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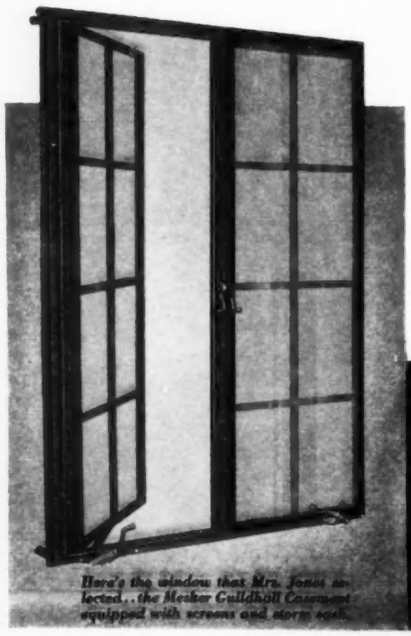

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PUBLISHER'S PAGE

Highways—or Homes?

THOMAS H. MacDONALD, chief of the U. S. Bureau of Public Roads, is advocating an expenditure during the next twenty years of 35 to 40 billion dollars on superhighways. There would be 28,000 miles of them to connect the business districts of all large cities.

That's a lot of money—almost equal to the present record-breaking national debt. The country's people are paying much more taxes than ever before; but their national government, and most of their other governments, are still going deeper into debt.

Where, then, does Mr. MacDonald propose to get the 40 billion—plus interest on it and the wherewithal to maintain such an expensive additional highway system?

Not from highway *users*. He says motorists would not—in fact, *could not*—pay it in tolls or increases of present vehicle and gasoline taxes. He would get a large part of it by *condemning real estate* along the proposed superhighways, and, after they were built, selling the same real estate—perhaps to its former owners—at a profit to the government. The rest he would get by increased property taxes—*mainly on real estate*—and increased income taxes on individuals and business.

DON'T think this project should not be taken seriously. It emanates from a *government official* and is backed by *Big Business* interests that expect it to benefit them by increasing the demand for highway construction machinery and materials, motor vehicles, gasoline and so on.

Residential construction and other forms of building are increasing, but are still far below their pre-depression level. One of their principal obstacles is *excessive taxation of real estate*, especially farms and homes. Virtually all owners of real estate, like practically the entire population, own automobiles; but a large majority of motor vehicle owners *don't own real estate*. Why, then, should not *practically all highway costs* be paid by *practically all the people that use the highways?* Why should so much of *present highway taxes*, and *a much larger part of proposed superhighway expenditures*, be loaded on real estate—by the so-called "excess condemnation" of real estate and in other ways?

These superhighways would be built principally to relieve traffic congestion for fifty miles or more out of big cities. Why, then, should farmers, and people living in small cities and towns throughout the country, be heavily taxed to help pay for them?

THE building industry in every city, town and village, and all those who want it to build for them, have a vital interest in *every* proposal for government expenditures tending to increase taxes, especially on real estate. The country has *more and better highways* than ever before. What it needs most is *more and better homes.* But while there has been *more highway building* throughout the last decade than ever before, there has been *less home building* than for many years. When did *highways* become so much more important—economically, socially or culturally—than *homes?*

Home-building has been the largest in 1939 since 1929—but only 70 per cent as large as in 1929, and *less than half as large* as it averaged from 1923 to 1928. Real estate owners, contractors, building material manufacturers and dealers can exert a great influence, locally and nationally. In their own interest and that of the public they should exert this influence for every government, business or labor policy that will stimulate building—*and against every proposal or policy threatening to retard building.*

Samuel O. Dunn

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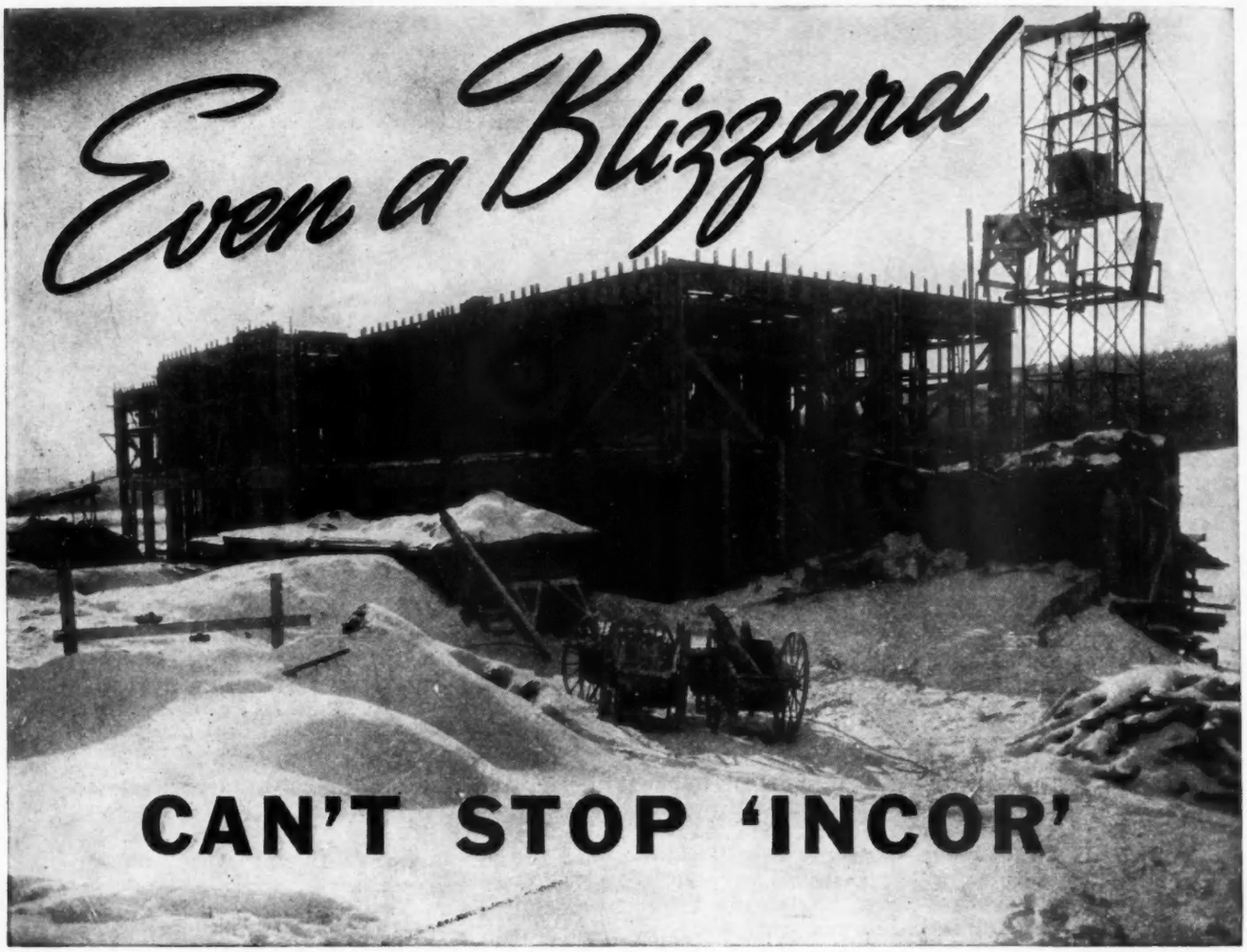
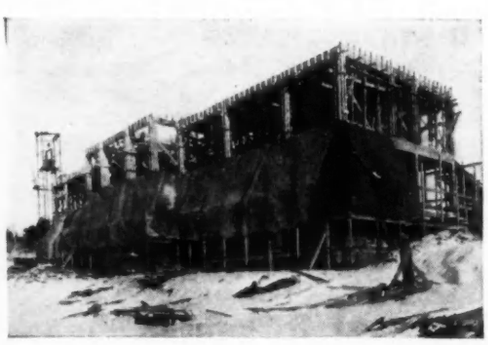


HOW TO SAVE 50% TO 60% ON HEAT-PROTECTION COSTS

"WE were repaid many times over for the slight extra cost of 'Incor' 24-Hour Cement used for all reinforced concrete work on General Medical Building No. 8, Veterans' Administration Facility, White River Junction, Vt.," writes G. L. Roy, of J. G. Roy & Sons Co., Springfield, Mass., Contractor.

"This building is concrete skeleton-frame, with 3 floors of pan-type construction," Mr. Roy's letter continues. "Concreting started in late November; by using 'Incor' we were able to remove floor forms within a week after pouring, thereby maintaining our progress schedule with only one set of pans and supports. Outside temperatures were well below freezing, as low as 5° F., and we had a lot of snow. All work was done under canvas protection, with oil-salamander heat. *Yes, 'Incor' certainly does cut heating costs on Winter work.*"



Thank you, Mr. Roy. We're passing the word along to engineers and contractors who have jobs in progress, or about to start, this Winter. Twelve years' experience shows that 'Incor' cuts heating costs 50 to 60 percent, reduces form costs and saves on job overhead. 'Incor'* means earlier completion, usually at lower (not higher) cost—and that's well worth considering. Write for copy of "Cold-Weather Concreting." Lone Star Cement Corporation, Room 2234, 342 Madison Avenue, New York.

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AND BUILDING AGE

Crafts, Unions and Labor Agreements

A SIGNIFICANT development in labor relations in the home building field took place last month in New Jersey, with the signing of a new type of labor agreement between the state's largest residential builder and the A. F. of L. Under this agreement, all crafts engaged in building houses under $10,000 receive the same wage. A rate of $1 per hour for skilled workers and 75 cents for unskilled labor is established.

The builder who brought about this new development in union labor agreements is Charles H. Reis, who has been for many years one of the largest speculative builders in Bergen County, who operates several subdivisions and builds several hundred single-family homes a year. The agreement was signed with the Bergen County Building & Construction Trades Council, a subsidiary of A. F. of L. Alexander L. Bombell executed the agreement as president of the Council, and Daniel E. Collins as secretary. It is claimed that the agreement was fully approved by all building trades councils of the state of New Jersey at the recent annual convention of the A. F. of L. in Atlantic City.

The purpose of this new labor agreement is said to be the fostering and encouragement of the building of houses in a price class below $10,000. By placing all crafts engaged in the operations of building a home on a uniform wage basis, it undoubtedly should have an important effect in stabilizing costs and eliminating misunderstandings, disputes and delays. For the Metropolitan New York-New Jersey area, the uniform wage of $1 for skilled workers and 75 cents for unskilled workers was considered fair and equitable. The men so employed on the Reis operations will have relatively steady employment. In the past 13 years Reis has built more than 2,500 single-family homes in the Northern New Jersey area, and is in a position to give continued and steady employment. Many of the houses he builds are in the $3,000 to $5,000 price range.

A five-day week with sensible exceptions for emergencies is established by the agreement, and questions of grievances are to be arbitrated by a representative of the employer, the building trades council and a disinterested arbitrator. It is felt that the amicable relationship of a group of crafts working on the same project will offset in a large measure any increases necessitated under the new wage scale.

