in the same type of buildings as First, if the slight imperfections permitted under the Rules are not objectionable.

MFMA Third Grade gives excellent satisfaction in factories, warehouses, mills, on farms, etc. This grade and also Second Grade is adapted to use in grill rooms, dens, rooms of antique design and decoration, especially if the floor is given a color finish.

The 25/32" thickness is most commonly used for general purposes, the 3/8" thickness being satisfactory for laying over old residence floors. The 33/32" or 41/32" thickness is recommended for floors subjected to extraordinary strain and trucking wear.

TABLE OF SIZES	
Tongued and Grooved Strip Maple Flooring	
Thickness	Face Widths
25/32"	1½", 2", 2¼", 3¼"
33/32"	2", 2¼", 3¼"
41/32"	1½", 2", 2¼"
3/8"	2", 2¼"
25/32" and 33/32"	2½", 3½"
Jointed (Square Edge)	
2½", 3½"	
Maple Flooring Blocks—Squares & Rectangles	
25/32 x 2¼"	6¾" x 6¾", 9 x 9", 11¼ x 11¼", 6¾ x 13½"
25/32 x 1½"	7½" x 7½", 9 x 9", 11¼ x 11¼", 6¾ x 13½"
33/32 x 2¼"	5¾" x 6¾", 9 x 9", 11¼ x 11¼", 6¾ x 13½"
33/32 x 1½"	7½" x 7½", 9 x 9", 11¼ x 11¼", 6¾ x 13½"
Single piece Blocks	
(For Herringbone & Other Pattern)	
Thickness and Face Width	Face Lengths
25/32 x 2¼"	6¾", 9", 11¼", 13½", 15¾"
33/32 x 2¼"	13½"
(For Continuous Strip Pattern)	
25/32 x 1½"	2", 2¼", 3¼"
33/32 x 1½"	2", 2¼", 3¼"
41/32 x 2"	2¼", 3¼"
} From 8 to 15", as desired.	

Available, too, are some sizes of blocks and wide face strip maple flooring having chamfered (beveled) edges, and edge grain and bowling alley maple flooring requiring special milling.



MFMA Northern Hard Maple Floor in the Hollywood Turf Club, Hollywood, Calif.

Hardwoods for Interior Trim

THE great variety of hardwoods produced in the United States provides a wide range of choice of woods. In choosing hardwoods for flooring, trim, veneers, paneling, and built-in cabinets, the property of hardness is important. This property of different hardwoods can be expressed in definite numerical values based upon scientific research.

A high degree of hardness is desired in flooring; a reasonable degree in trim, veneers, paneling, built-in equipment, and other woodwork. The chart shows the comparative hardness of the principal hardwoods. These data are based upon the results of hundreds of thousands of tests by the U. S. Forest Products Laboratory, Madison, Wis., and are taken from U. S. Department of Agriculture Technical Bulletin 158.

The ability of a hardwood to take natural finishes, such as stains, varnishes, and lacquers with a smooth finish, is dependent partly on the structure of the wood and partly on its hardness. Generally speaking, the harder hardwoods take natural finishes better than the softer hardwoods. Hardwoods are adapted to enamel and paint finishes but vary in their ability to take a smooth paint covering. The softer hardwoods take paint better than the harder hardwoods.

PHILIPPINE MAHOGANY, now the largest selling tropical hardwood in the United States, is logged in the Philippines where the forests cover thousands of square miles. Lovers of beautiful woods choose it for its distinctive warmth of color and its striking beauty of grain and figure. These properties of Philippine mahogany make it especially desirable when used in interior trim. Many prefer to leave this wood in its natural color. Others find it takes a stain exceptionally well. You may in excellent taste use it to express modern style trends.

Used for paneling, it imparts an atmosphere of luxury to a room. Some of the most attractive paneled rooms to be found anywhere are done in this tropical hardwood.



WARMTH and richness characterize interiors trimmed in hardwood. Pictured is a Cleveland home library in Appalachian yellow poplar. John Sherwood Kelly, Architect.

It is maintained that builders profit by using Philippine mahogany since for the average dwelling the extra cost over softwood trim is only \$75 to \$100, while the increase in value of the residence is a much larger amount. Philippine mahogany also is growing in use for doors, fireplace mantels, staircases, china closets and paneling.

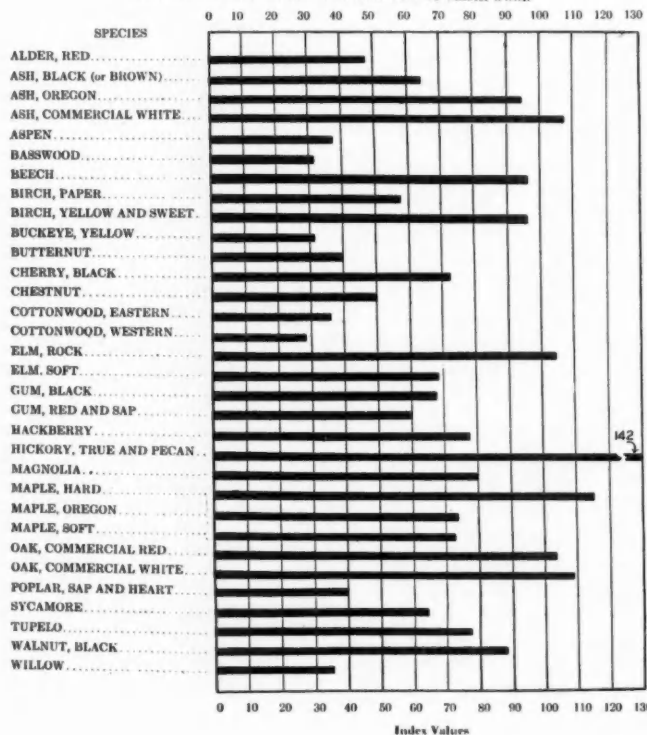
Color: The color of Philippine mahogany ranges from light red to dark red. The light red is produced from trees known in the Islands as *white lauan*, *almon* and *bagtican*; the dark red is produced from trees known as *red lauan* and *tanguile*.

BIRCH, a widely-used species for interior trim, is cut in the Michigan-Wisconsin region from yellow birch (*Betula Lutea*) and sweet birch (*Betula Lenta*). Red and white birch are not different species but are products cut from the same tree, red birch being the slightly reddish heartwood and white birch the nearly white sapwood or outer part of the log. Unselected birch (or mixed color) may contain both the red heartwood and the white sapwood in the same piece.

Unselected birch can be used at less cost than either the selected red or the selected white, as greater quantities of the unselected mixed color wood are obtained from the log. Unselected birch may be advantageously used: (1) wherever a striking and contrasting effect in a natural finish, or under light stains, is desired; (2) wherever a dark stain is used and under which the heartwood and sapwood shadings blend to a uniform tone, a valuable characteristic with birch; (3) for a remarkably fine effect in veneer work (paneling and doors), and (4) always under paints, enamels and lacquers.

APPALACHIAN YELLOW POPLAR is one of the most serviceable and dependable of our native hardwoods. It has been prized for fine painted or enameled woodwork since early Colonial days. This species, a diffuse porous hardwood, has a straight, fine grain and uniform texture. Its annual rings are not prominent and therefore the wood shows little figure or grain pattern. It is moderately soft, strong and light weight (2.5 lbs. per bd. ft.), kiln dried. The heartwood is greenish yellow and is very durable when used for painted exterior woodwork. The sapwood is white.

COMPARATIVE INDEX VALUES FOR HARDNESS OF CLEAR WOOD



Standardized Hardwood Paneling

TO SATISFY the general desire for wood paneled walls and to make them available to home builders of average means, the Appalachian Hardwood Manufacturers, Inc., in cooperation with leading architects and various organizations serving the woodworking and construction industries, has developed a new and inexpensive type of paneling. This paneling is not patented, but is a contribution of research to the cause of better building, without restrictions on either manufacture or use. However, to insure uniformity of design as well as quality of material the National Bureau of Standards of the U. S. Department of Commerce, has set up, with the advice and consent of the originators, a commercial standard to govern the production of the paneling.

This new paneling has been developed without any sacrifice of the traditional beauty of wood, and without any lowering of utility values for which it has long been noted. The paneling is relatively inexpensive, simply because economies resulting from quantity production of standardized patterns make it possible to offer a quality product at a popular price.

Standardized Appalachian hardwood paneling is offered in both conventional and unusual grade effects. The latter includes the new "Character-marked" grade, in which features inherent to the tree, such as knots, burls and natural configurations, combine with attractive grain to produce an effect that is strikingly beautiful. Paneling made of "Character-marked" lumber bears out the familiar adage, "Nature never repeats," for no two boards are ever the same, while a complete installation contains features to set it apart from all others in the world.

Standardized Appalachian hardwood paneling offers home builders, at nominal extra cost, a feature so thoroughly in accord with modern construction practices that it should be an agency for preserving values. In addition to preserving values by increasing the longevity of homes in which it is used, the paneling enhances the original values by imparting that intangible but nevertheless desirable element of exclusiveness. In the final analysis, paneling may be considered a feature that represents the difference between merely a house and home of distinction that will be a source of lasting pride to the builder as well as to the owner.

Standardized Appalachian hardwood paneling provides builders a splendid medium for creating interiors that reflect modern building trends and for giving clients a much desired feature at slight additional cost. The paneling provides wide latitude in the design of interiors, as is evidenced by twelve wall effects that can be produced from the same panel boards and mouldings. The paneling is made of different woods, including Appalachian beech, birch, oak, maple, yellow poplar and other species, thereby providing further latitude in the choice of effects by permitting the selection of the species best suited for the finish desired, whether stain, paint or enamel.

The new standardized Appalachian hardwood paneling consists of random width, tongued-and-grooved, V-jointed and machine sanded panel boards, 4" to 8" wide and $\frac{3}{4}$ " thickness. Tongued-and-grooved moulding are available for insertion between the panel boards, thereby giving the choice of different effects. As the mouldings are separate members, they can be inserted between every two boards or between two or more boards, creating in the latter instance the effect of

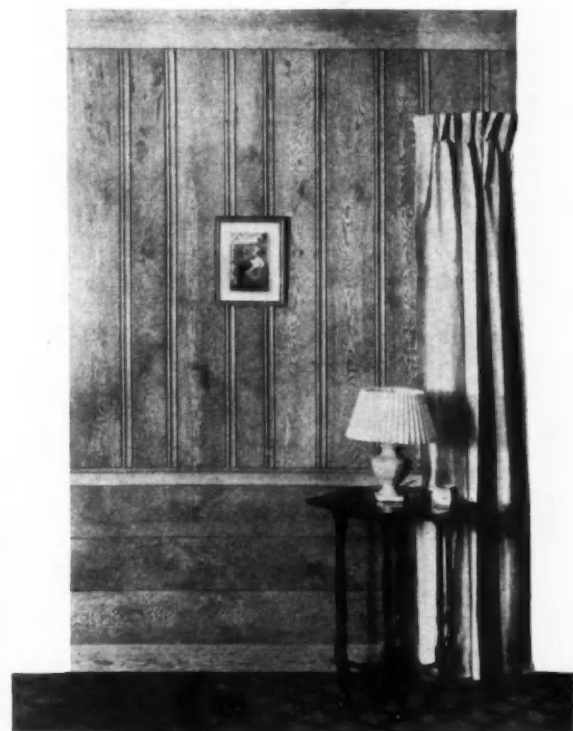
wide panels separated by pilasters. Vertical paneling stock is furnished in several lengths, each designed to meet some standard building requirements. These lengths vary from chair rail height of 30 to 36 inches, to a ceiling height of nine feet.

Horizontal paneling to be used as a low wainscot, or in combination with vertical members also is supplied. Horizontal paneling consists of three or more members which produce chair rail wall sections in lengths ranging from four to fourteen feet. Suitable base, chair rail, cornice and necessary mouldings for door and window openings are included in the list of standard items. The range of material is complete and designed to meet every requirement. No matter whether the installation is a low wainscot in a breakfast nook or dining room, or ceiling-height paneling covering four walls, the builder is offered material that will produce a harmonious and attractive interior. Coupled with beauty that is impossible to picture in words is an element of surprising economy.

Appalachian standardized hardwood paneling is packaged in strong, tight cartons to protect it from dust, moisture and rough handling. Vertical panel stock is packaged according to lengths and units consisting of one board each of the 4", 5", 6", 7" and 8" widths. Each unit has a surface coverage of thirty inches, face measure. Cartons are used for the insert mouldings, each carton containing twenty mouldings of given length. Horizontal paneling also is packaged, each carton containing the necessary panel members to erect a horizontal wall section chair rail height and of unbroken lengths ranging from four to fourteen feet on increases of six inches. The method of packaging horizontal paneling permits the builder to purchase panel sections of proper lengths, thus making undue waste of material unnecessary.