As a model union labor agreement which may be introduced elsewhere throughout the country, the workings of this setup will be watched with great interest by residential builders constructing houses under $10,000—and this represents more than 90 per cent of the single-family home construction in the entire country.

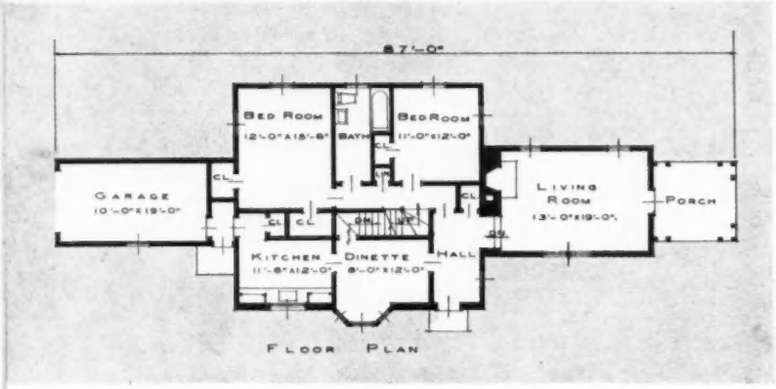
TruCost Estimating Figures on Request

AS a further extension of *American Builder's* TruCost estimating service the editors will mail free to any reader requesting it a Service Sheet giving the TruCost Estimating Figures for any one or more of the home designs illustrated with floor plan in this issue. These figures in large readable type will take the place of the small type data that was formerly presented in each magazine in tabular form and in the October and November issues in a paragraph alongside each design.

It has been a problem to give these important estimating figures in large enough type to be satisfactory in the limited space available in the home design section itself. The editors hope that by offering these TruCost figures direct by mail, free to those interested, this problem will be agreeably solved.

THE SIGNING of the agreement of accord between Charles H. Reis, largest home developer in the State of New Jersey, and representatives of the American Federation of Labor. Behind the table, on the left is Charles H. Reis, on the right is Alexander L. Bombell, president of the Bergen County Building and Construction Council; extreme left front of table is Daniel E. Collins, secretary; at his right is Joseph W. Connolly, manager of the Reis organization. The signing took place Tuesday, Oct. 24, 1939.

EIGHTY-SEVEN FT. rambling Colonial built on half-acre plot in North Shore Acres, Glen Head, L. I. Joseph Watterson, Architect.



LIVING room has a separate wing in this rambling North Shore Acres Colonial which has plenty of room to spread out on the plot.

New Trend Toward Ho

Larger Plots Sell Better, Bring New Style, Rambling Colonial Homes

ARTIST'S choice—this low, long homestead type house in North Shore Acres, L. I., was picked by an artist because he liked the large ½-acre plot which permits this type of rambling home design.

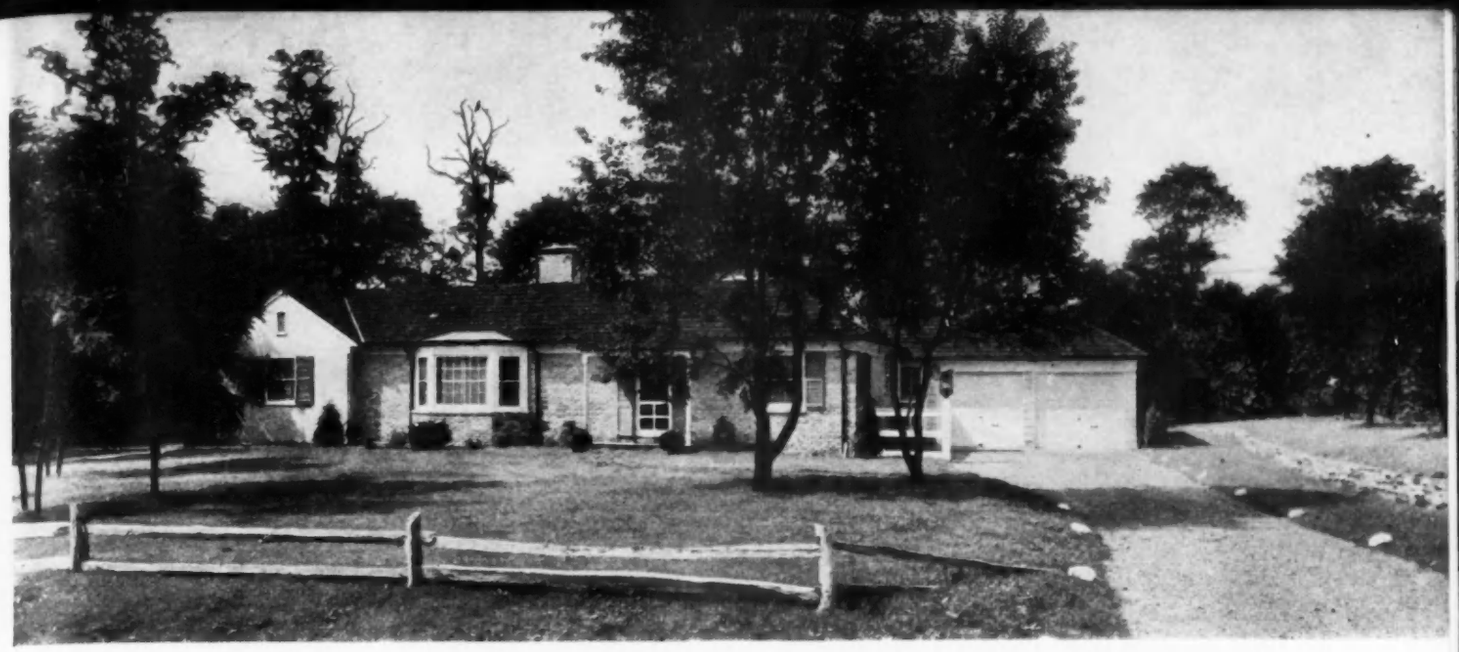
SPECULATIVE home builders in the Long Island suburban section of New York have stolen a march on critics by increasing the sizes of allotted homesites beyond the expectations of the most exacting prospects.

The old grievances against the speculative developers—scanty land division and more or less monotonous architectural design—have been scotched in one fell swoop, as the sports writers say. Abandoning the so-called "time honored" procedure of cutting land up into 40, 50, or 60-foot lots, the most progressive builders are now going in for full half-acre plots which permit house styles entirely new to the New York suburban field.

There is no altruism in this scheme—just shrewd business policy. And this is the way it works:

Walter Uhl, who for years has been engaged in the construction of expensive country homes in Vincent Astor's Sands Point section of Long Island's picturesque North Shore, had been building a few residences of the mansion type per year while he watched aggressive developers make strong plays for the substantial middle-class trade. Builder Uhl naturally was ambitious to go after business in the field where the most activity was centered. Having been thoroughly schooled in the building of homes to meet every individual whim and preference of families who could afford to be particular, this builder envisioned possibilities in combining country home luxury with popular suburban requirements. It was practicable for him to attempt such a venture because large landed estates on the North Shore, where such modern barons as the late Clarence H. Mackey, Frank A. Munsey, the Vanderbilts and others had assembled hundreds of acres, were being dumped on the market. Unimproved acreage had become available at reasonable prices.

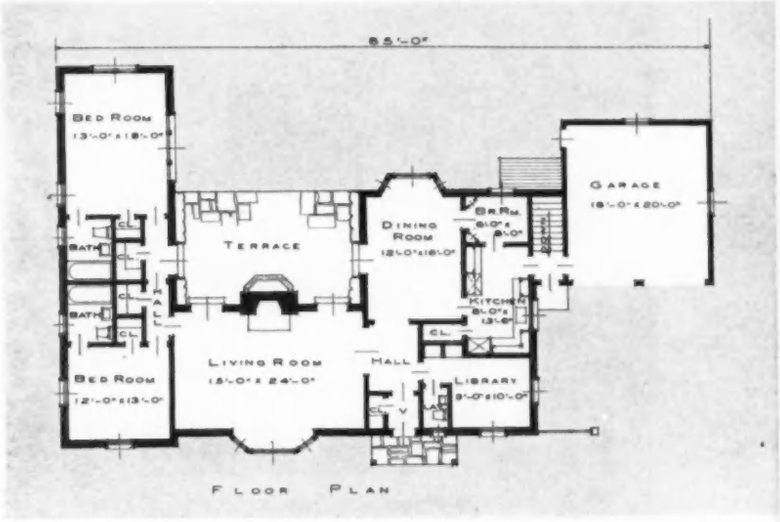
All builders had seen large homesites prove exceedingly successful in the higher priced brackets. At Sterling Ridge in Westchester, for example, where speculatively built homes were being sold from $35,000 to $60,000, activity had been maintained remarkably all during the depression, because of restrictions of one house to one acre. Broadlawn Harbor at Kings Point, Long Island,



CALIFORNIA ranch style is featured in this Flower Hill Estates home built by Walter Uhl. Henry W. Johanson, architect

Half-Acre Homesites

By David George Bareuther



ROOMS in this ranch house plan are grouped around a flagstone terrace almost as large as the 15' x 24' living room; lot, 180' x 150'.

A GLIMPSE of outdoor living in the flagstone terrace at rear of Flower Hill Estates ranch house, showing privacy of the terrace.

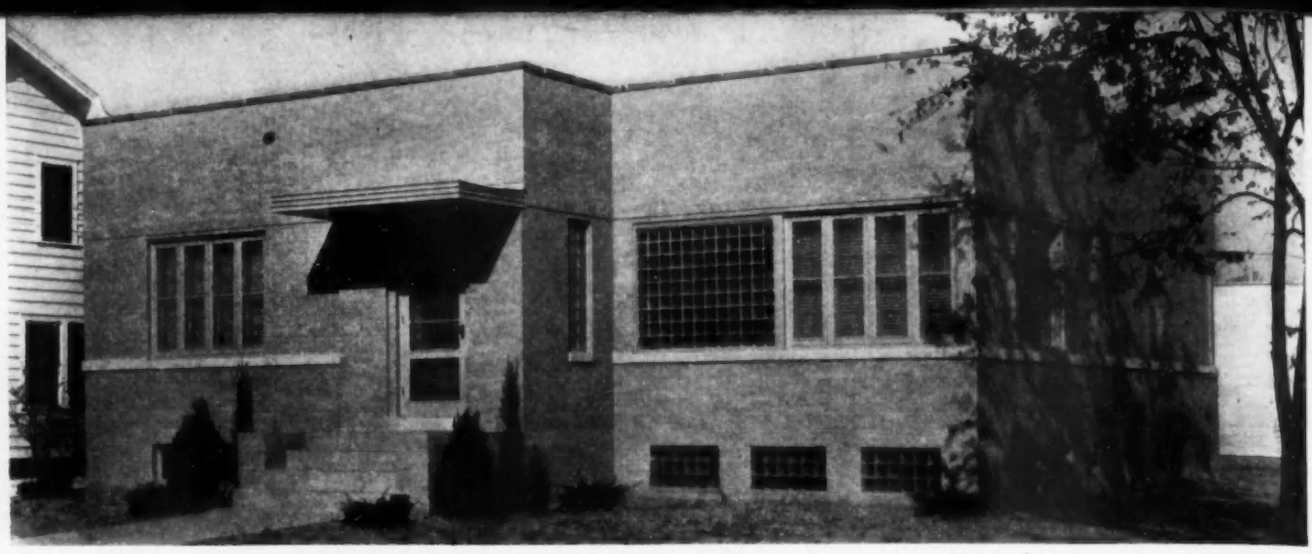
also found a market in the price class above $20,000 with half-acre minimum plots. In the popular price field between $8,000 and $15,000 suburban plot sizes had been progressively increased from 60 foot frontages to 85 feet, to quarter acres, and to third acres. The trend was distinctly from typical suburban environment to country home settings. Builders could see this change in the market and began to buy land for less than $3,000 per acre to adjust their building programs accordingly.