Standardized Appalachian hardwood wall paneling is made available to builders through their local retail lumber dealers. Consult them for particulars on cost and methods of installation.

RICH EFFECT produced in combining vertical and horizontal "Character-marked" Appalachian oak paneling. Vertical members are keyed to chair rail by means of tongue and groove. Height of horizontal paneling is 30".



Western Red Cedar Shingles

WESTERN red cedar shingles for roofs and side-walls are manufactured and graded under rules and supervision of the Red Cedar Shingle Bureau. When specifying red cedar shingles, insist that the Certigrade Label appear on each bundle. This is your assurance that the shingles are guaranteed by the manufacturer to meet grade standards, as inspected by the Red Cedar Shingle Bureau.

These shingles make a beautiful roofing material. Soft color effects, obtained by staining, combined with deep shadow lines produce an inviting home. Red cedar shingles have been tested by storm, hail, tornado, hurricane and earthquake. They have proved their long life on the homes of our forebears. They also make a durable and beautiful sidewall covering. They are adaptable for practically all types of homes and for any kind of exterior wall covering. They may be laid in many different patterns to afford variety.

Insulation: Red cedar shingles form a natural insulation. Correct application gives three laps of wood, forming triple protection from summer heat and winter cold—effecting a decided fuel saving.

Modernizing: Red cedar shingles solve the perplexing

difference in labor costs. The expense of removing the old roof is saved, there is no litter or dirt, no damage to lawn or flowers, and the double roof gives double insulation value. Work can be done at any time because of protection of old roof.

Proper Nails: Only copper nails or nails zinc-coated by the hot dipping process should be used. Plain or blue wire nails should never be used with red cedar shingles. They will rust out long before the shingles need replacing.

Sizes and Grades: Red cedar shingles are manufactured in three lengths—16 in., 18 in., and 24 in. Each length has three grades—Nos. 1, 2 and 3. (See table.)



ABOVE: The Certigrade Label; LEFT: Laying Shingles right over old shingles. New chimney flashings have been applied.

problem of home modernizing. Most homes are well constructed. By the application of shingles over the old side-walls they can be transformed into new homes at but a trifle more than the cost of repainting. The slight additional cost is more than offset by the added insulation value and fuel savings. The home is materially enhanced in value and made more salable. Double-coursed shingle walls with wide exposures are particularly attractive.

Over-roofing: Re-roofing with red cedar shingles over the old roof is practical, economical and efficient. Whether the old roof is of wood shingles makes little

Grade Name	Character of Grade and Suitable Uses
No. 1-24" 4 Butts to 2"	No. 1-24" is the highest quality shingle. It must be entirely clear, edge grain, and all heartwood. Thick butts assure deep shadow lines. Properly laid with rust resisting nails this grade will give service for a lifetime. This grade conforms to United States Department of Commerce Commercial Standard Specifications CS31-38. The Certigrade Label denoting this should always be specified to appear on each bundle.
No. 2-24" 4 Butts to 2"	No. 2-24" is suitable for the undercourse for double coursing on roofs or walls with No. 1-24" shingles on the top. The double laid roof with these shingles produces a combined thickness at the butts of 1" which renders a most beautiful depth with a wide shadow line. These shingles must be clear for 16" from the butt, and for 10" from the butt may not contain more than 1" of sapwood.
No. 3-24" 4 Butts to 2"	No. 3-24" is the lowest grade manufactured in the 24" length shingles. Their use should be confined to temporary or cheap work such as sheds, garage sidewalls, or for undercourses on double-coursed walls. These shingles are 10" clear or better from the butt but may contain sapwood.
No. 1-18" 5 Butts to 2 1/4"	No. 1-18" is a high grade clear edge-grain, all-heart shingle suitable for use on roofs or sidewalls. This grade conforms to the United States Department of Commerce Commercial Standard Specifications CS31-38. The Certigrade Label denoting this should always be specified to appear on each bundle.
No. 2-18" 5 Butts to 2 1/4"	No. 2-18" is a good grade for use for undercoursing for a double course on roofs or walls, with No. 1-18" shingles on top. It must be clear for 12", and for 10" from the butt may not contain more than 1" of sapwood.
No. 3-18" 5 Butts to 2 1/4"	No. 3-18" is the lowest grade manufactured in the 18" length. It is suitable for temporary or cheap work, such as sheds, garage sidewalls, or for undercourses on double-coursed walls. These shingles are 8" clear or better from the butt but may contain sapwood.
No. 1-16" 5 Butts to 2"	No. 1-16" is the most popular high quality shingle for all ordinary construction. Being clear and vertical grain, if properly laid will give lifetime service. This grade conforms to United States Department of Commerce Commercial Standard Specifications CS31-38. The Certigrade Label denoting this should always be specified to appear on each bundle.
No. 2-16" 5 Butts to 2"	No. 2-16" is suitable for the undercourse of double laid roofs or walls, with No. 1-16" shingles on top. It is 12" clear or better from the butt, and for 10" from the butt may not contain more than 1" of sapwood.
No. 3-16" 5 Butts to 2"	No. 3-16" is the lowest grade of shingle manufactured. Its use should be confined to temporary work or cheap work such as sheds or garage sidewalls or for undercoursing on double-coursed walls.

COVERING CAPACITIES IN SQUARE FEET OF THE VARIOUS SIZED SHINGLES
Square Pack

Size of Shingles	No. Bundles per square	Number of inches exposed to the weather																	
		4	4 1/2	5	5 1/2	6	6 1/2	7	7 1/2	8	8 1/2	9	9 1/2	10	10 1/2	11	11 1/2		
1 Square of 16 in.—5/2 in. will cover on	Roofs	4	80	90	100	Greater exposure not recommended.													
	Sidewalls	4				110	120	130	140	150	Greater exposure not recommended.*								
1 Square of 18 in.—5/2 1/4 in. will cover on	Roofs	4	70	80	90	Greater exposure not recommended.													
	Sidewalls	4					110	120	125	135	145	155	Greater exposure not recommended.*						
1 Square of 24 in.—4/2 in. will cover on	Roofs	4					80	90	95	100	Greater exposure not recommended.								
	Sidewalls	4									106	113	120	127	133	140	147	153	

*Applies to single-course walls only. Greater exposures permissible when double coursed. For details consult the Bureau's "Certigrade Handbook".

1940



Nobody has a right to complain about building "conditions" for 1940. Whether or not the building business is good is going to depend on the building business itself. Every factor bearing on an abundance of profitable construction during the year is favorable. Let's take advantage of these circumstances:

- ¶ **A 3 MILLION FAMILY MARKET**
- ¶ **ULTRA LIBERAL CREDIT**
- ¶ **LOW INTEREST RATES**
- ¶ **LARGEST SAVINGS IN HISTORY**
- ¶ **FEW RESIDENTIAL VACANCIES**
- ¶ **INCREASING RENT TRENDS**
- ¶ **BUILDING COSTS ARE NOT GOING DOWN**



The National Small Homes Demonstration, Inc., a non-profit, non-dues-paying corporation of 32 manufacturers of building materials, originated and sponsored by the National Lumber Manufacturers Association and the National Retail Lumber Dealers Association, is ready with the tools to help you secure the biggest profit crop from fertile 1940. The following sales tools are available to you:

- | | |
|--|---|
| <p>1. ENGINEERED SMALL HOME DESIGNS
1 and 2 story—4 to 5 rooms
Twenty-four Alternate Designs
New Ideas in Structural Framing</p> <p>2. SMALL HOMES MANUALS
A—for Builders—"How to Sell More Small Homes"
B—for Consumers—"How to Build a Small Home"</p> | <p>3. A READY-WRITTEN ADVERTISING SERVICE</p> <p>4. A SMALL HOME MAT SERVICE</p> <p>5. A PREPARED PUBLICITY SERVICE</p> <p>6. SMALL HOME MODELS — WOOD OR CARDBOARD</p> |
|--|---|

Write to

NATIONAL SMALL HOMES DEMONSTRATION, Inc.

1337 Connecticut Avenue, N.W.

Washington, D. C.

WINTER WINDS... MEAN WINDOW CONDITIONING

and profitable extra business for you!



There are still plenty of wintry days ahead. Suggest pine storm sash for greater comfort and lower fuel bills. Western Pines are ideally suited to this purpose—easily milled, light to handle, strong and tough-fibered.

THE WESTERN PINES WILL DO YOUR NEXT JOB BETTER — TRY THEM

Western Pine Association, Yeon Building, Portland, Oregon

*Idaho White Pine *Ponderosa Pine
*Sugar Pine

THESE ARE THE WESTERN PINES

New Building Materials and Equipment

Standardized Oak Paneling

AN EXAMPLE of the "character marked" Appalachian oak which goes into the "Century" brand packaged hardwood wall paneling is illustrated below. This is part of a line of the M. B. Farrin Lumber Company, Cincinnati, Ohio. This new idea in packaged wall paneling is being promoted through the retail lumber dealers and is gaining in popularity because of its ease of application and beauty of the finished wall. An all-wood paneled room in every home is the present-day trend.

The Farrin line also includes aromatic cedar closet lining, oak and maple flooring, packaged stair treads, door sills, etc.

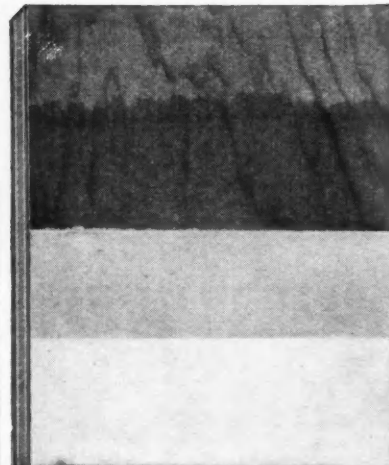


"CHARACTER MARKED" Appalachian oak standardized wall paneling in vertical board effect.

"Firzite" Prefinishing Treatment

THE "WILD" grain effects, grain showing through well painted work and other difficulties encountered in staining, painting or enameling fir plywood are overcome by a single application of "Firzite," according to Breinig Bros., Inc., Hoboken, N.J., the developer of this product. Penetrating the spring and summer growths of the wood uniformly, "Firzite" makes the subsequent coats "take" smoothly and evenly. The accompanying illustration shows the painted effect obtained. The four stages, from top to bottom, are: (1) bare fir; (2) one coat of "Firzite"; (3) enamel undercoat; (4) eggshell enamel finish. Note the absence of grain or hairline checking.

Available in both quart and gallon cans, "Firzite" has an average coverage of 600 square feet per gallon. However, the manufacturer advises that consistent reports of coverage averaging up to 800 square feet have been received. Free samples of "Firzited" plywood are being distributed.



TOP to bottom: The four stages of plywood finishing with new product giving perfect surface on the last coat.

Maple provides complete harmony of floors with furnishings and paneling, in this modern new home in Highland Park, Chicago suburb. Living room, bedrooms, library, halls and stairs have Northern Hard Maple floors. Associated architects, PAUL SCHWEIKER and THEODORE WARREN LAMB, Chicago.



It's Maple Floors for truly Modern Homes

Watch the swing back to Maple... for homes! It's gaining momentum. For of all floors, none fits modern needs so well.

Smooth, warm, fine grained Hard Maple echoes the simple design of modern furniture, never clashes. It does not intrude on attention, merely complements the beauty of furnishings—makes floors what they *should* be, a background for detail decorative effects.

Note in the photographs on this page, no special attention is drawn to floors, yet how perfectly Maple serves as a "base for beauty."

So smooth, too, it cheerfully reflects daylight, takes a high polish, can be finished "natural" or in a variety of rich, transparent colors*

*** THREE WAYS TO USE HARD MAPLE:**

1. In unselected color (strips or blocks).
2. Grouped for color tone ("White Clear" or "Brown Clear").
3. Color finished—(Early American, Spanish Brown, Ebony Black, etc.)—to match any decorative scheme. Write for folder.

... is a flooring of rare beauty, ever practical, ever a tribute to taste... Time merely adds to its charm.

Lay Hard Maple in homes—as in schools, stores, recreational and public buildings—to add a "second profit"... that of a satisfied customer. Look for the MFMA trademark on the flooring—it guarantees genuine Northern Hard Maple, assures satisfaction.

See our catalog data in Sweet's, Sec. 11-78

MAPLE FLOORING MANUFACTURERS ASSOCIATION

1781 McCormick Building, Chicago, Ill.



To the bedrooms, smooth clean Maple brings warmth and cheer. In the library, the quiet fine grain of Maple adds to comfort and charm.