While Walter Uhl decided to offer modern air conditioned homes on half-acres in the exclusive village of Flower Hill from $10,000 in complete price, H. L. Carey and Cyrus A. Potts went a step further and offered modern Colonial homes farther out at North Shore Acres, Glen Head, Long Island, from $7,500 upward on half-acre plots.

The result of these ventures has been entirely new styles of architecture for the suburban territory. Low rambling dwellings, of the type that developed in the early Colonial days with wings and additions appended as families grew in members and affluence, were made possible by the wide frontages of the half-acre plots. The idea of luxurious apartment layouts with most rooms on one floor, to which New Yorkers have become accustomed, could be carried out in these houses. The country estate spirit was maintained with nearest neighbors at least a half a block away while at the same time the half-acre of grounds was not too large to be taken care of without the expense of a gardener.

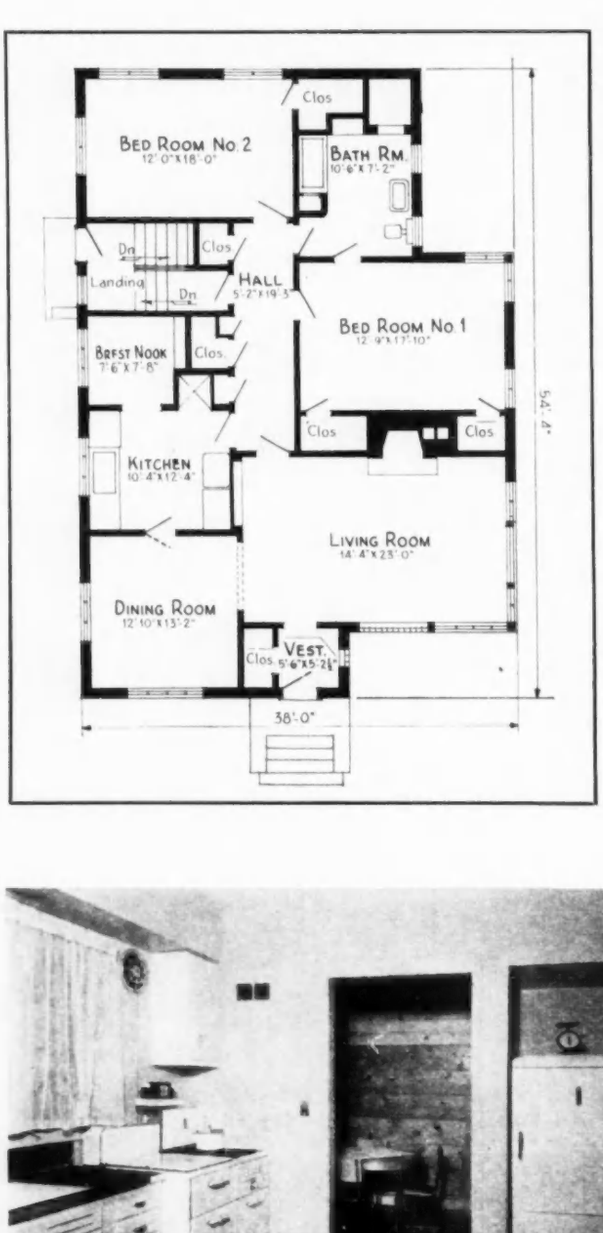
The homes being built in these new communities include many of the best known materials and details of equipment. The typical house in North Shore Acres, for example, is a six-room home with two tile baths and attached garage. It is insulated with Johns-Manville rock wool in both ceiling and sidewalls. Its air condi-

(Continued to page 84)



THE large glass areas in this modern five-room home in Effingham, Ill., assure proper lighting for all rooms.

Modern Home Designed for Comfortable Living

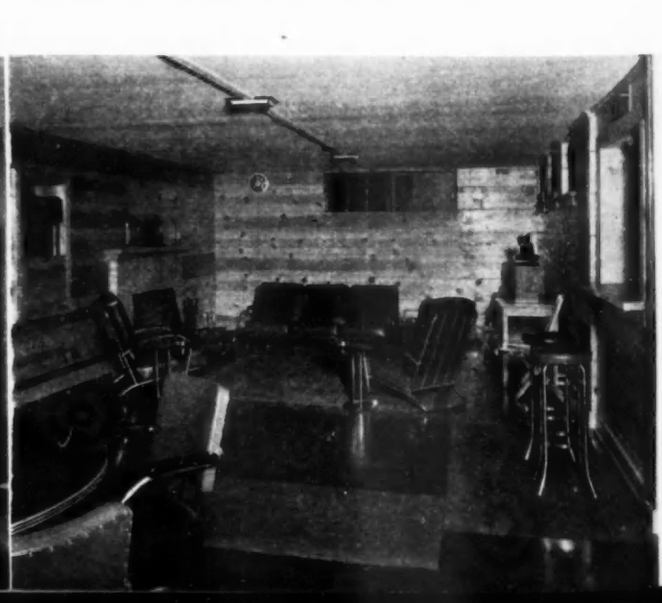


IT IS always interesting to see the type of house that a person in the building business puts up for himself. The modern example on these pages is F. C. Wenthe's recently built home in Effingham, Ill.; George E. Ramey & Co., Champaign, Ill., were the architects. The fact that Mr. Wenthe is head of the Wenthe Bros. Co., lumber, building material and equipment dealers, gives him a wide knowledge of the latest planning ideas and construction trends. This is reflected both in exterior and interior design, as well as in his choice of equipment items.

The floor plan at the left presents a most livable arrangement of five rooms on the first floor; there are also a large recreation room in the basement and utility space. A view of the recreation room appears below; the walls are finished in horizontal boarding of Ponderosa knotty pine; a ventilating fan clears out smoke when the room is crowded; the three glass block panels, as seen above in the right side of the foundation, give good light; a wood-burning fireplace is placed on the opposite side of this room.

The kitchen view shows cabinet arrangement and pine paneled breakfast room beyond. Living room and dining room walls are finished in a modern styling of wood paneling, the former being avodire, and the latter walnut Texbord; the floors of these two rooms are of Bruce block selected to carry out the richness of the walls and trim.

Fixtures and equipment throughout the house contribute to the streamlined modern appearance and comfort. The lighting fixtures combine well with such design elements as large window areas, plain surfaces and modern detail. The house is well insulated and winter air conditioned.



OUTLINE SPECIFICATION

FOUNDATION and Basement: Reinforced concrete walls; concrete floors; partition walls 2x6 studs; Celotex walls and ceilings except recreation room, Ponderosa knotty pine.

STRUCTURE: Graystone brick over wood framing. Steel lintels, steel basement sash.

WINDOWS: Carr-Trombley Weathertight, rattle-proof.

ROOF: Vulcanite 20-year asphalt. Copper flashing.

INSULATION: Outside walls, 25/32" Celotex Vapor-seal sheathing; inside, Vapor-seal lath. Partitions, National Gypsum Gold Bond lath. 2" rock wool between outside walls; 4" rock wool between ceiling joist and over 3-lb. metal lath.

PLASTER: California interior stucco finish except walls in living room, avodire; dining room, walnut Texbord; breakfast room, knotty pine.

FLOORS: Vestibule, living and dining rooms, Bruce 9" "Arabesque" block laid over asphalt felt. Kitchen and breakfast nook, Goodyear rubber. Bath, ceramic tile, including walls.

WOODWORK: Doors 1¾" slab. All interior trim birch.

HARDWARE: National Brass two-tone, chrome and black.

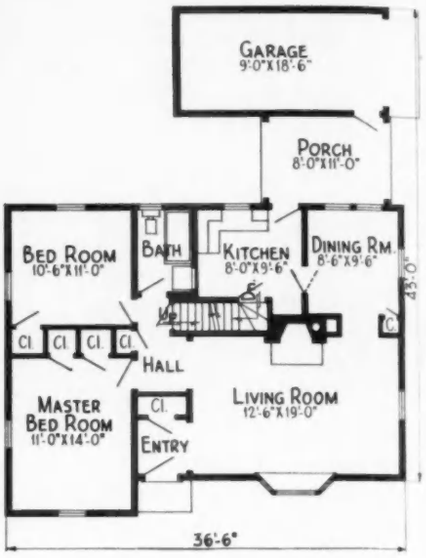
FIXTURES: Kitchen cabinets, I-XL wood. G-E garbage Disposall; Victor ventilating fans.

PLUMBING: All fixtures Standard Sanitary Mfg. Co.

HEATING: Sunbeam automatic gas-fired winter conditioning.

AT LEFT, on opposite page: the kitchen of F. C. Wenthe's modern home is planned for streamlined convenience; breakfast room is seen beyond. The well lighted and ventilated recreation room has such building conveniences as book shelves and desk, wood-burning fireplace, ventilating fan, glass block panels and bar.

ABOVE, to right: the large mantel mirror has been designed as a part of the wall areas, which in the dining and living rooms are richly paneled in wood. The bedroom has proper wall space with ample twin closets.



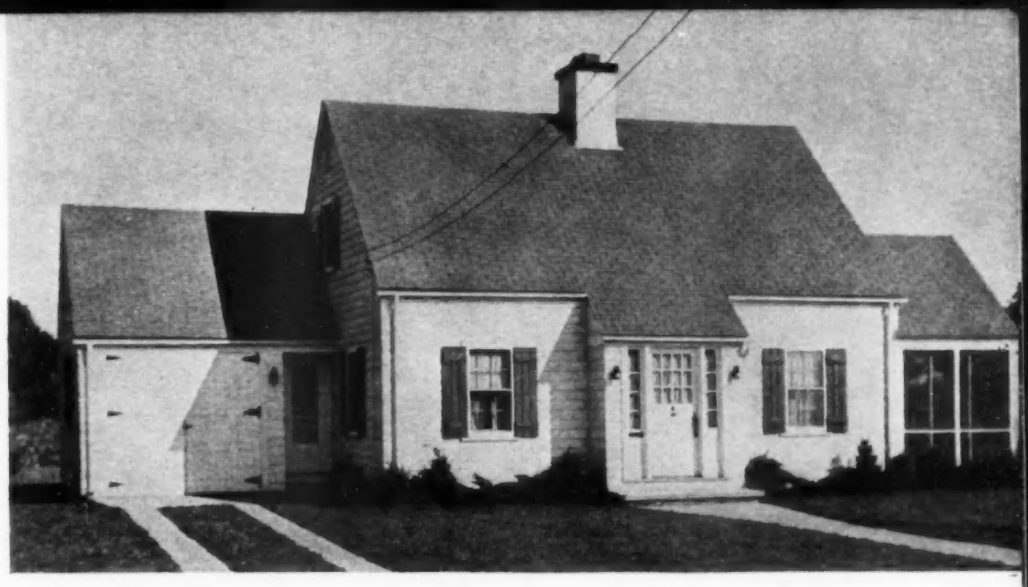
THE front cover home, above, was one of the first homes completed at Colonial Park development, Port Chester, N.Y., by Gustave A. Feuerstein, builder. The exterior design is particularly pleasing, the floor plan well worked out. The five rooms are arranged for construction economy and convenience. Upstairs bedrooms can be added later.

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.

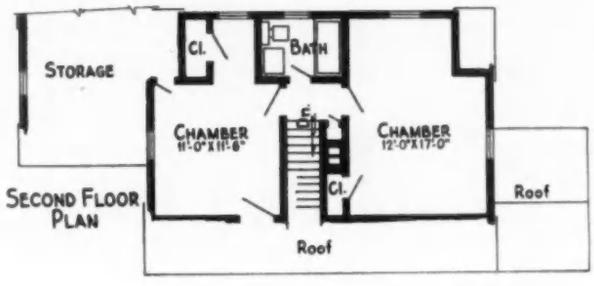
Flexible Basic Plans for 5 to 7 Rooms–

THE house below is an attractive Cape Cod design turned so that, with the end toward the street, it is only about 24 feet wide and will fit on a narrower city lot. It was built by Campbell Realty Company in the Beverly Hills section of Chicago; Jerome Robert Cerny, architect. Two more bedrooms have been completed on the second floor.

THE addition of the garage wing and screened in porch at the sides of this Springfield, Mass., house increases the overall width to over 50 feet, but either or both could be moved to the rear or left off with little change in the basic plan; the garage can also be attached directly to the house by moving the service entrance around to the rear. This however, sacrifices the dinette space. Designed by Charles Rais for Hampden Lumber Company.

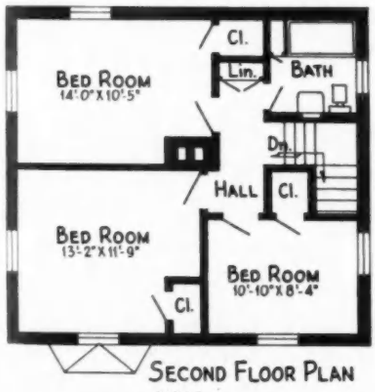


FIRST FLOOR PLAN



SECOND FLOOR PLAN

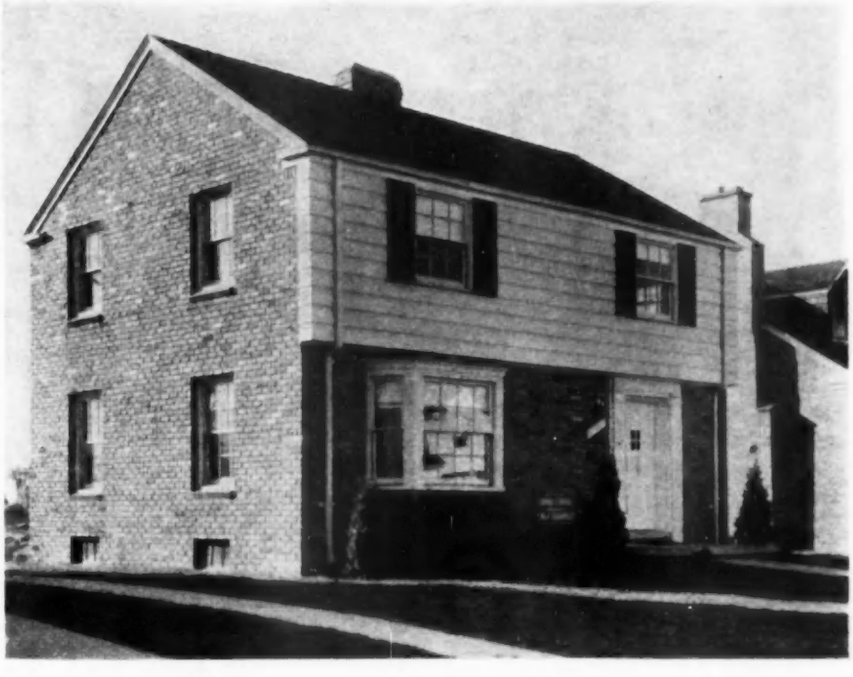
Can Add Garages, Porches or Bedrooms



SECOND FLOOR PLAN

FIRST FLOOR PLAN

AS one of the outstanding two-story designs in the Duchess demonstration project, Detroit, the house below combines attractiveness, simplicity, livability and economy; a porch can be added to side or rear. Stairs and access to front of house are practical. Kitchen provides space for a breakfast set. Edward J. Russell, Detroit, was the builder of this 6-room model home.

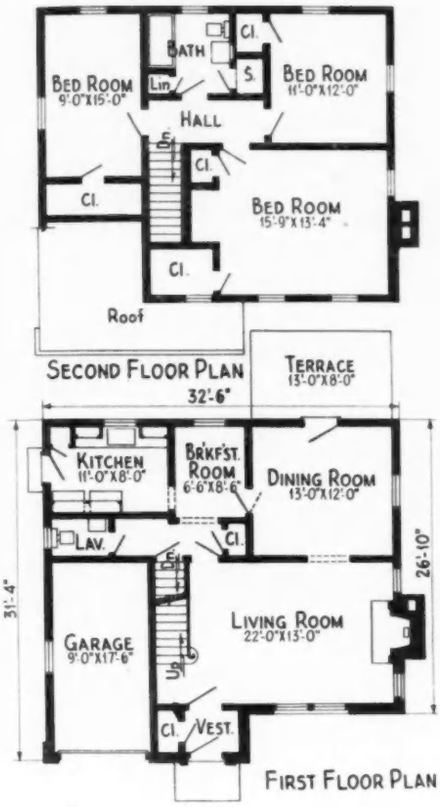


Four Distinctive Homes with 2-Floor Pla

THERE are a number of features which made this model house outstanding in the North Shore 1939 Home Show in Evanston, Ill.; it was designed and built by W. C. Tackett, Chicago. As shown in the floor plans at the right, the through front hall and semi-circular stair arrangement are quite novel. Lavatory and guest closet are placed along one side; basement stairs lead down to a large recreation room.

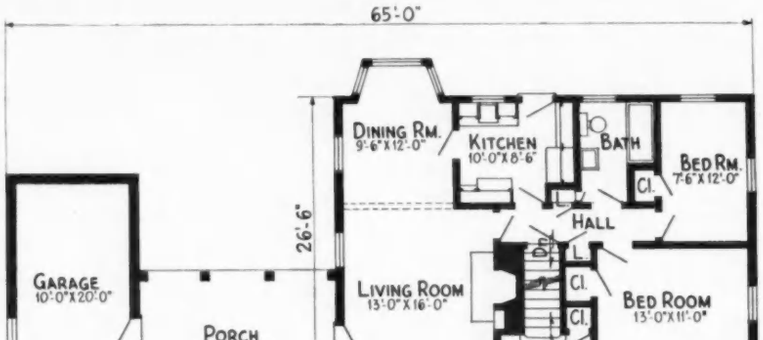
THE above house, designed by Architect David J. Abrahams and built in Newton, Mass., was awarded honorable mention in the recent A.G.A. Builders' Competition. Although from the exterior it has the appearance of a small house, it contains seven rooms, two baths and attached garage with storage space above, giving it good accommodation for a large family. The hall arrangement provides exceptionally good access to all parts of the house without sacrificing compactness.

Plans That Are Efficient and Salable



ONE of sixteen houses in the Loft Estates development on Long Island, the above design is typical of their good planning by Walter D. Spelman, architect. The six rooms and built-in garage are compactly arranged within an overall of 32'6" by 26'10". Numerous closets, breakfast room, well planned bath, cross ventilation and complete insulation of walls and ceilings with rock wool are features of this house.

THIS unusual Cotswold type design fits nicely on its side hill site with the basement garage directly accessible on the lower side. Features include efficient U-shaped kitchen, library or first floor bedroom with adjoining lavatory off rear hall, large corner window of period styling, French windows in other rooms for better view, second floor bedrooms provided with good closet placement. The house was built in Highland Park, Ill., Arthur P. Swanson was the architect and landscape designer.

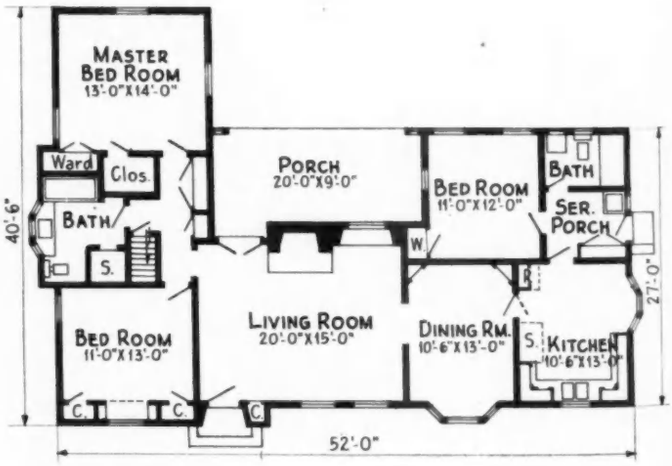


TRUCOST figures for houses in this design section are available upon request to the AMERICAN BUILDER, Chicago, Ill.

Broad Colonial Hor
Large Lots or Cou

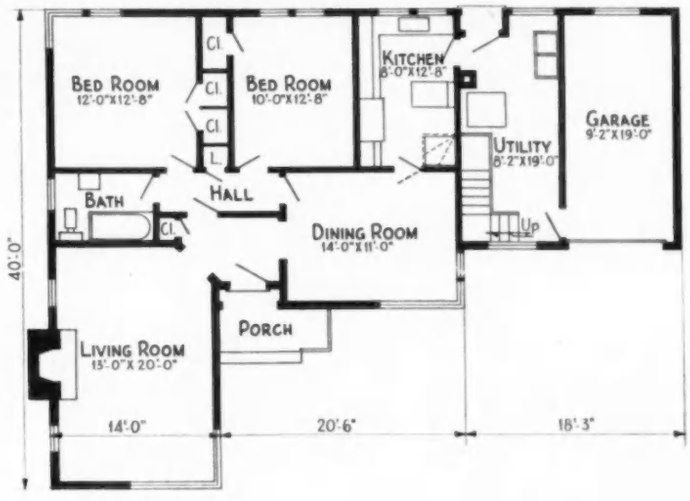
THE porch connecting the above house and garage serves the double purpose of providing for outdoor living and a covered passageway between them. This feature can be placed to the rear on narrower lots with a door replacing one of the windows in the dining room bay. Upstairs there are two additional bedrooms and a bath; built in Downers Grove, Ill., by Home Builders Co.; Jerome Robert Cerny, architect.