Floor with MFMA Maple

REG. U. S. PAT. OFF

(N O R T H E R N H A R D)

TO SELL THE HOUSE— SELL THE HOUSEWIFE



HOME-BUYERS' CHOICE is this entrance hall floor of Armstrong's Linoleum in an Evanston, Ill., residence. The field is Black Marbelle No. 021 with a star inset in White No. 23. Nationally advertised Armstrong's Linoleum helps sell houses because it has wider consumer-acceptance.

*For floors that catch the feminine eye,
use colorful Armstrong's Linoleum*

FEW homes are bought without a woman's stamp of approval. By installing colorful floors of Armstrong's Linoleum in the houses you build, you win over the woman instantly. And don't forget to mention that the linoleum is *Armstrong's*. That's a name she is sure to know.

From your viewpoint, Armstrong's Linoleum is a most satisfactory floor to work with. The 200 colors and patterns available make it easy for you to create appropriate floors for homes of every type. From the buyer's viewpoint, floors of Armstrong's Linoleum immediately suggest a home that's easy to keep clean—one which will have unscuffed, fresh-looking floors for years without replacement or expensive refinishing.

For over 20 years, Armstrong's national advertising has been telling *millions* of women that Armstrong's Linoleum is ideal, not only for kitchens, bathrooms, and entrance halls, *but for every room in the house*. See Sweet's for full information, or write for color-illustrated booklet. Armstrong Cork Company, Building Materials Division, 1218 State Street, Lancaster, Pa.



ARMSTRONG'S FLOORS LINOLEUM

Rubber Tile • Linotile (Oil-Bonded) • Asphalt Tile • Cork Tile • Linowall Wall Covering

Porce-Tite Waterproof Paint

A WHITE waterproof and fireproof paint, called Porce-Tite, has been announced by Bedard & Morency Mill Company, Oak Park, Ill. This paint, which gives a white porcelain-like surface, may be used on exterior or interior surfaces such as cement, concrete, face brick, common brick, cement and cinder blocks, stucco, clay tile, cast or natural stone, weathered asbestos siding, coating for asbestos pipe covering, cement floors, for anchoring bolts or brackets in concrete, and all types of plaster-board or fibre building boards. When mixed to a mortar consistency, it can be used for filling cracks or holes in all types of masonry.

Porce-Tite is easily applied with brush or spray, sets in three hours, and dries in twelve hours, producing a smooth, hard surface which repels grease and dirt. Due to this surface it can be washed with paint cleaners and washing compounds without marring or destroying the finish.

"Easy Glide" Window

A NEW type of window, which has no weights, pulleys or cords, yet slides easily up and down in any weather and stays open securely at any height, is being produced by the Freeland Millwork & Supply Co., Detroit, Mich. Besides making this "Easy Glide" window completely weathertight, the manufacturers have, by an ingenious arrangement, made it possible to quickly remove both upper and lower sash without trouble, to facilitate washing the outside of the glass. With no weights or counter balances, this window is reported not to stick in any weather, opens easily and remains open securely at any height without the use of bolts, screws, or clamps.



NEW "Easy Glide" window sash can be quickly removed for cleaning.

Master No-Draft Sash Balance

A NEW, improved patented spring sash balance which combines weatherstripping with sash operation in one unit, known as the Master No-Draft sash balance, is announced by the Master Metal Strip Service, Inc., Chicago, Ill. This new unit, when fitted to either old or new double-hung sash, provides an easy operating, trouble-proof window, weatherproofed under all conditions of wood shrinkage or swelling.

The balance consists of a strong, flexible, aluminum channel guaranteed against rust corrosion, in which is housed a tempered steel spring of proper strength and tension for smooth operation of sash. Four springs are used per window, laboratory tested for 25,000 operations. One end of the spring is fastened to top of jamb, the other end to bottom of sash, and action of spring perfectly counterbalances frictional contact of weatherstrip members. Installation is simple, requiring only a sash groove $\frac{3}{8}$ x $\frac{3}{8}$ inches. No adjustments or maintenance of any kind are required after installation. If desired, runways are completely metal covered, including parting strip.

Tytecote Insulation Blanket

SPECIALTY Converters, Inc., East Braintree, Mass., is marketing Tytecote insulation blanket, an efficient one-inch felted mat composed of fire-retarding fibres permanently sealed in a substantial waterproof heat-reflecting envelope.

This envelope is built up of two sheets of heavy kraft paper cemented together with a thick layer of asphalt and strongly reinforced between sheets with jute cords. The two exposed surfaces are processed with a silver-like, non-oxidizing metallic coating which has high reflective properties and is also waterproof. Within the waterproof envelope is a compact one-inch

(Continued to page 96)

★ ★ THIS THEATER FEATURES ★ ★

*the quiet, comfort and beauty of a
Temlok DeLuxe
interior*



ATTRACTIVE PATTERN AND COLOR EFFECTS in the Foster Theater, Youngstown, Ohio, were obtained by using Coral Temlok De Luze Beveled Plank on upper walls and Ash Panels on ceiling. Pilasters and wainscot were finished in Armstrong's Temboard De Luze. Contractor: Heller-Murray Company, Youngstown. Scheibel and Shaffer, architects.

PROFIT for you, and lasting satisfaction for your customer . . . that's the twofold result you work for on every building job. And that's the result you can be sure of when you use Armstrong's Temlok De Luze for new construction or remodeling, residential or commercial.

This smooth-surfaced structural interior finish meets *three* separate needs in *one* application . . . and at *one* cost! First, Temlok De Luze **DECORATES**:—it comes factory-colored in cream, green, ash, coral, and white; it is made in planks, panels, and boards that can be combined into a wide variety of interesting pattern effects.

Second, Temlok De Luze efficiently **INSULATES** against heat and cold:—it saves fuel for your customers and increases year-round room comfort. Third, this versatile wall and ceiling material **QUIETS NOISE**—a feature especially im-

portant in offices, theaters, and public buildings. Furthermore, it is made by the makers of Armstrong's Linoleum—a company you can rely upon for consistent high quality.

You'll find Temlok De Luze easy to handle and quick to install. Authorized retail lumber dealers throughout the country are equipped to give you efficient service. Get all the facts about Temlok De Luze. Write today for samples and literature to Armstrong Cork Company, Building Materials Division, 979 Concord St., Lancaster, Pennsylvania.



SAVE TIME AND MONEY ON TEMLOK JOBS WITH TEM-CLIPS

New galvanized metal devices—Armstrong's Tem-Clips—provide a *permanent, invisible support* which "floats" individual panels or planks against furring strips on walls and ceilings.



Tem-Clips eliminate high shearing stresses caused by lateral movement of the furring, allowing normal movement of the base without disturbing the Temlok panels. For a faster, more efficient installation, try Armstrong's Tem-Clips—they'll save time and money, and increase your customer's satisfaction. Samples and complete specifications will be sent on request.

Armstrong's TEMLOK INSULATION

DE LUXE INTERIOR FINISHES

TEMSEAL SHEATHING - LATH - ARMSTRONG'S MONOWALL



You Can Make
MORE MONEY
with the
NEW
HIGH SPEED
AMERICAN
STANDARD

BIG PROFITS

Here's your chance to make some big money—be your own boss and get into something for yourself. There is no reason why you should not be a big success in the floor surfacing business—you already know a lot about the building game, so you naturally have a head start on the other fellow.

EFFICIENT ONE-MAN MACHINE

The time saving, money-making new American high-speed Standard floor sander is easy to run—no skill is required to operate and within a few hours you can run one as well as an "old timer." American floor sanders are easy to take from job to job. You don't need any helpers.

SEND COUPON

Be sure to sign and mail coupon below and get complete details and prices without cost or obligation. It costs you nothing to investigate. So, if you are in a rut, now is the time to get out and become independent—have your own American Method floor surfacing business.

AMERICAN FLOOR SURFACING MACHINE COMPANY

511 SO. ST. CLAIR ST.

TOLEDO, OHIO

Gentlemen:

Send complete details and prices without cost.

- I want to go into floor surfacing business.
- I would use sander in my contracting business.

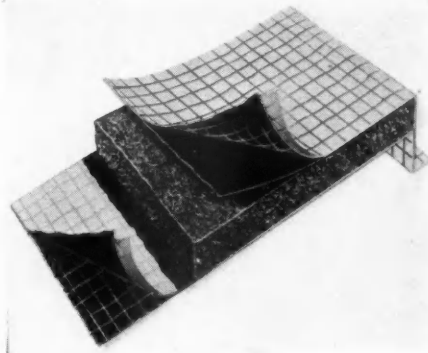
Name

Street

City State

(Continued from page 94)

thick, felted mat of fire-resisting fibres, firmly cemented in place with asphalt on all sides. The edges of the envelope firmly cemented together extend 1 3/4 inches beyond edges of mat to form a 3/4-inch nailing flange and a one-inch spacing flange.

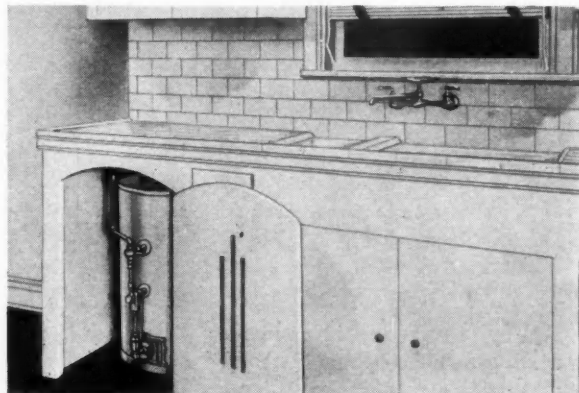


STURDY, waterproof envelope seals felted mat insulation blanket.

Kitchen Cabinet Water Heater

THE Hotstream Heater Company, Cleveland, Ohio, is offering a kitchen cabinet model automatic storage water heater, Model KK. It is designed for homes and apartments with limited space, and is usually placed in an under-sink compartment, although it can be located equally well in any other section of the kitchen.

Besides this very worth while space-saving feature, the Kitchen Cabinet heater also provides an extra heavy steel storage tank, snap action thermostat which can be regulated by the user to provide hot water at temperatures desired, a safety pilot which automatically cuts off gas supply to the main burner, a heavy rock wool blanket to minimize heat loss, and an optional temperature and pressure relief valve or a gas control valve are available as extras.



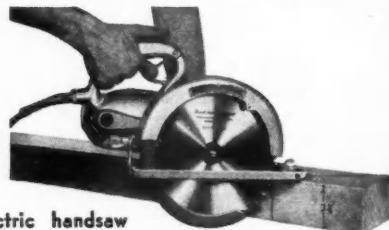
COMPACT automatic water heater fits under kitchen sink.

Portable Electric Handsaw

A NEW portable electric handsaw, the Model A-9", is now being marketed by Fred W. Wappat, 7323 Penn Ave., Pittsburgh, Pa. This saw has a 9 1/2-inch blade with a maximum cutting capacity of 3 3/4 inches, and will bevel cut 2-11/16 inch thick lumber at a 45-degree angle, simplifying the cutting of jack rafters, etc. Weighing but 21 pounds, it is well balanced for easy one-hand operation, and can be operated either vertically or horizontally; inverted and set in a stand, it becomes a table saw for cutting small pieces.