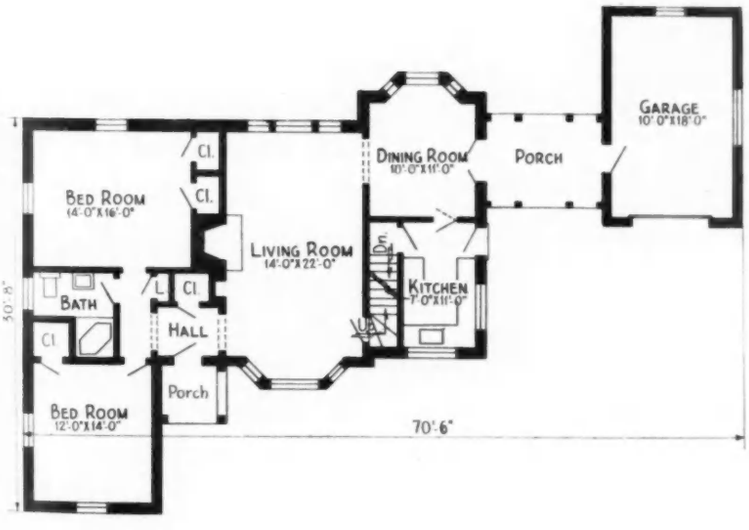
THE six-room house shown below was built in North Hollywood, Calif., by William Mellenthin, and designed by Leo F. Bachman. While it is placed on a suburban site, it is particularly adaptable to outdoor country living. Like many Southern country homes, the driveway to the unattached garage is partially enclosed by a board fence to give a court on which badminton might be played. There is also a large living porch overlooking the rear; it is roofed over and partly protected by short wall extensions. Service porch, maid's room and second bath are placed convenient to the U-shaped kitchen, which has a breakfast alcove bay at one side.



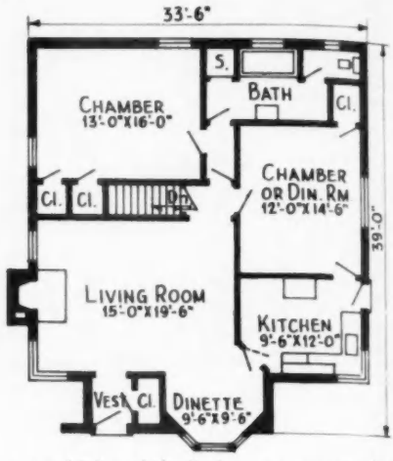
Homes Planned for Country Living

THE basementless design above is typical of moderate cost houses being built in View Ridge Addition, Seattle, Wash. Unfinished attic space is accessible from the utility room. The corner windows give modern styling to its modified Colonial lines. Entrance is recessed. It was built by Carl Edstrom, Seattle, and designed by Lowell Casey.





BUILT beyond the water mains near Glenview, Ill., by Frank M. Howard, this house offers city conveniences and the pleasure of country surroundings. It is located on a lot with 100-foot frontage. The large living room receives light and air from both ends, and separates the bedrooms from the dining room and kitchen. Space for extra bedrooms and a bath is provided on the unfinished second floor; stairs lead up out of the living room. The basement extends only under the center of the house. The living porch, dining room, living room and master bedroom all overlook the garden area to the rear, while the kitchen is placed at the front where the housewife can see anyone approaching the front entrance.



THE floor plan of this charming little five-room English home offers an arrangement which, while being economical in space, allows ample living area throughout. Master bedroom is of good size with twin closets; generous bath features separate toilet and shower stalls. Built by Alvin B. Wolosoff, in Kew Gardens Hills, a development on Long Island.

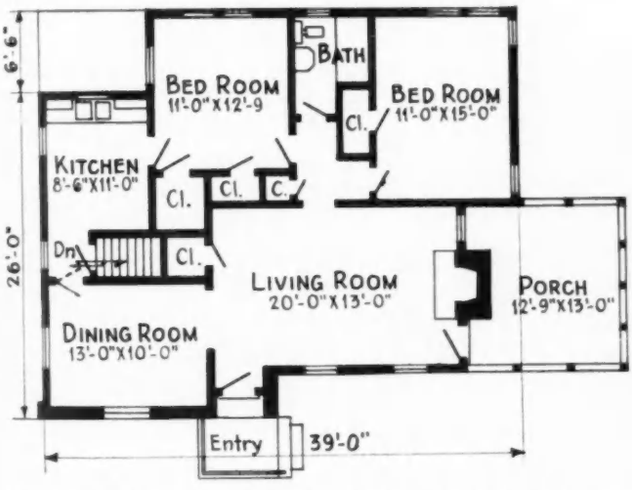
Six Small Homes with Economy Plans-

BUILT as a low-cost demonstration home by Potlatch Yards, Inc., Dayton, Wash., this little four-room cottage with attached garage presents much in the way of economical livability. It features high quality materials, including Nu-Wood board insulation inside and out. The house was designed by H. H. Johnson of Potlatch Yards and built by Eli Neal.

THE Farm Security Administration developed plans for a group of houses, such as the one below, to be assembled from fabricated panels at Southeast Missouri Farms, New Madrid, Mo. While planned for mass production, the simplified layout offers a good basic design for minimum cost rural cottages.

THE well detailed exterior of this five-room model home built by Kuhlman-Rohde Co., in the Duchess demonstration, Detroit, indicates the equally good planning and construction found in the interior. The layout is convenient; circulation and storage space are good; a bedroom may be added above.

Offering High Value at Moderate Cost



THE house above is typical of the fifty which have been built by the Shepherd-Sloss Realty Co. in its Mountain Park Estates Subdivision, Birmingham, Ala.; Nelson Smith, architect. Exterior is clapboard except sandstone on entrance wing. Storage space is ample; hall area minimum. There is a good sized screened living porch off the living room.

BELOW is one of the group of a hundred houses built by the Koppers Coal Co. in its garden-home village at Kopperston, W. Va. The houses, which are rented to company miners, are four and five room variations of economical plan at the left. R. H. Hamill Co., Huntington, W. Va., was the builder.

THE two-family dwelling shown at the left contains two well arranged six-room apartments, each with two baths. It was designed and built by Lanham & Co. of Milwaukee, and is located in the suburb of Shorewood.

Attractive Duplex in Concrete Brick

THIS unusual duplex was built in a Milwaukee suburb; planning and construction are the work of Lanham & Co., Milwaukee, Wis., builders.

An outstanding feature of the exterior design, as viewed above, and to the right, is the front entrance handling which segregates the two doors. The one to the first floor apartment is located off the side porch, while the one giving access to second floor stairs is placed to appear as the front entrance.

The solid masonry walls are constructed of concrete brick and block in a novel bond which gives the wall a good insulating value. This is detailed on the opposite page, and consists of 8x8 Waylite blocks white matt glazed on one face used every sixth course as a bond, with white matt glazed Dunbrik as face material and standard Waylite concrete brick as backup between these bond courses. The garage wall uses the same material laid in such a manner as to give an air space between the bond courses, with the 8x8 block set on edge on the inside.

Both of these walls from the exterior have the appearance of a regular veneer job, with no headers or bond courses in evidence; the color being part of the masonry, this appearance is permanent.

The plans provide for two six-room apartments and individual basement facilities for each. This generous accommodation is arranged within an overall dimension of 32 feet by 52 feet 4 inches; the width allows for placement on a city lot with 50 foot frontage and still gives ample space at the sides, or might even be placed on a narrower lot. The apartments are practically identical; while the one on the first floor has an extra closet, both apartments have plenty of storage space. The living rooms have natural wood-burning fireplaces; adjoining dining rooms have built-in cupboards flanking the connecting archway. In the kitchen, work and storage spaces, together with the equipment, are placed along two walls in an efficient L-shaped grouping. Three bedrooms for each apartment occupy the remaining portion of the plan. The full bath is placed between the larger two, while a smaller bath with shower is located so as to be handy to the rear bedroom which might be used as a maid's room. This bath, having no outside wall, is supplied with a 3½ by 6 inch vent to the roof.

The upper apartment has an airing porch **off** the rear bedroom and the deck over the first floor entrance porch gives a second porch area.

This project is another example of the current trend in duplex design toward more compact, livable structures which fit into the average residential community without being out of harmony with adjacent homes.

WHILE the brick exterior is laid up to look like regular veneer, the walls are actually 8" solid, with a special bond as detailed on opposite page.

OUTLINE SPECIFICATIONS

FOUNDATION & Basement: 12" concrete block walls on 20" poured footings; walls finished on inside with 1/4" coat cement plaster. 3" concrete floor over cinder base with 1" top coat.

STRUCTURE: 8" solid masonry walls laid with special bond using combination 8x8 white matt glazed Waylite block and glazed Dunbrik for face and standard Waylite brick backup; No. 1 Douglas fir framing lumber.

WINDOWS & Doors: Frames and sash No. 1 clear pine; windows weatherstripped; copper screens.

ROOF: Green Duntex cement tile over 30 lb. felt on 1" roof boards tight together.

LATH & Plaster: Plaster on USG Rocklath on furring strips; Milcor metal corner beads; USG patented metal clip ceiling suspension.

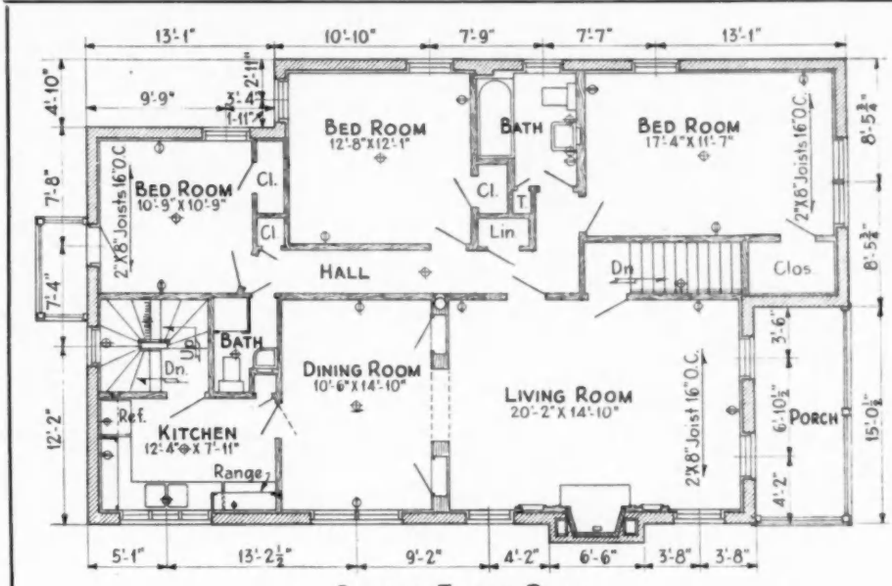
FLOORS: Red oak flooring except rubber flooring in bathrooms and linoleum in kitchens.

WOODWORK: Kiln-dried sap gum interior trim.