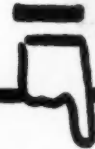
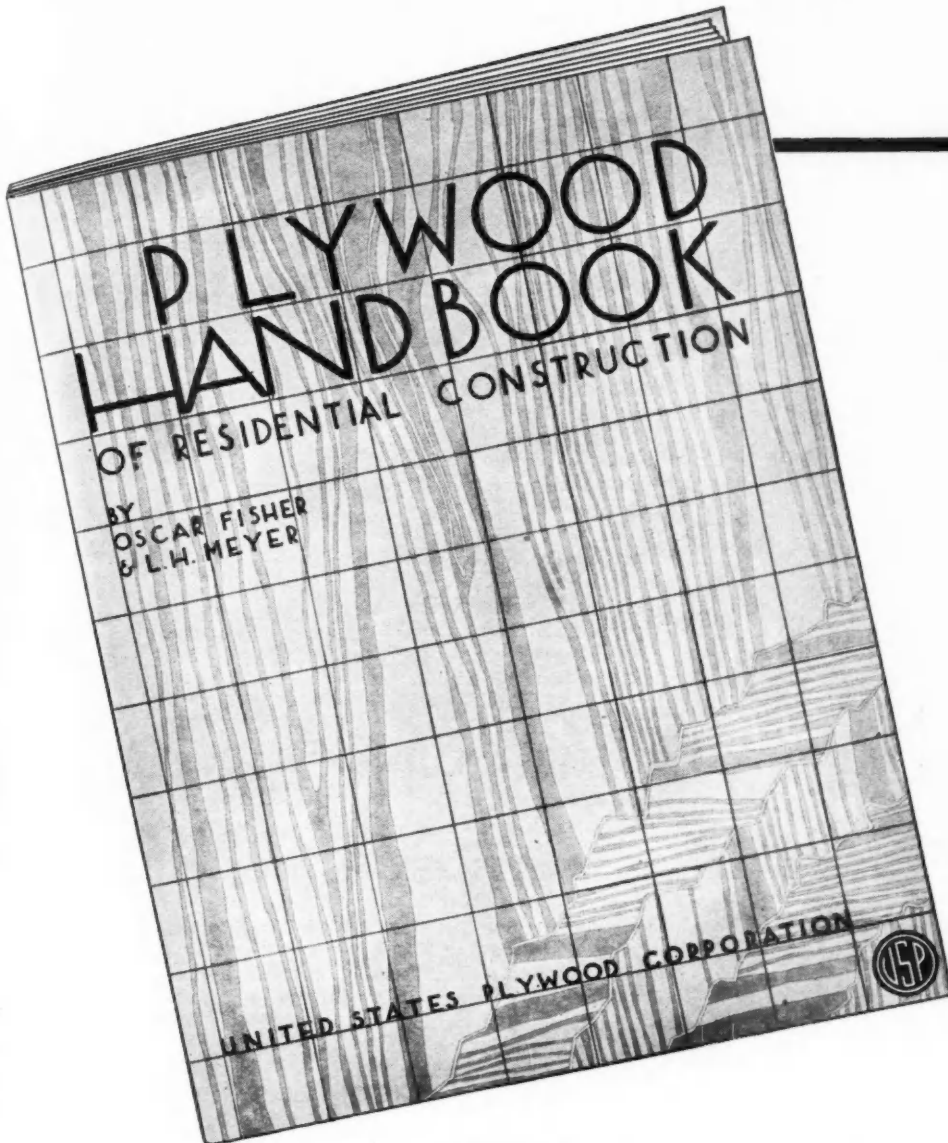
Several features of this handsaw are: a telescoping safety guard and an automatic safety switch; a graduated quadrant for precise bevel adjustments; an effective guard to keep sawdust out of operator's eyes, and a blower to keep the cutting line clear and completely visible.

This saw will cut a 3 x 6 in two seconds, and can be equipped with abrasive discs.



NEW portable electric handsaw

FREE to ARCHITECTS and BUILDERS



The Plywood Handbook

summarizes the *field* experience of *practical* men in the erection of all-plywood houses. It explains the fundamental steps in design and development and includes draughting details such as

● EXTERIOR and INTERIOR CORNERS and JOINTS, DATA on INSULATION and MOISTURE BARRIERS, NAILING and FINISHING.

The TYPICAL PLANS and renderings of \$2,000, \$3,500 and \$5,000 HOUSES with outline SPECIFICATIONS and COST BUDGETS will serve as a sound basis from which designers can develop individual ideas.



One hundred illustrations make the Plywood Handbook a clear, concise and invaluable aid to the practical man.



FREE *A note on your letterhead or business card will bring this 40 pp. 8½" x 11" booklet* **FREE**

UNITED STATES PLYWOOD CORPORATION

Producers of

WELDBORD

DeLuxe Blue Label

FOR interior trim, in bright finish or under paint, enamel or wallpaper.

WELDWOOD

Waterproof Plywood

FOR Siding or any other outdoor use.

DOUGLAS FIR

the all-purpose Plywood

FOR cabinets, under-flooring, sheathing, wallboard and built-ins.

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BRANCH OFFICES AND WAREHOUSES IN PRINCIPAL CITIES



Designed by
Robert Charles Martin

Another successful year for Fox Chase Manor . . . with CONCRETE again featured

Firesafe concrete helped Joshua M. Holmes, Jr., builder and developer, and Heyer-Kemner, Inc., realtors . . . and it will build business for YOU

Fox Chase Manor, just outside Philadelphia, made its initial bid for public attention by featuring *better construction* with firesafe, economical concrete.

52 houses were sold the first year, 46 more this year! And *eighty-five percent are concrete*. The basic sales price, including lot and landscaping, is \$4,450—a grand value for these attractive homes.

In the past four years, over 45,000 home buyers have chosen concrete. They like its beauty that is adaptable to any architectural style . . . its delightful comfort in winter or summer . . . its assured protection against fire, storms, termites and decay . . . its low first cost, low upkeep and high resale value—all factors that make concrete homes the top in value.

Put concrete to work as a powerful sales aid for your houses. Write us for literature.

USE
COUPON FOR
VALUABLE
FACTS

PORTLAND CEMENT ASSOCIATION

Dept. A1-3, 33 W. Grand Ave., Chicago, Illinois

Yes, I am interested in the profit possibilities of featuring concrete home construction.

- Please send booklet suitable for showing to prospects, "Why People Like Concrete Homes."
- Send literature on construction details.

Name _____

Address _____

City _____ State _____

New "Red Devil" Floor Sander

LANDON P. SMITH, Inc., Irvington, N.J., manufacturer of "Red Devil" glass, painting and woodworking tools and equipment, has developed and produced the new No. 444 "Red Devil" Leader Model floor sander, following its recent acquisition of the Rugaard Mfg. Co., Lawrence, Mass., maker of flooring machines.

The machine, which is built in the popular 8-inch size, weighs only 120 pounds and is easily carried without fatigue or awkwardness. Its finger control permits easy operation, and its disc-type floor wheels roll smoothly and noiselessly on rubber tires. A special feature is the centrifugal fan which automatically gathers all dust into the machine's dust bag.

Powered by the specially built "Red Devil" 1-horsepower motor, guaranteed to carry a 1½-horsepower load without heating, and with a cutting speed of 1550 revolutions per minute, the "Red Devil" floor sander scrapes the average room in less than an hour. Its adjustable floor contact pressure feature permits the "feather touch" in refinishing inlaid floors.

The scientifically balanced 4½-inch diameter drum is solid and steady to the floor, sanding smoothly and without vibration to within ⅛-inch of straight baseboards, or flush with ½-inch round, and is equally effective with backward or forward motion, getting into the corners and out-of-the-way places. This special drum assembly permits quick and easy change of sandpaper, and the handle assembly may be adjusted to suit the operator's height.

DRUM SANDER works close to floor edges.



Improved Disc Floor Sander

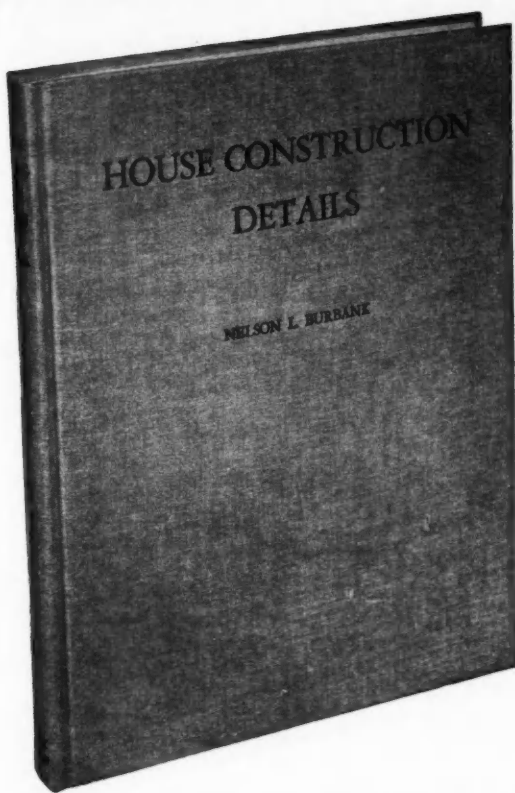
A NEW disc sander for floor edges, borders, stairs, landings, closets and small halls, named American Spinner, has been developed by The American Floor Surfacing Machine Co., Toledo, Ohio. With this machine, edges are quickly surfaced, smoothly and beautifully matched with the rest of the floor. It works right up to the edge, making it unnecessary to remove quarter round or shoestraps.

Features of construction include:

Cast aluminum alloy used throughout, except motor and disc, the latter being precision balanced 7-inch diameter, grooved resilient rubber pad vulcanized to steel disc; free rolling disc guard protects rubber pad without interfering with sanding action; the motor is heavy duty universal type, air cooled; all revolving parts are provided with highest quality ball bearings; the dust pick-up system is composed of over-sized parts along with full aluminum skirt to assure complete pick-up at all times. Machine weighs 25 pounds net, is approximately 9 inches in diameter and 14¾ inches high, has capacity to sand borders and edges of average size bedroom in 8 to 12 minutes, is equipped with built-in headlight, 50 feet of trailing wire, sample surfacing discs, wrench, and disc tool.

WORKMAN using Spinner sander in closet.





Now Ready
**HOUSE CONSTRUCTION
 DETAILS**

Compiled by Nelson L. Burbank

Author of Carpentry and Joinery Work

Builders will find this new book helpful when making alterations in a set of stock plans and when drawing up a complete set of plans. By simply referring to the detailed cross-index the draftsman can locate drawings of construction details and photographic views of the finished work which can be used for guidance. The layout of these details is in accordance with standardizations recommended by housing authorities wherever such have been established.

In this book are brought together the best features of two popular predecessors: "Good Construction," by "American Builder," and "Building Age Construction Details." Sections are presented in construction sequence so as to constitute a working guide in detailing every step in the construction of a modern dwelling, from foundation to finish.

Many of the details and photographic views have appeared in "American Builder and Building Age." In addition there is brought together graphic and factual information that is otherwise scattered through books, magazines, catalogs and sets of plans. Because of its plan of organization it can be used as a companion volume to the author's CARPENTRY AND JOINERY WORK by carpentry apprentices and in the school as well as in the contractor's drafting room.

Many of the important new building materials such as plywood which have been developed in recent years are pictured. The assembly of pre-fabricated units is shown in step-by-step views. Various systems of pre-fabrication construction are shown as well as the standard methods of wood frame house building and finishing.

CONTENTS

Floor Plans—Sets of House Plans; Excavations — Foundation Forms— Foundations; Outside Walls; Inside Walls — Wall Sheathing — Ceiling Joists; Roof Construction—Bay Construction — Roofing; Cornices and Porches; Exterior Wall Construction; Interior Wall Coverings—Interior Trim; Stair Construction; Windows; Doors; Hardware; Closets—Shelves—Built-in Equipment; Finished Flooring; Chimneys and Fireplaces; Scaffolds; Garages; Heating—Air Conditioning; Elements of Electric Wiring; Insulation—Sound Proofing; Gates—Garden Furniture; Shopcrafter's Corner; Camps—Cabins — Cottages; Farm Buildings; Wood Connectors; Pre-fabrication —Modern Building Materials; Painting and Finishing; Modern Homes; Index.

320 pages, 1500 illus., 9 x 12 inches, cloth, \$3.00

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News of the Month

Building Activities and Meetings

December Residential Building Volume Indicates Continued Increase Over '38

RESIDENTIAL building volume for the first half of December, according to F. W. Dodge figures, amounted to \$45,788,000 in 37 eastern states; this represents an increase of approximately 10 per cent over the same fifteen-day period of 1938. Statistics for the four classes of construction as recorded during November are as follows:

37 Eastern States	Nov. 1939	Nov. 1938	Dec. 1-15, '39
Residential	\$116,588,000	\$ 95,253,000	\$ 45,788,000
Non-Residential	77,769,000	116,008,000	26,482,000
Public Works.....	81,584,000	70,692,000	26,978,000
Utilities	23,906,000	19,726,000	9,939,000
Total	\$299,847,000	\$301,679,000	\$109,187,000

RFC Buying of Title I Loans on New Small Homes Expected to Expand Market Greatly

BECAUSE of the recent decision by the Reconstruction Finance Corporation to purchase small mortgages from lending institutions granting loans for new low-cost dwellings, it is expected by officials of the RFC and the Federal Housing Administration to stimulate additional credits for new home construction.

A statement by Jesse Jones, federal loan administrator, explaining this action, is as follows:

"The Federal Housing Administration has issued revised regulations covering insurance of Class 3, Title I loans up to \$2,500, the proceeds of which are to be used to finance the erection of new homes.

"The RFC Mortgage Company will, until further notice, purchase these Class 3, Title I loans bearing 4½ per cent interest and a service charge of ½ per cent, where the entire proceeds are used to finance new homes the construction of which is started after January 1, 1940. These mortgages will only be bought from originators of the loans who establish to the satisfaction of The RFC Mortgage Company sufficient financial responsibility, their qualifications to service the loans, and who provide an FHA insurance reserve equal to 10 per cent of the original principal amount of the loan, and whose office or a branch thereof satisfactory to The RFC Mortgage Company is situated within 100 miles of the mortgaged property.

"Loans will be purchased at par and, upon execution of a contract to purchase a loan, a fee of one-half of 1 per cent of the loan will be charged. Originators and sellers of the mortgages will be required to service them and may retain the service fee of one-half of 1 per cent paid by the mortgagor, and, in addition, will be allowed another one-half of 1 per cent.

"The RFC Mortgage Company will not purchase modernization and improvement Title I loans or loans evidenced by notes written on a discount basis as distinguished from interest-bearing notes."

Stewart McDonald, FHA administrator, has pointed out that loans for new homes under Title I may be obtained up to \$2,500, or the cost of construction, whichever is less. Borrowers under this plan need only own a lot free and clear, representing at least 5 per cent of the appraised value of the completed property. As an alternative, the house may be built on leased land when the borrower has invested 5 per cent in the completed property.

The maximum financing charge includes 4½ per cent interest, annual service charge of one-half of 1 per cent, and mortgage insurance premium of one-half of 1 per cent on original principal.

"To assure sound construction and protect buyers of homes," Mr. McDonald explains, "the FHA after Jan. 1 will make at least three inspections on all homes financed with loans insured under this section of the act and will have the benefit of the same minimum construction requirements and property standards as are applied to properties under Title II.

"The small home provisions under Title I are designed to make home financing under the FHA more flexible. A smaller equity requirement may be needed under Title I, and the FHA

(Continued to page 102)



Photo taken at U. S. Housing Project No. TEX 5-1, Houston.

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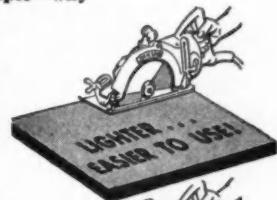
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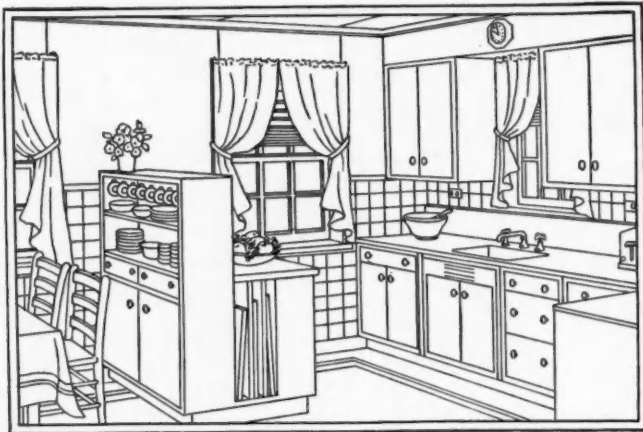
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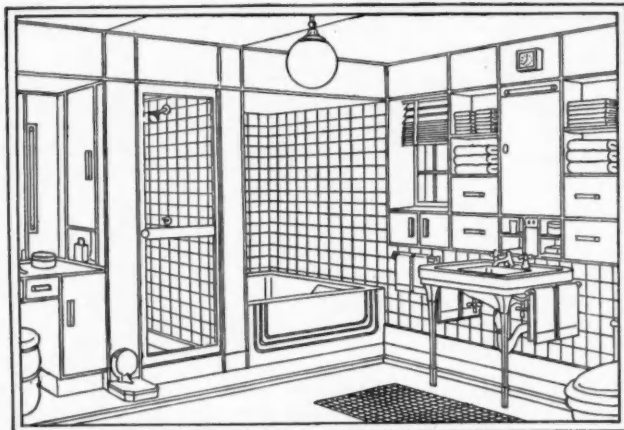
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Some suggestions for using Masonite Presdwood Temprtile



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The new-home and remodeling ideas outlined on this page are being carried to millions of home-owners in full-page national advertising that will appear in February issues. We believe you'll be interested in examining Masonite Presdwood Temprtile for yourself, and will gladly send you a free sample on request. For your convenience, just clip and mail coupon.



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(Continued from page 100)

will leave the question of the borrower's credit risk up to the institution making the loan. The Title I loans have a maximum maturity of fifteen years."

N.A.R.E.B. Survey Forecasts Better Building and Sales Year for 1940

THE volume of real estate sales in the year 1940 will be higher than for 1939 in three cities out of every four of the country, according to a forecast of the real estate market for 1940, made by the real estate boards in 261 cities, and prices for residential property will be higher in almost one city out of every two, at least for new-built structures and for existing structures that are modern types and in the low-cost range.

While there are many uncertainties, it is further forecast that 1940 will be a recession year for old houses. A split will be visible between the market situation for obsolescent properties and for those properties, old or new, that have been tailored to fit today's life. However, for wanted types and new structures, barely one city in twenty faces either price drop or slower sales.

Industrial upthrust has penetrated so far that industrial property will have heightened demand in one-third of all cities reporting. Only 7 per cent of the cities look for a let-down.

A new feature of the real estate situation is likely to be a stir in the long moribund demand for vacant property. In 48 per cent of the cities over the country real estate boards predict a livelier market immediately ahead for this type of property. Only 7 per cent expect present interest in it to fall off.

Rent Changes, if Any, to Be Largest Upward; Single Family Dwellings Largest Element of New Construction

Change in the rent level, where any occurs, will be predominantly upward, the boards predict. Rents for detached houses will rise much more generally than apartment rents. In single-family dwellings, 45 per cent of the cities look for a rise, 52 per cent look for present rates to continue; only 3 per cent look for lower rates. Apartment rents are expected to stay put in 61 per cent of the cities, to rise in 31 per cent of the cities.

Construction volume will increase, but not evenly in all types. The "20 per cent increase for single-family dwellings" for the nation as a whole by one high but unquotable Washington source coincides quite accurately with the real estate board forecast. In 62 per cent of the cities livelier new home building is in sight, and in only 8 per cent of cities is it likely to fall off. Only 24 per cent of the cities expect greater activity in apartment construction, but 57 per cent expect present volume to hold. It is interesting that 17 per cent see an up in construction of new business buildings, but on the whole commercial construction promises to be little over that of the past year.

More money rather than less will be available for financing real estate investment and development in the coming year and the real estate boards hazard the opinion that it will cost less than it did in the last year. Lower interest rates are foreseen in 17 per cent of the reporting cities; better supply is in sight for 31 per cent while only 2 per cent fear the supply may dwindle.

"No new subdividing" is the expectation in more than one city, but in three cities out of ten subdividing will increase in volume. In one out of ten present activity is expected to fall off.

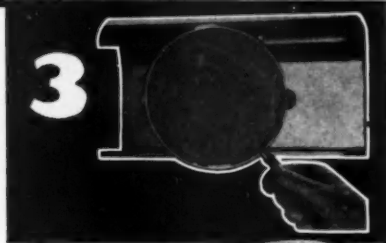
Biggest Cities Have Rosiest Outlook

In prospects for better residential prices, both in sales and rentals, big cities lead the country, while 56 per cent look for higher sales prices, 63 per cent for higher dwelling rentals, 33 per cent for higher apartment rentals. But not one city of over 500,000 population forecasts higher prices to be general in its community for downtown property. Cities of between 25,000 and 100,000 population have the best outlook for central business property, with one-third of them seeing good prospect of higher prices, and only one in twenty anticipating a drop.

For construction of single-family dwellings, No. 1 outlook is in New England, where higher volume is expected in 79 per cent of cities. No. 2 forecast is from the Southeast region (70%). No. 3 is the North Central region (69%). For apartment construction it is the Southeast region (37%), followed by the Southwest region (33%) and the Great Lakes region (28%). For construction of new business space it is the Southeast region (27%), followed by Great Lakes region (25%), and Central Atlantic region (22%).

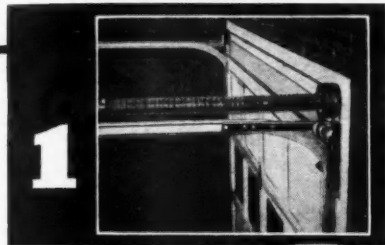
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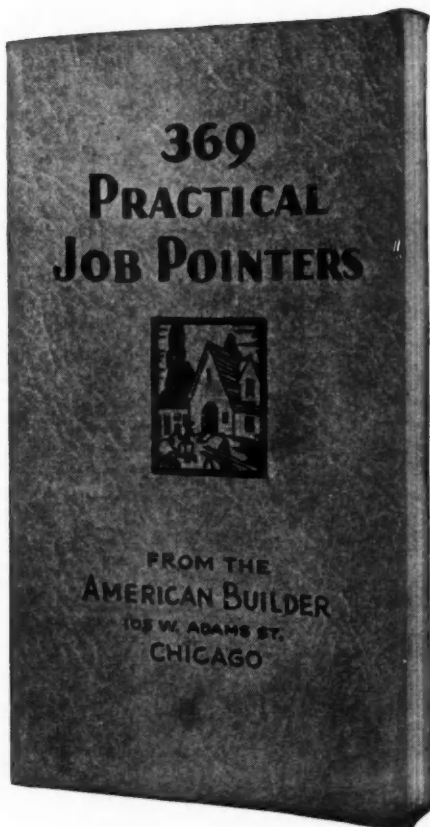
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Every pointer is clearly illustrated by a clear working drawing or photograph. Some pointers show alternate methods. An index facilitates quick reference to a particular problem. The book is roughly divided into three sections:

1. Ingenious methods or practical pointers on how to do it.
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3. Details of construction and recommended ideas.

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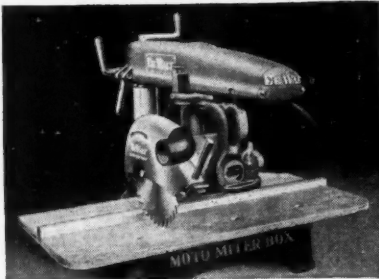
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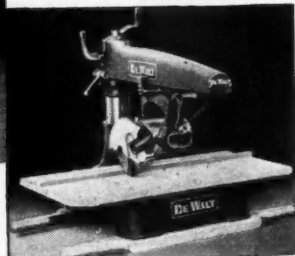
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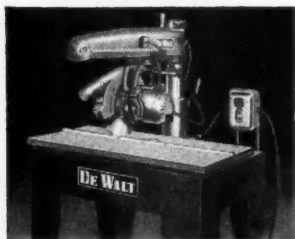
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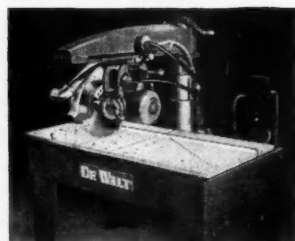
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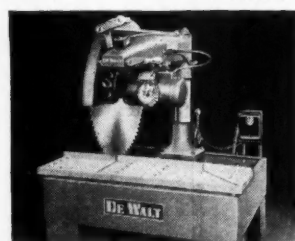
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Census Gathers Building Industry Facts

THE building industry will be subjected to a much-needed, nation-wide checking over by the U. S. Census Bureau when that governmental agency begins its Business, Manufactures and Mines and Quarries census-taking Jan. 2, 1940.

These three censuses mark the first phase of the Sixteenth Decennial Census Year. The second phase, which gets under way Apr. 1, will include a complete census of the nation's population, housing, farms, occupation and unemployment.

Builders and building contractors will be covered under the Business Census. The construction schedule, Form 60, is designed to bring out an over-all picture of the present condition of the industry. The schedule includes nine sets of questions, each probing a particular angle.

The queries are of general nature, aimed to measure volume and turnover. Builders are requested to report value in dollars of total contracts received, work subject, work performed, material and machinery used, and annual payroll.

Beside the total number of hired workers, information is also desired regarding proprietors, firm members and members of the family gainfully employed by the business. Reason behind this query is to obtain information regarding the total number of people who find employment in the industry.

The most important new query on the construction schedule requests a breakdown of contracts or orders received and work sublet into five categories: (1) New one or two family houses; (2) New residential buildings such as apartments; (3) New industrial buildings (factories, warehouses, etc.); (4) Office and commercial buildings, churches, schools, hotels and hospitals, and (5) Repairs and alterations to buildings. Answers are to be in dollar values and are to be entered under one of two headings denoting whether the work was done within or outside the metropolitan limits of a city.

In selecting questions to be included on the schedule, the Bureau conferred with representatives of all phases of the building business. No questions were included that were not considered pertinent and of most value to the industry.

When the 12,000 enumerators assigned to the taking of the Business, Manufacturers and Mines and Quarries censuses complete the task of interviewing the country's estimated 3,000,000 business concerns (including 200,000 construction contractors, 170,000 manufacturers and 30,000 mines and quarries operators), the Washington office will proceed to compile and analyze the information gathered. Figures will first be tabulated according to states, and then broken down by counties and cities and towns of over 2,500. No figures will be released which would disclose information regarding individual reports. As statistical tables are completed, they will be issued in mimeograph forms. Later they are to be published in pamphlets and finally in books.