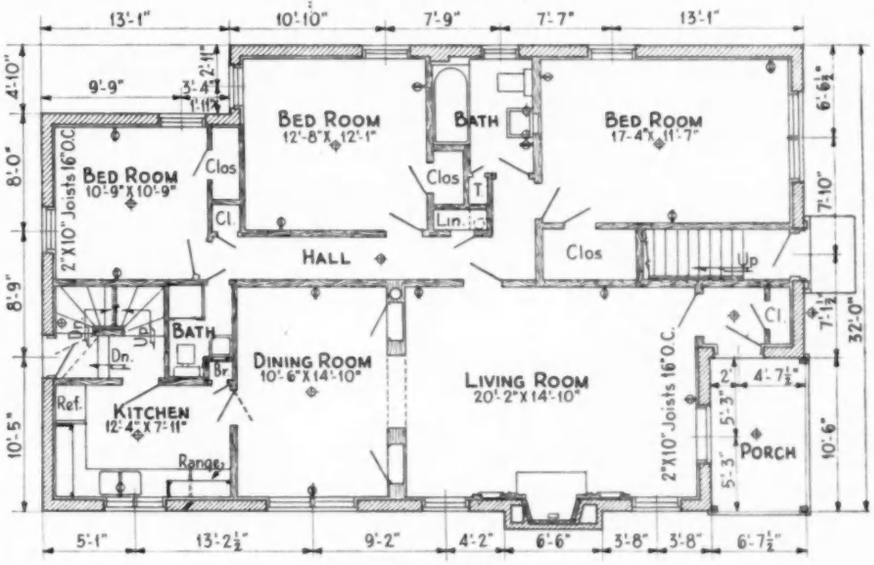
PAINTING: 2-coat white lead and oil on exterior; halls and basement stair well 1 coat Luminall; oak floors 2 coats Sherwin-Williams varnish.

HEATING: 2 Janitrol winter air conditioning systems, 1 for each floor.

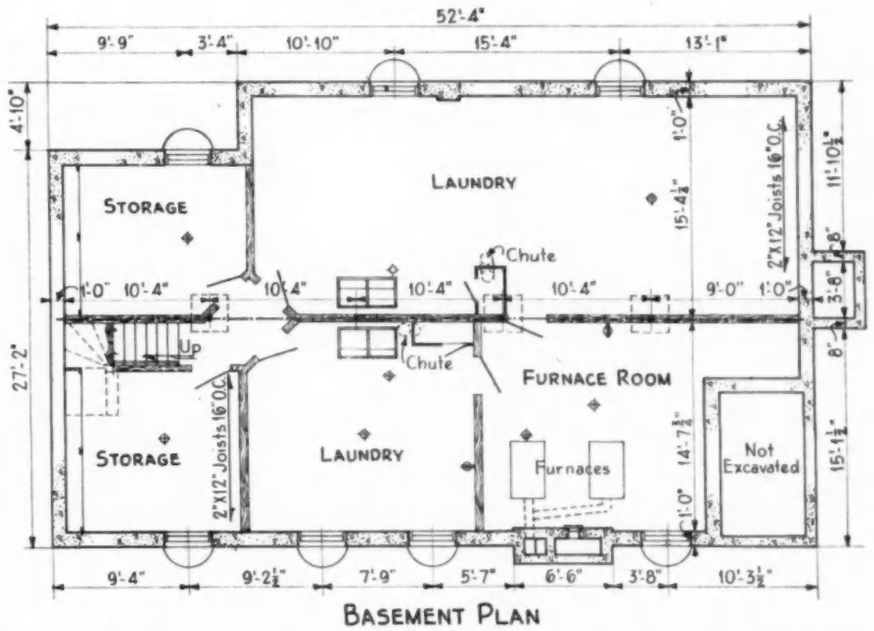
WIRING: G-E system.



SECOND FLOOR PLAN

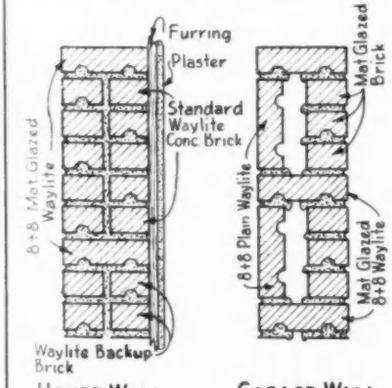


FIRST FLOOR PLAN



BASEMENT PLAN

DETAILED floor plans and wall cross sections showing use of 8x8 block in suburban Milwaukee duplex.

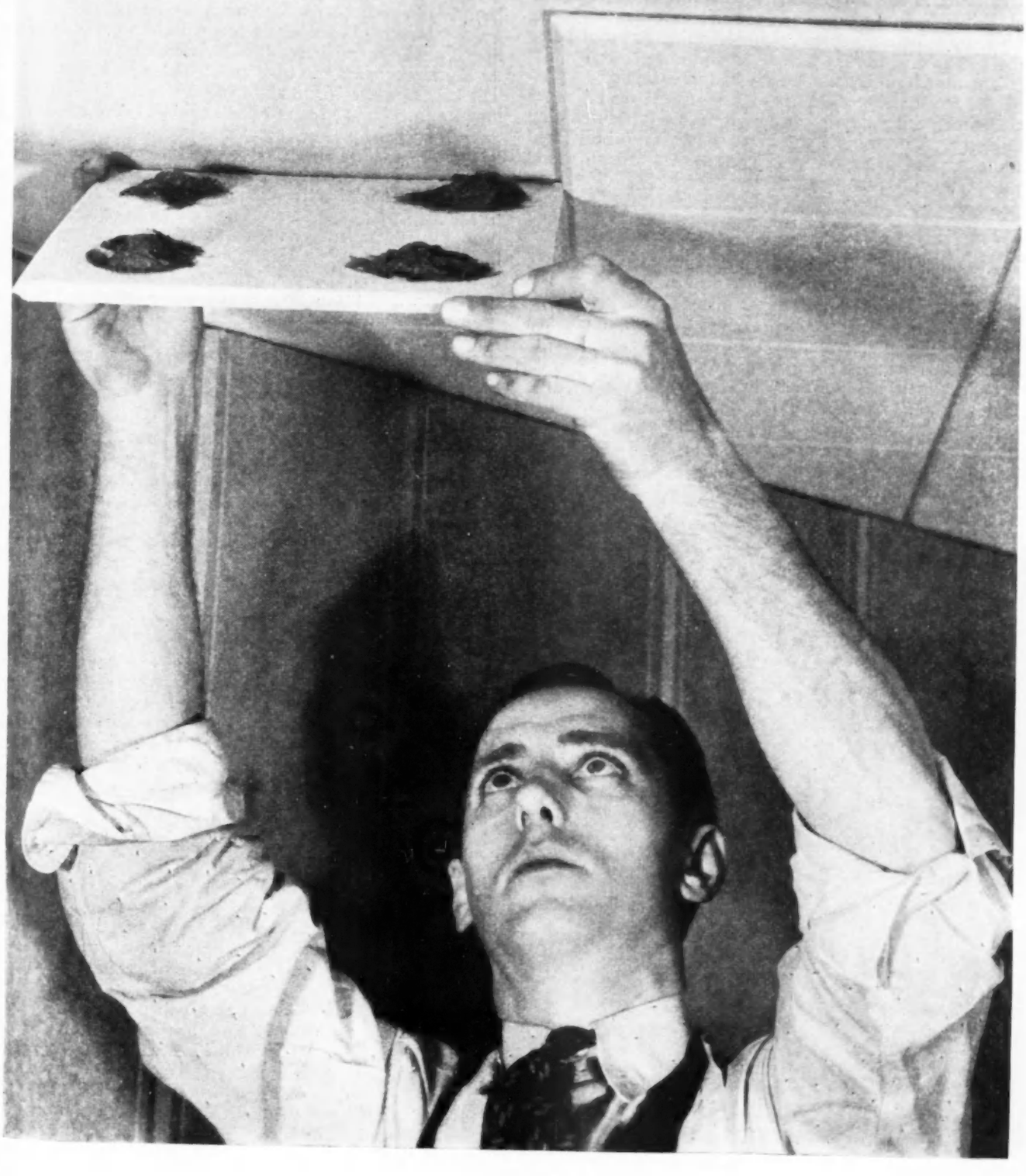


HOUSE WALL GARAGE WALL

INDEX TO 1939 HOUSE DESIGNS AND PLANS

ALL HOUSE DESIGNS AND FLOOR PLANS published in the AMERICAN BUILDER during the year 1939 are listed and classified in this index. Date and page number on which each house appears are given opposite name of type, such as Colonial, English, French, Modern, etc.

INSULATION BOARD *for* HOME BUILDING



Insulation Board, an Improved Material for Home Building

INSULATION board is essentially manufactured insulating "lumber" produced in large units without knots or grain. It is classified in Federal Specification LLL-F-321a as "Fiber-board; insulating" and described as being "manufactured from wood or other vegetable fiber, by a felting process, suitable sizing material being incorporated in the product to render it water resistant."

The insulation board industry had its inception in Minnesota about 25 years ago and has grown steadily since that time until today it is a major factor in the building industry. A dozen or more large concerns in the United States are at present engaged in the manufacture and sale of this product.

Manufacture

Although the methods of manufacture vary somewhat, certain operations are common to all products. The first step usually is to reduce the raw material to a pulp, after which the fibers are cooked and washed. The cooking dissolves the soluble matter and the washing removes it. The clean fibers are then chemically treated with waterproofing materials so that the finished board will be highly water resistant throughout its entire thickness.

The next step is the felting process by which the loose fibers are formed over large rolls or in molds into a large coherent sheet. During this operation, a large part of the water in which the fibers have been suspended is removed.

INSULATION board is popular for sheathing homes, assuring both stiffness and warmth.

The final steps are the removal of the remaining water from the sheets by means of driers, and the cutting and trimming of the board to the finished size.

Insulation board products are classified as building board, lath, roof board, sheathing, tile and plank.

Most building boards are 4 feet wide, from 4 to 12 feet long and ½, ¾ and 1 inch thick. At least one mill is producing larger sizes, up to 8 feet wide and 14 feet long. The lath sizes are 16, 18 and 24 inches wide by 48 inches long by ½, ¾ and 1 inch thick. The roof board is usually 22 x 47 inches by ½ inch and multiples of ½ inch thick.

Insulation board sheathing is generally available in the same sizes as the building board but is 25/32 inch thick, the same as that of conventional lumber sheathing. Some of the insulation board sheathings are additionally waterproofed with asphalt by means of either a surface or an integral treatment, or by means of a paper covering. Certain products also have aluminum coatings designed to give further protection.

Insulation board tile and plank are usually fabricated from the building board, manufactured according to the foregoing general process to the desired thickness. The lath is also fabricated from the building board stock in most cases, whereas the roof board is frequently a special product manufactured in a manner similar to the building board but according to somewhat different specifications to obtain certain physical properties.

Practically all insulation boards are made in single plies up to a thickness of 25/32 inch, but in some cases greater thicknesses are obtained by laminating the proper number of plies, usually ½ inch thick, by means of a water-resistant cement. These various products are further described as they are referred to in other articles and their uses are shown in Figure 1.