Individual information received is kept in strict confidence by the Bureau. Only sworn Census employees have access to it. The Congressional act which authorized the census also forbids the disclosure of any information from individual reports to other agencies whether governmental or not.

According to Census figures, there were 75,047 contracting establishments in the country in 1935, doing a total business of \$1,622,862,000. The same table shows that 57 per cent of this work was done in the city in which the firm was located, 27.4 per cent in the company's state and 15.1 per cent in other states.

NEWS BRIEFS--

THE Red Cedar Shingle Bureau has announced that **FRANCIS D. HOLMES** has joined its staff as eastern field representative. He comes to the Bureau with impressive record of over twenty years' association service, recently having been manager of the Tri-County Lumber Exchange of Detroit, Mich. . . . **F. A. SILCOX**, chief of the Forest Service, U. S. Department of Agriculture, died suddenly Dec. 20 in Washington, D. C. . . . A Mortgage Bankers Assn. of America survey indicates that occupancy of office buildings in 64 principal cities now stands at about 85 per cent. . . . **EARL MARR** has been named sales manager of heating for the Airtemp Division of Chrysler Corp.



EARL MARR



copy of "American Builder Buyer-Approved Homes" is included with a paid-in-advance new or renewal American Builder subscription order, accompanied by \$2 for one year, \$3 for two years, or \$4 for three years. To get YOUR copy use the form at right.

Continued from preceding page

Additional Promising Candidates For Your Clients' Quick Approval

A W. C. Tackett Home

in Scarsdale, Ill., combining the types of modern styling and detail that have proved salability in today's market. Arrived at after repeated testings of public reaction to various new features—equipment items, methods of room arrangement and exterior design. Exterior view, floor plans, elevations, construction details and outline specifications on pages 50 and 51.

Easy to Buy, Easy to Own

is an attractive house by experienced builder John A. Baldwin, Teaneck, N. J. Quartered oak floors, solid brass hardware, complete insulation, year-round air conditioning, spacious rooms, etc., combine to make it a thoroughly satisfactory buy to those who can afford the \$85 a month over a long period which it costs them.

Corner Lot Colonial from the Midwest

designed and built by the McKay Construction Co. at Cedar Rapids, Iowa, offers a very attractive elevation facing each street. A neat cornice with wide fascia and dentil course give an added note of distinction. Five rooms on first floor, bedroom, home office, toilet and roomy storage space on second floor.

The "Home of Today"

which was awarded First Prize in the annual competition of the Chamber of Commerce of the Borough of Queens for dwellings in the less than \$5,000 price class. A typical example of what the fastest building community in the United States considers a practical, salable home in the popular price class. Has spacious living room, with open staircase, arch entrance to center foyer, off which are two bedrooms, bathroom, large airy kitchen and dinette. Space available in the attic for two additional rooms without requiring structural changes in the plan. Fully detailed on pages 84 and 85.

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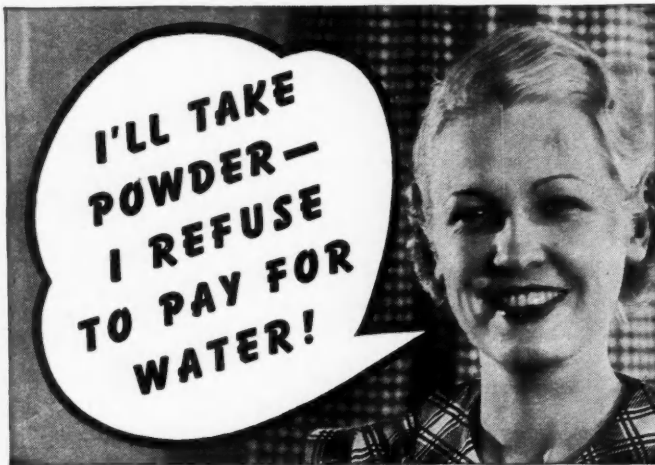
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... IF WOMEN BOUGHT CASEIN PAINT



- Thrifty Housewives Buy Flour—Not Dough
- Thrifty Paint Users Buy Powder Casein—Not Paste

MRS. HOUSEWIFE: I want to do a little decorating and I understand that casein paint gives an attractive effect at low cost.

MR. PAINT DISTRIBUTOR: Yes—it does. We have it in two forms, paste and powder.

MRS. HOUSEWIFE: What's the difference?

MR. PAINT DISTRIBUTOR: There's no difference as far as the finished product is concerned—both have to be mixed up. Both meet the same Federal Specifications.

MRS. HOUSEWIFE: Then, I suppose paste and powder are the same price?

MR. PAINT DISTRIBUTOR: No—casein paint in powder form costs about 25% less than the paste.

MRS. HOUSEWIFE: Why is that?

MR. PAINT DISTRIBUTOR: Well, the paste contains water and has to be packed in expensive metal containers. The powder is concentrated.

MRS. HOUSEWIFE: I'll take the powder casein paint then. When I bake a cake I buy flour not dough—I wouldn't think of paying for water!

The Lady is Right! Anyway you look at it—savings in cost; ease of mixing; fresh paint for every job—powder casein paint is the "buy" and the call is for **MODEX**.

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Please send me your new illustrated folder on Modex, the concentrated powder casein paint.

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195

BOOKS on BUILDING

A REVIEW of current publications in the building field. For information about these books, write American Builder, Book Service Dept., 30 Church Street, New York City, or the publishers.

THE STEEL SQUARE—by Gilbert Townsend. 1939. 96 pages, 101 illus., 5½ x 8½, cloth. American Technical Society, Chicago. \$1.25.

This explanation of the steel square has been written so that the reader will be able to learn all its standard uses entirely from the book; it is filled with actual examples, and no previously acquired knowledge of framing or other intricate carpentry operations is required. It explains clearly, by means of illustrations and detailed instructions, the various markings which appear on the square, and the purposes for which they are used by the carpenter. Instruction is also given on the use of the square in the construction of the different parts of wood-framed buildings, including detailed information on the building of roofs.

STEAM AND HOT WATER FITTING—by William T. Walters. 1939. 184 pages, 182 illus., 31 tables, 5¾ x 8½, cloth. American Technical Society, Chicago. \$2.00.

A "how-to-do-it" book which places before the readers the principles of good heating and brings out three main points—how to design the system according to good practice; how to select the best equipment for the system and know what each part should do; and how to install the equipment correctly so that it will function at its maximum efficiency. It is written in a clear, easy-to-understand manner, and should be of value to students, apprentices, steam fitters, draftsmen, designers, and others.

PRACTICAL MECHANICS HANDBOOK—by F. J. Camm. 1939. 400 pages, 379 illus. 5¼ x 8, cloth. Fortuny's, 67 W. 44th, New York City. \$3.00.

This is a book containing facts, figures, tables and formulae for the mechanic, fitter, turner, draftsman, and engineer. The author has laid stress on the inclusion of only useful information, listing tabular matter which is most constantly referred to, as well as a fully cross-indexed reference. Chapters cover such subjects as: drills and drilling, marking out for machining, lathe tools and tool angles, gears, soft soldering, soldering aluminum, case hardening, electro-plating, blueprints, reading and using the micrometer and vernier, sharpening and setting woodworking tools, wood finishes, woodwork joints, and how to obtain a patent.

DESIGNS FOR 60 SMALL HOMES FROM \$2,000 TO \$10,000—by Samuel Glaser, Architect. 1939. 72 pages, illus., 9 x 11, paper, spiral binding. Coward-McCann, Inc., New York City. \$2.00.

How to build, buy and finance a small home, with 60 original designs of small homes to choose from. An architect's drawing of the exterior view of the finished house, floor plans, a brief general description and an outline of the specifications are given, with approximate cost. The houses are of four types—American Colonial, English Cotswold, French Provincial and Modern—and are varied in construction—frame, concrete block with poured concrete floors, brick veneer, and stone. At the end of the book is presented a section on planning data for living activities, giving the results of a survey as they refer to design details of specific parts of the small one-family house.

REVOLUTION IN LAND—by Charles Abrams. 1939. 320 pages, 6½ x 9¼, cloth. Harper & Bros., 49 E. 33rd St., New York City. \$3.00.

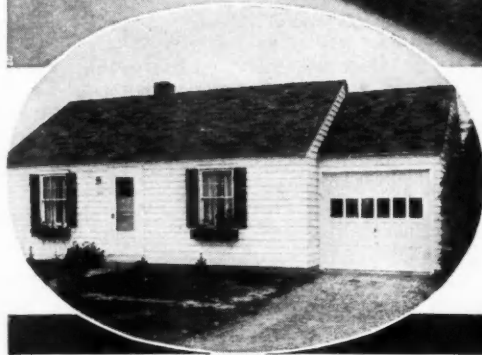
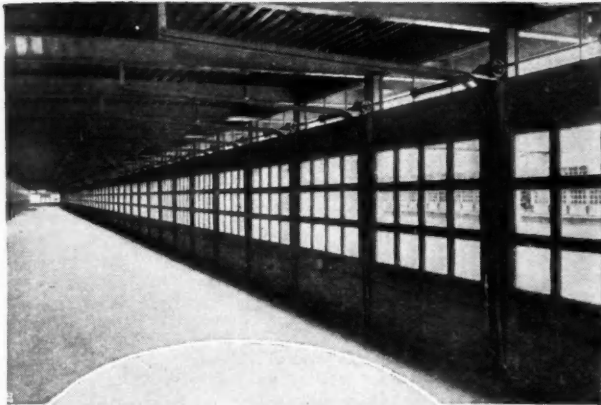
This book presents the story of the great transformation in the position of American land from the founding days to the present time. The land problem is viewed as an organic whole: home and farm ownership; urban and rural tenancy; the development of the mortgage system; the influence of local tax policy on land use; the backwardness of the construction industry. Finally, the scope and methods of government interference are described and the consequences critically appraised—including federal farm legislation, housing laws, government slum clearance, and lending programs for public and private building.

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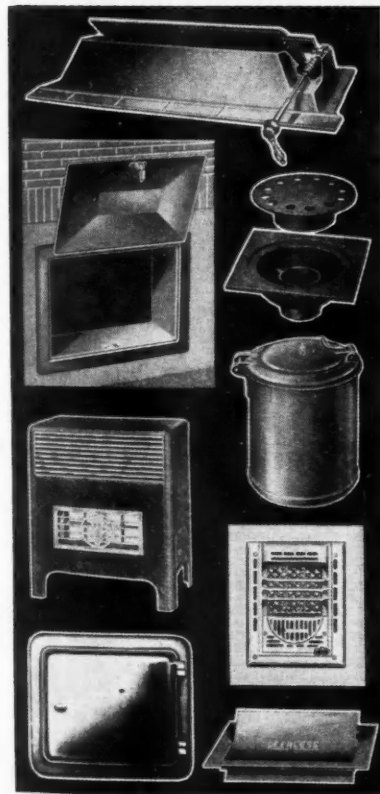
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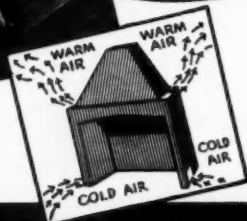


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Make your homes more distinctive by using "Century" Brand standardized and packaged hardwood wall paneling. It is low in cost and economical to erect. It also adds beauty and sales appeal to new homes.

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MANUFACTURERS
CINCINNATI, OHIO

LETTERS from Readers on All Subjects

Facts, opinions and advice
welcomed here

TruCost Estimating Figures by Mail

Crawfordsville, Ind.

To the Editor:

We note in your Christmas issue that you have changed your policy and no longer list the TruCost figures but will send them along with material lists on request.

We have very carefully kept all the pages showing these figures in previous issues and wonder if it is possible that these figures and lists might be sent to us each month without our having to write each month.

JOSEPH BINFORD AND SON.

Indeed "The World's Greatest—"

Ottawa, Can.

To the Editor:

As you know, we have been in the habit of subscribing to the *American Builder* for some years, not only for our head office but also for the use of our branch offices, and I can assure you that of all the building publications we receive from many parts of the world, *American Builder* contains more "real meat" and "live tips" than all other publications of the same class put together. Your December number was of a particularly outstanding nature, which prompted us to order sixty extra copies.

INTERNATIONAL FIBRE BOARD LIMITED,
By Fred C. Johnstone, Adv. Mgr.

John Mangan Forecasts Bankruptcy

Chicago, Ill.

To the Editor:

Gaily our happy legislators approach the \$45,000,000,000 debt limit. While continuing their heavy spending, they make elaborate plans to step up the limit at the next session of Congress. The press, editorial writers, taxpayers organizations—all will oppose raising the limit. They will justly shout, "Bankruptcy is inevitable." Business cannot survive. More taxes will close more private industry and increase unemployment.

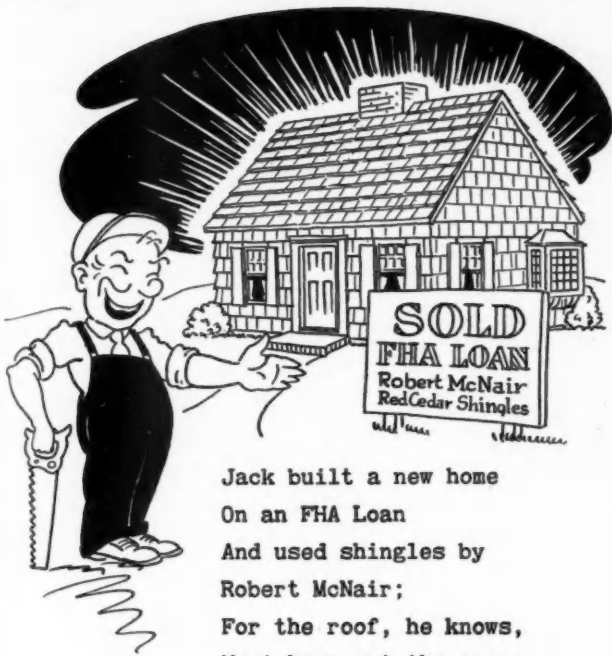
Politicians controlling the swag at Washington will counter with "The hungry must be fed." "Milk for the babies." "Shelter for the homeless." "Clothes for the needy." In the end the politicians will win. The limit will go up, maybe as much as \$10,000,000,000, making the new goal \$55,000,000,000.

This, of course, is just a start. Unless the public in a tremendous protest threatens dire action against raising the limit, in a short while the boys will be upping it again. Lacking public opposition, the false confidence they gain in this debt raise will make them bold enough to quickly seek another. Unless we stop this request by 1944, they will be again asking to step up the debt another \$10,000,000,000.

There is only one reason why a group of cheap, slippery, conniving politicians can increase debt limits, raise taxes and spend this nation into bankruptcy, and that reason is lack of public interest on the part of millions of our citizens. Fifteen years ago, back in 1925, if you remarked to friends that by the year 1940 the public debt of this nation would be close to \$45,000,000,000, you would have been eyed with suspicion. Your friends would have gone to your relatives or your wife, repeated the strange story and suggested a general tightening up in some sanitarium before something serious happened to you. Mention to your friends today the \$43,000,000,000 that we now owe and the reply will be, "What do you think the White Sox will do next year?"; "Have you seen any good shows lately?"; "Are the Blackhawks playing good hockey?"; or "Have you anything good in the last race?"

They don't care if the debt is \$43,000,000,000 or \$83,000,000,000.

(Continued to page 112)



Jack built a new home
On an FHA Loan
And used shingles by
Robert McNair;
For the roof, he knows,
Must keep out the snows,
The rain, and the cold win-
ter air.

ROBERT McNAIR SHINGLE CO.
VANCOUVER, BRITISH COLUMBIA
"OVER 400 DEALERS TO SERVE YOU"

The Builder's Saw!

For more profit, the Wallace No. 1 Radial Saw is phenomenal in its economies! Saves from \$75 to \$200 on every \$4,000 to \$8,000 residence. Equally profitable for heavy construction work.

This one machine does:

- X-CUTTING
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- CUTTING TILE

Carry it
to the job.



Safe, speedy, accurate in operation. Cuts jack rafters, hip rafters, studs, joists, sheathing, flooring. Use for cabinet work, mouldings, sash, routing stair-stringers, etc.

If you want to make extra profits, write today for bulletins on the Wallace No. 1 Radial Saw.

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LARGE, BEAUTIFUL ROOMS WITH PRIVATE BATHS
Single from \$3 daily • Double from \$4.50 daily

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BROADWAY at 34th ST., NEW YORK
Under KNOTT Management John J. Woollie, Manager

YOU be the JUDGE!

Mr. Contractor:
You know from experience what a modern concrete mixer should have. So we ask you to judge the merits of the Smith Tilter. Study the list of features. Frankly, can you think of any other mixer that gives you as much for your money?

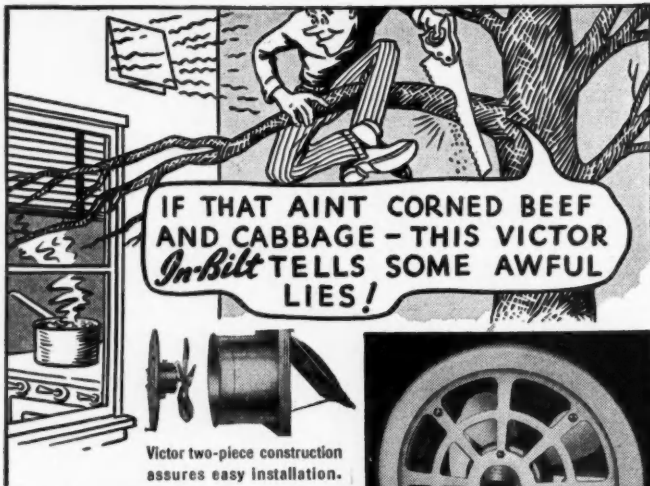
SMITH 3 1/2 - 5
Tilter Features:

- Low Charging Height, only 34 1/2"
- Handy Feed Chute, 31" wide
- Famous Double Cone Drum
- End-to-Center Mixing Action
- Short Drum Tilt (Thru 40 arc)
- Spring-Mounted Axle
- Hyatt Roller Bearings
- Electric Welded Steel Frame
- Low Pressure Pneumatic Tires
- Enclosed Crankcase Engine
- Machine Cut Drive Gear and Pinion
- Gears and Engine Completely Housed
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SMITH is the ONLY mixer with ALL these quality features—yet it costs you no more than ordinary "tub" mixers.

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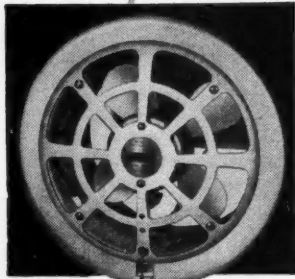
SMITH MIXERS
THE BOULDER DAM MIXERS



Victor two-piece construction assures easy installation.

Sales Appeal for Homes

In kitchen, bath, den, laundry, bedroom, and game room Victor In-Bilts circulate air from the inside to the outside—push stuffy house odors out—make room for fresh air. Victor In-Bilts have super-powered motors, weatherproof shutters, telescopic wall sleeve, and two-piece construction to facilitate quick installation. Get the Victor In-Bilt Ventilator Catalog, now. It will help sell your homes! Write . . . **VICTOR ELECTRIC PRODUCTS, INC., 1001 Robertson Ave., Cincinnati, Ohio**

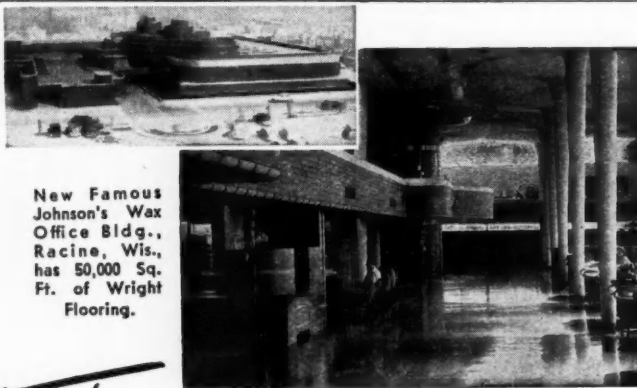


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\$19.95
 Now! **VICTOR**
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VICTOR In-Bilt VENTILATORS

less your regular discount
 The Victor In-Bilt Catalog illustrates and describes the complete line.



New Famous Johnson's Wax Office Bldg., Racine, Wis., has 50,000 Sq. Ft. of Wright Flooring.

Flooring of Distinction

PRICED FOR EASY PROFITS

● Enjoy bigger profits installing Wright Rubber Tile on new or old floors in homes, schools, offices, churches, hospitals, etc. Wright Floors are quiet, comfortable, easy to clean, and resist years of heavy traffic. They come in gay colors and patterns to match all decorative schemes—yet they cost no more than good grade linoleum. See Sweet's or write for illustrated literature.

WRIGHT RUBBER PRODUCTS COMPANY
 1603 Layard Ave. Racine, Wis.

WRIGHT RUBBER TILE

LETTERS—

(Continued from page 110)

Their problem is not prevention of murderous taxes, or a staggering public debt. Their problem is making the proper connection, or obtaining a profitable "in" so they, themselves, can get some of the easy money and partake of the spoils. They blindly overlook the fact that the misery and suffering which follow bankruptcy will be shared alike by all classes of people and that they, too, will be engulfed in the disaster.

Lack of public interest on the part of millions of our citizens is permitting this, the greatest free government on earth, to rapidly become a hot bed of dissension, unrest and disorder. Graft and greed have caused millions to shelve the ideals that our forefathers fought and died for. Graft and greed are openly permitting the glorification of class hatred. Today, to those who have it, it is not, "Did you get it dishonestly or otherwise?" but "How much have you got?" Today, to those who have not, it is not "Did he get it honestly or otherwise?" but "Let's take it away from him."

Although very close, we are not yet actually in bankruptcy. There is still a slight possibility that this country can be saved. We have to act fast. We are facing ruin. This is everybody's emergency. To save the nation, all government costs, both locally and nationally, must be drastically reduced. Citizens will have to immediately become government minded. Citizens will have to immediately organize. Tomorrow may be too late.

JOHN J. MANGAN, Builder.

Wants TruCost Figures

Toronto, Can.

To the Editor:

In your December issue you list some very attractive houses. I note that TruCost estimating figures and quantities of material for each are available. I would very much like to have these particulars with reference to:

1st house on page 34—designed by W. C. Tackett, Chicago.

Lower house on page 35—designed by A. P. Swanson.

1st house on page 39—designed by Kuhlman-Rohde Co.

I trust that this request is not asking too much, and with many thanks.
 P. R. COURT, Carpenter and Builder.

Have No Plans or Lists for Sale

Fargo, N. Dak.

To the Editor:

Your book, "Buyer Approved Homes of Known Cost," is one of the finest publications of its kind that I have looked over in some time. How is it possible for me to obtain an additional supply of these and what would they cost me?

Do you have detailed plans and material lists for these various homes and, if so, how are they obtainable? And are these homes FHA approved?

I will greatly appreciate receiving the above information.
 NORTH DAKOTA RETAIL LUMBERMEN'S ASS'N,
 By John F. Alsop, Secretary.

* * *

1940 Building Outlook

(Continued from page 38)

Indications are that due to the more stringent requirements on FHA financed rental housing projects, there will be a decline in private multi-family construction next year. This will be more than offset, however, by the completion of the USHA public housing program.

A promising housing field in 1940 being watched by many with interest is the low-cost house in the \$2,500 class which may be financed under Title 1 of the Housing Act or by private capital on similar terms. Great emphasis is being laid on this type of construction, not only by FHA and by Federal officials, but by dealer groups, manufacturers, and many other active groups in the building industry who feel that this is one of the biggest untouched markets in the industry.

The trend towards smaller and lower-priced houses is interestingly shown in Table V, in which the average valuation of all FHA insured new houses in 1938 is shown to be \$5,530. This compares with an average of \$5,978 in 1937, \$6,255 in '36 and

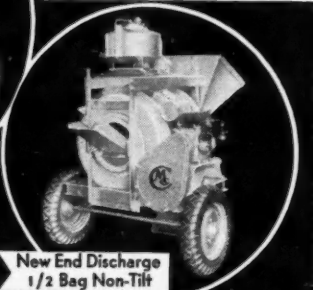
(Continued to page 114)

C.M.C. GIVES YOU MORE OF EVERYTHING FOR YOUR MONEY IN 1940

More Features
More Improvements
More Dependability
More Profits



New 1/2 Bag End Discharge Tilter



New End Discharge 1/2 Bag Non-Tilt



New 1, 2, 3 Bag Non Tilt Trailer

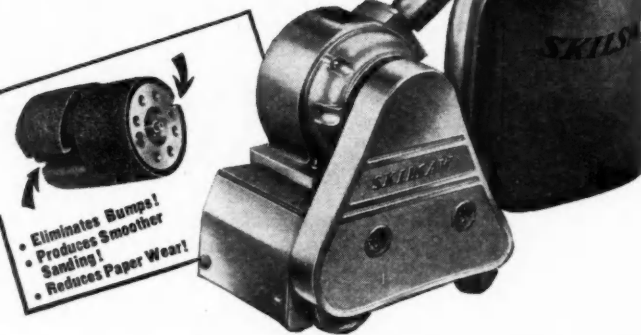
New Mixers that boost output—a revolutionary new Batching Plant—New Pumps, New "Kost Kutter" Power Saw Rigs—a "Standout" line in every detail including Hoists, Carts and Barrows. See them at the Road Show. Get your reservation in for new C. M. C. Catalog ready in January.