Physical Properties

Perhaps the outstanding characteristic of insulation board is that it combines structural strength with insulating value. This combination of characteristics is important in at least two respects, *first* because insulation board may be used where it serves both as a structural material and an insulation and *second* the structural qualities tend to perpetuate the insulating value because the insulation board is not readily compressed or otherwise damaged.

Insulation Value: Because of the millions of entrapped air voids within the fibers as well as the interstices between the fibers, insulation boards have an excellent insulating value. The unit of measure of the insulating value of a material is known as its thermal conductivity, and the average thermal conductivity of insulating boards of production-line dryness is 0.33. This is the number of Btu (British thermal units) that will pass through one square foot of the material one inch thick, in one hour, for one degree temperature difference.

Strength: The natural interlacing and interweaving of the fibers and their subsequent shrinkage during the drying process knits them firmly together and forms a grainless board of high tensile strength and stiffness.

The ***tensile strength*** of a material is its tendency to resist two forces away from each other to pull the material apart. The average tensile strength of insulation board used for structural purposes is about 175 pounds per square inch.

Sound Absorption: The exposed surface of insulation board has a degree of sound absorption and for this reason is an effective material for acoustical correction and noise quieting in auditoriums, theatres, offices and other enclosures in which the hearing properties are important. Another equally important characteristic of this type of product is its tendency to reduce sound transmission through floors and partitions, when properly installed. These subjects are discussed in detail in another article.

Resistance to Air Leakage: Insulation boards are practically impervious to air leakage under ordinary conditions. Even at high wind velocities the amount of infiltration directly through products of this type, when used in combination with other materials, usually is insignificant. This fact is of considerable practical importance from the standpoint of heating costs.

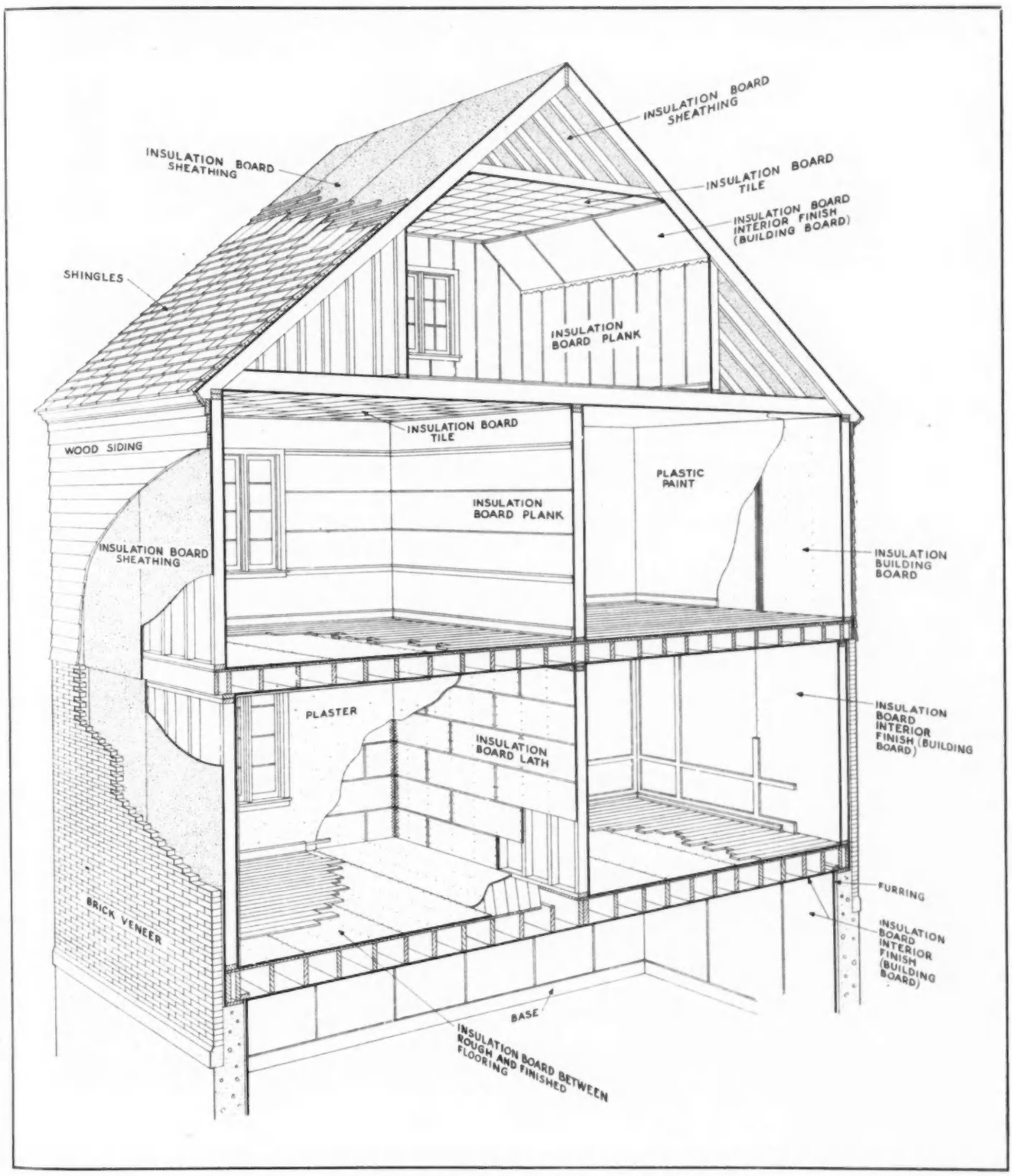


Figure 1. Section of building showing typical uses of insulation board.

Beautiful Interiors Obtained with Insulation Board Products

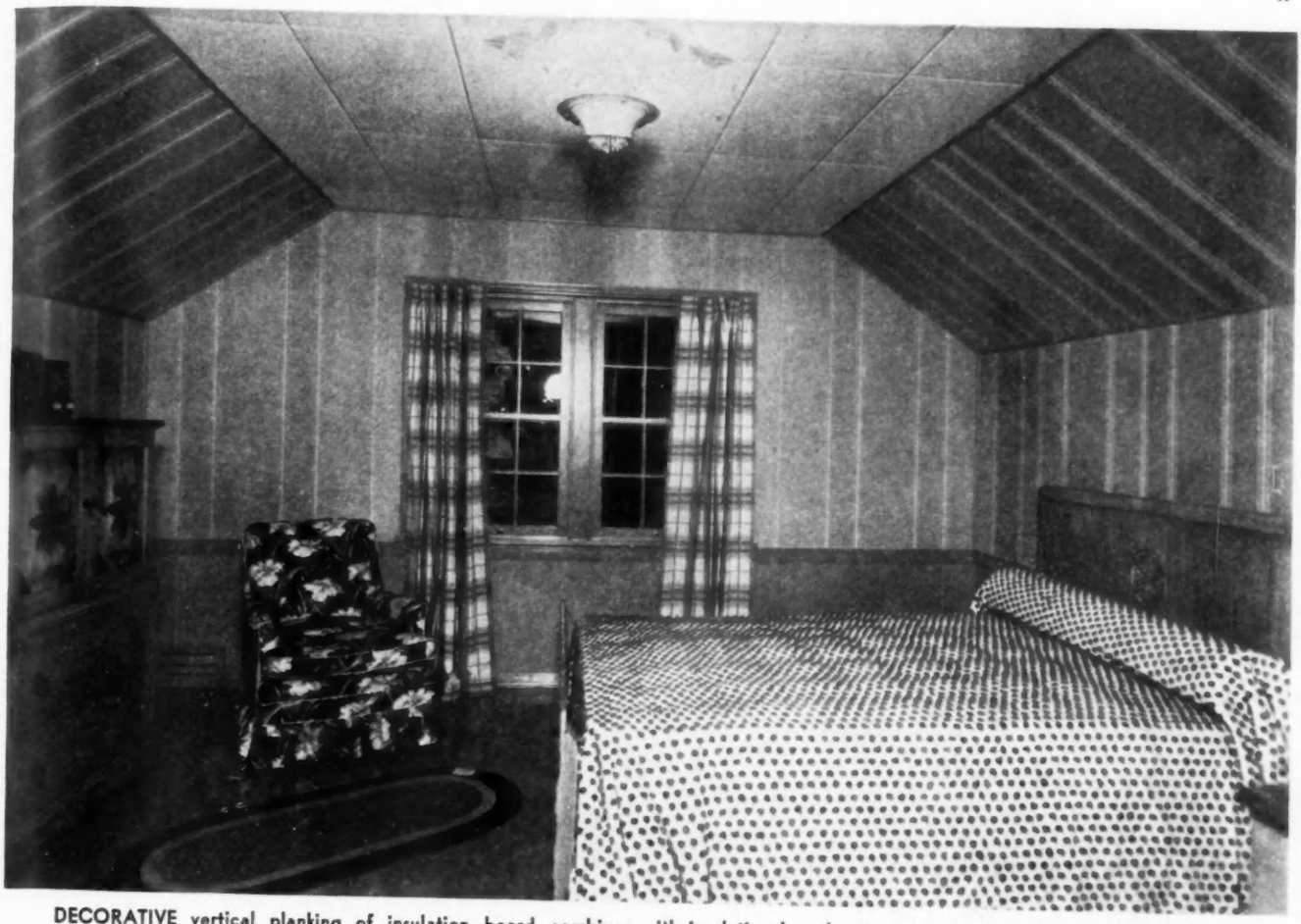
INTERIOR wall and ceiling finishes of beauty and charm are obtainable by means of insulation board interior finish products. These products include the tile and plank specifically designed for this purpose as well as the large-sized building and insulating boards, which are also suitable for decorative purposes. Insulation board interior finish products not only provide attractive and economical interiors, adapted to practically any decorative scheme or motif, but also serve as heat and "cold" insulation, acoustical correction and noise quieting. Special acoustical materials are also available.

Churches, lodges, auditoriums, school-rooms, restaurants, taverns, hospitals and residences are a few of the buildings for which these interior finish products are especially adapted. Residence uses include recreation rooms, living rooms, dining rooms, bedrooms and attics.

The large boards are available in a variety of colors and textures and generally are ½ inch and 1 inch thick, 4 to 8 feet wide and 4 to 14 feet long. Tile boards are small square and rectangular units of convenient sizes, whereas, the plank, as the name implies, are long narrow units produced in various widths and lengths. The plank and tile are usually ½ inch thick and are also available in a variety of tints and textures. The accompanying illustrations show a few of the design possibilities of insulation board interior finish products. The building boards may be V-grooved, carved or beveled, for various attractive designs. Modern or period paneling may be obtained by using mouldings of insulation board, wood or metal. Insulation board and wood mouldings are now obtainable in a variety of colors.

Beveled panels (tile) are used primarily for ceilings. Because of the many sizes available, both in the square and rectangular tile, a wide range of patterns is possible, such as herringbone, ashlar, basketweave, plaid, rectangular and diamond. Insulation board plank are used mainly for wall

THE ATTRACTIVE finish of this insulation board, combined with invisible nailing of the wall and ceiling panels, results in a number of new decorative possibilities for this economical surfacing material.