CONSTRUCTION MACHINERY CO.
Waterloo, Iowa

SKILSAW "Rotoglide" FLOOR SANDER

produces more Square Feet of Fine Sanding . . . easier, quicker, cheaper!

• No other floor sander has the patented "ROTO-GLIDE" Drum that does away with usual slot across the entire drum surface—eliminates the bumps that make sanding wavy and wear out the paper too fast in ordinary floor sanders.



- Eliminates Bumps!
- Produces Smoother Sanding!
- Reduces Paper Wear!

Here is America's finest floor sander—designed by a group of practical floor surfacing contractors—leading the entire field in mechanical construction and operating performance. It incorporates many advanced features found in no other machine. More compact, more efficient, more convenient to handle, only 45 seconds to change paper! Powerful motor. 8 in. drum. One-piece heavy steel frame.

SKILSAW, INC., 5031 Elston Avenue, Chicago

36 East 22nd St., New York • 182 Main St., Buffalo • 52 Brookline Ave., Boston • 15 S. 21st St., Philadelphia • 2124 Main St., Dallas • 918 Union Street, New Orleans • 1253 South Flower St., Los Angeles • 2065 Webster Street, Oakland • 29 North Ave., N. W., Atlanta • Canadian Branch: 85 Deloraine Ave., Toronto.

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The scene was a prominent Western dealer's showroom. Two screens, looking exactly alike, were displayed side by side. A sign over one read: "This screen costs 11c more." Customers asked why. The dealer told them the screen had been treated in WOODLIFE. It was protected against moisture and water absorption, swelling, shrinking, warping, decay and blue stain. It would not stick or rattle. They needn't worry about service complaints.

Many builders and contractors insist on WOODLIFE—treated millwork and rough lumber. They save money on replacements, gain a reputation for better work. Write for new literature on how you can make an extra profit by treating in your own tanks.

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Research Laboratory and Plant KALAMAZOO, MICH.

NEW COMBINATION SASH BALANCE and WEATHERSTRIP

SAVES UP TO \$1.00 PER WINDOW



DETAIL SHOWING TYPICAL APPLICATION ON 1 3/8" SASH AND GROOVING DIMENSIONS

• Eliminates all pulleys, weights, sash cords and the old leaky, clumsy box frames. Gives greater glass area for each opening and efficiently weatherstrips the sash. Fits any size window, new or old . . . two grooves per sash is all that is required and installation is simple enough for any carpenter to do a satisfactory job. Easy operation provides actual finger-tip control. Here is an opportunity for every contractor to cut costs on the small home. Send coupon today for full information.

MASTER NO-DRAFT SASH BALANCE

MAIL TODAY

- Eliminates weights, pulleys and cord.
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- Fits new or old sash.
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- A "two-in-one" cost saver for small homes.

Master Metal Strip Service Inc.
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Gentlemen:
I am interested in your new Sash Balance. Please send me complete information.

Name _____
Street _____
Town _____

Here's what your clients demand of a gas furnace!

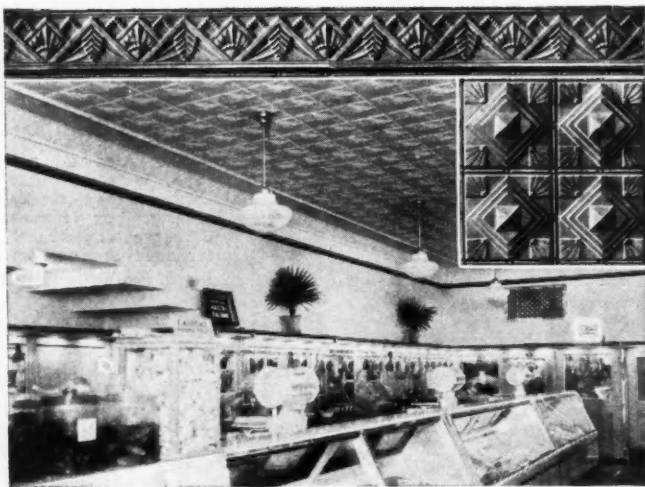
- Warmth where they want it ✓
- Warmth when they want it ✓
- At the right temperature ✓
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FLOOR FURNACES
FORCED AIR UNITS
DUPLEX FURNACES
GRAVITY FURNACES
CONSOLE HEATERS
ZONE AIR UNITS

• Prove to yourself that Payne meets *all* these requirements. Then make 1940 a Payneheat year! A leading name in gas heating for more than a quarter of a century, Payne makes a furnace for every heating need.

Write today for information

Payne FURNACE AND SUPPLY CO., INC.
Beverly Hills, Calif.



EDWARDS STEEL CEILINGS
BRING PROFITABLE WINTER BUSINESS

Many of our building contractors kept their key men busy all last winter installing Edwards Steel Ceilings and Side Walls in stores, display rooms, warehouses, churches, clubs, public buildings and private homes. Repressed beads assure perfect alignment; die-cut nail holes make installation easy, on new construction or over old plaster.

Write for Catalog 176 and Prices

THE EDWARDS MANUFACTURING CO.
542-562 Eggleston Avenue Cincinnati, Ohio

1940 Building Outlook

(Continued from page 112)

\$6,450 in '35. The latest data on FHA mortgages in 1939 shows that the average value of mortgages on new FHA homes in 1939 was \$69 lower than in 1938.

Not only is the trend towards the building of lower-priced houses, but the percentage of the total houses built in the lower-priced brackets is much higher. One of the best "samples" showing the countrywide trend is the analysis of FHA insured homes in Table V. This Table shows the valuation of house and lot placed on 100,000 new homes financed under FHA in 1938. It is one of the biggest "samples" of nationwide building available. As this Table indicates, 90.7 per cent of the 100,000 new FHA insured homes analyzed were valued by FHA at less than \$8,000. As the second column from the left in this Table also shows, 65.3 per cent were valued at less than \$6,000. The valuation, of course, includes both house and lot.

Further data of interest shown in Table V is the per cent of the valuation of the average residential property made up by the house and the land. As indicated in the column at the extreme right of Table V, in the lower-priced houses the land cost was from 12 to 15 per cent, while in the higher-priced properties, the land valuation ranged from 15 per cent to 19 per cent.

Materials Used in Small Homes

New light on the cost of materials used in small house construction was contributed last year by a study made by the Bureau of Labor Statistics of the cost of the 8 small demonstration houses built in Washington as part of the National Small Homes Demonstration. These were small houses ranging from 8,000 to 15,000 cubic feet, and costing from \$2,200 to \$3,500, exclusive of land and contractor's profit. Analysis of these houses showed that 35 per cent of the cost of the outlay of the amount spent went for labor at the site and 65 per cent for materials. In materials used, lumber accounted for 21.3 per cent of the average cost. The next important item was millwork, including flooring, 14.6 per cent. Cost of equipment and fixtures was 27.9 per cent which included the range, refrigerator, heating plant, plumbing fixtures, kitchen cabinets and electric fixtures. The complete analysis used is shown in Table III.

Estimates on Total U. S. Construction

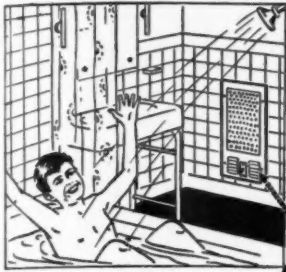
Although readers of *American Builder* may be primarily concerned with residential and light-load-bearing construction, an overall view of the total business involved in the vast and wide-spread construction industry is of value, since to a great extent no part of the industry is independent of all others. It is common knowledge that many contractors do a greatly diversified work, running all the way from small homes to skyscrapers or public works.

A birds-eye view of the total U. S. construction activity from 1937 to 1939 is given in Table VII, prepared by Lowell J. Chawner, chief of the Division of Economic Research of the Bureau of Foreign and Domestic Commerce. This shows that total private construction, except utilities, totaled almost 3 billion dollars in 1939. Including privately-built utility work, the total was 3.51 billions. Public construction totaled 2.8 billions, making the total for all construction 6.31 billion dollars.

A comprehensive analysis of private construction, 1932-'39, is given in Table VIII, also prepared by Mr. Chawner. This shows that total private construction increased from 2.43 billions in 1938 to 2.96 billions in 1939, or an increase of 21.8 per cent. The total value of non farm residential construction increased from 1.39 billions in 1938 to 1.9 billions in 1939, or an increase of 36.7 per cent. Farm construction, including farm repairs, decreased slightly from 336 millions in 1938 to 330 millions in 1939.

Dodge Contracts Analysis

Total construction contracts in 37 eastern states, as reported by the F. W. Dodge Corporation, were 3.35 billion dollars, representing a 5 per cent increase over 1938. The Dodge Corporation estimates a 7 per cent increase in total contracts for 1940 (see Table VI). Of especial interest are the Dodge estimates for 1940, in which are predicted a 16 per cent increase in commercial building, a 41 per cent in manufacturing buildings and a 14 per cent increase in residential building.



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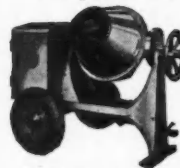
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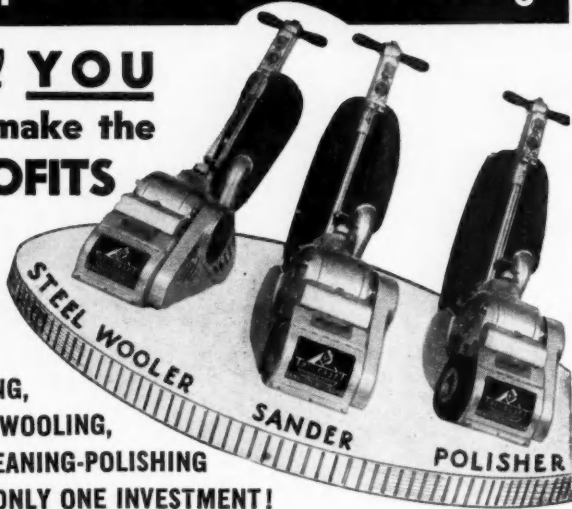
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Architectural Concrete Slabs

(Continued from page 40)

A summary of the properties of architectural concrete slabs includes the following:

1. *Freedom of Design:* The properties listed below enable the designer or builder to secure the color or texture desired; to increase the scale and character of the design; to provide the dignity and permanence that large-scale units give; and to obtain all these results more economically than heretofore.
2. *Sizes:* Up to 100 sq. ft. or more.
3. *Shapes:* Plain or fluted rectangles, curves, angles, channels and combinations in a single slab such as cornice, spandrel and soffit.
4. *Joints:* Large sizes and varied shapes eliminate up to 80 per cent of joints and flashing, reduce danger of leakage and increase freedom of design.
5. *Strength:* Scientific proportioning, careful curing, and reinforcing with welded steel provide high strength in sections only two inches thick or less.
6. *Remodeling:* Relative thinness often permits use without ripping off front of old building.
7. *Forms:* When slabs are used as forms and when a satisfactory bond is obtained with the poured structural concrete, half of the slab thickness may be considered as effective structurally.
8. *Color and Texture:* Slabs are made with a white cement matrix and selected aggregates such as crushed quartz, marble, granite, ceramics or vitreous enamel to provide any desired color and texture.
9. *Economy:* Repetitive patterns of simple or intricate designs are cast from a single mold; selected aggregates cost less than the same stone used in large size; these and other special materials are required only for the thin slab instead of throughout the full thickness of concrete.



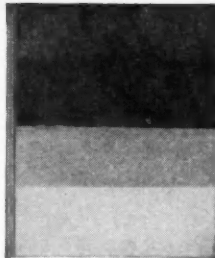
STORE building in New Haven, Conn., with colorful concrete exterior executed in architectural concrete slabs by Dextone Co.



MODERNIZING a large industrial building with architectural concrete slabs made with Atlas White cement. Note shape, thinness and large size of the panel being moved into place.

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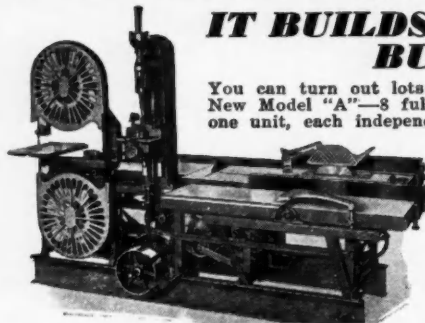
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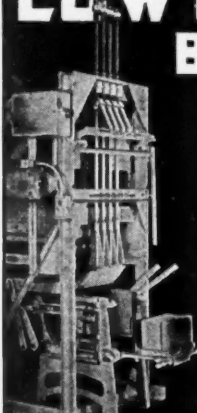
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