DECORATIVE vertical planking of insulation board combines with insulation board wainscot and ceiling in this Ohio bedroom.

INSULATION BOARD in large sizes for side walls and ceilings makes possible beautiful interiors like this.

treatment, and the various widths available make it possible to obtain regular or random plank effects. The plank may be applied either vertically or horizontally. Vertical lines emphasize height whereas horizontal lines emphasize length and width.

Wainscots are frequently desirable in modern and period wall treatments. They are used to reduce the apparent height of a room or to introduce color. Either the building board or harder non-insulating pressed wood boards are suitable for this purpose, using plank, beveled panels (tile) or building board above the wainscoting.

Overlay borders and friezes made from insulation board relieve harshness and monotony in a design. Ornaments and mouldings for embellishing or modifying a given pattern or motif are available, or may be cut from insulation board by means of special tools. Where two surface textures are available, they may be alternated to produce attractive effects.

Beveling and Grooving

By means of special tools which have been developed for the purpose, the large building boards may readily be beveled, grooved or hand carved. One of these tools is similar to a carpenter's plane and utilizes tool steel blades which may be used indefinitely if properly honed. This tool has adjustments for varying width and depth of cuts, and spacing of grooves. A supplementary tool or knife is used for freehand carving where the beveling and grooving tool would be unwieldy.

Some of the operations possible with these tools include square and beveled edges, V-grooves of varying widths, diagonal grooves edge to edge, edge to groove or groove to groove, and inside grooves "faded" by gradually lowering and raising tool. Overlays and perfect circles can be obtained as well as freehand curves and sweeps; also V-grooves in fluted designs and miter and slip joints.

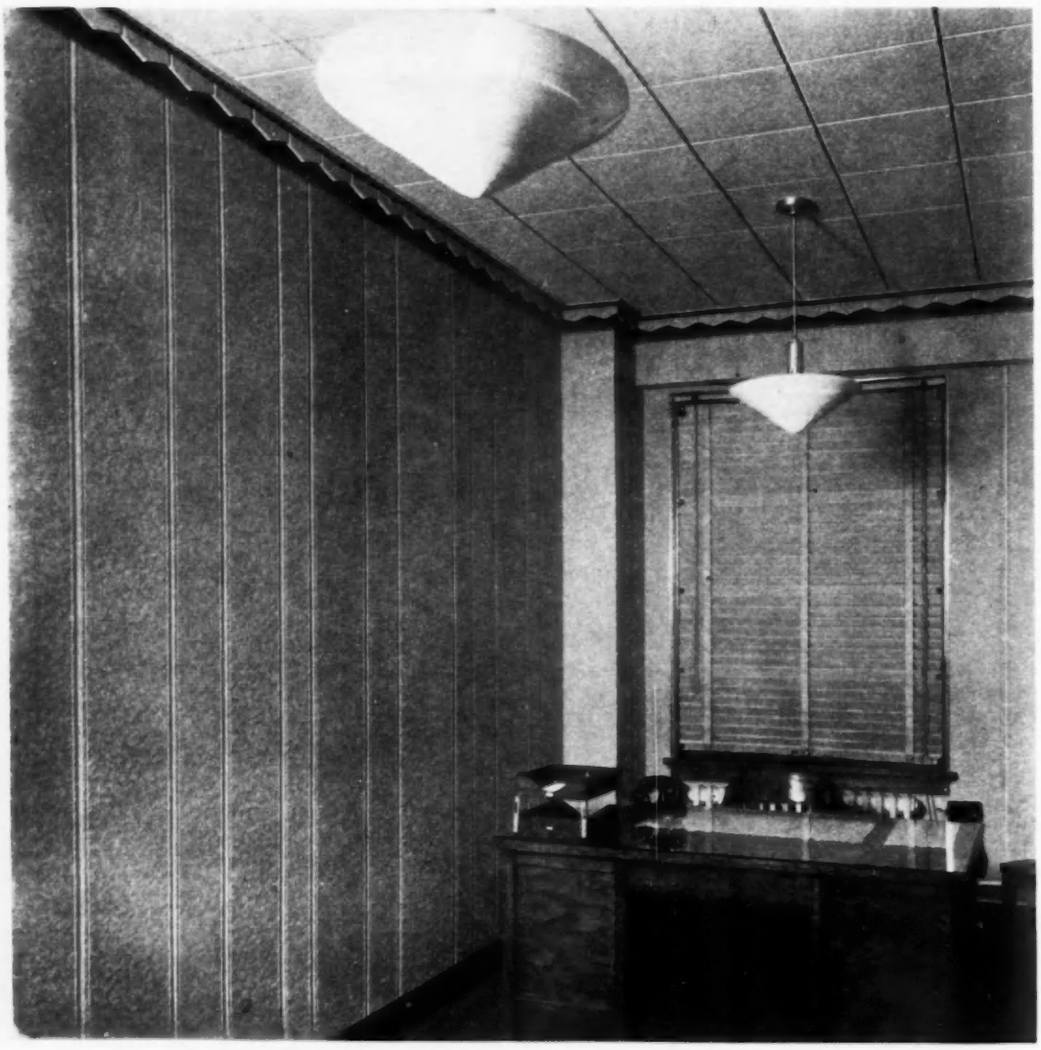
Methods of Applying

Proper application of insulation board for interior finish purposes is important and the specific instructions of the manufacturer of the product used should be followed for best results. The following details of application will however serve as a general guide.

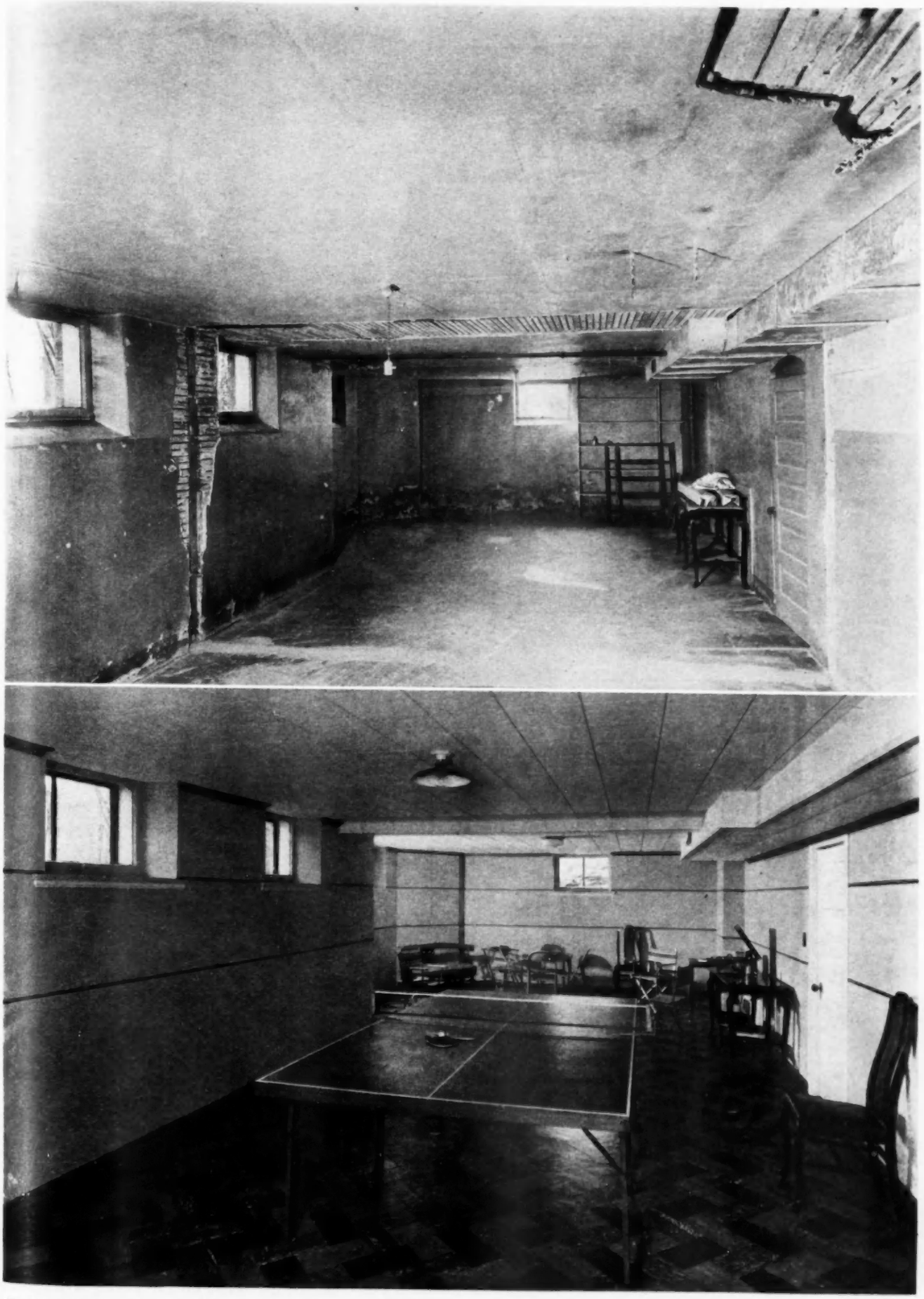
Interior finish products may be applied by nailing to framing or furring or by cementing to continuous, smooth surfaces. When attached to a nailing base, the framing should correspond with the size or type of product used but in no case should be installed on greater than 16 inch centers. Furring strips for plank should be at right angles to plank on 9 inch centers up to a height of 3 feet and 12 or 16 inch centers above this height. It is especially important that the framing or furring for tile units should carefully conform to the size of units used. Headers are recommended in back of chair rail and all other heavy mouldings.

Where nailing is to be exposed 1¼ inch finishing nails or 1¼ No. 16 brads for ½ inch thick insulation boards should be used and driven at an angle, setting nail below surface and tapping fiber over surface. Nails may be driven in beaded groove of plank. Where nails are to be covered with panel strips or mouldings, use ordinary 1½ inch nails.

Insulation board interior finish products may also be applied to sound plaster, smooth wood, plasterboard and other continuous surfaces by means of special adhesives available for this purpose, but for best results supplementary nailing is recommended where possible. For application over metal ceilings, rough plaster or other irregular or unsound surfaces, furring strips should be installed and the insulation board nailed thereto in accordance with the foregoing instructions.



PRIVATE OFFICE is both decorated and quieted by this wall and ceiling treatment in insulation board.



REMODELING is easily and effectively done with Insulation Board, as illustrated in the above photos showing (above) a St. Paul basement refinished into a smart recreation room, at small cost.

Where the larger building board is to be cemented, the adhesive should be applied in ribbons 3 to 4 inches wide along all edges with two intermediate ribbons, one each parallel to and approximately 16 inches from the long edge. In some cases the adhesive may be applied in spots 3 or 4 inches in diameter and spaced 6 or 8 inches apart along all edges with two intermediate rows of spots applied lengthwise.

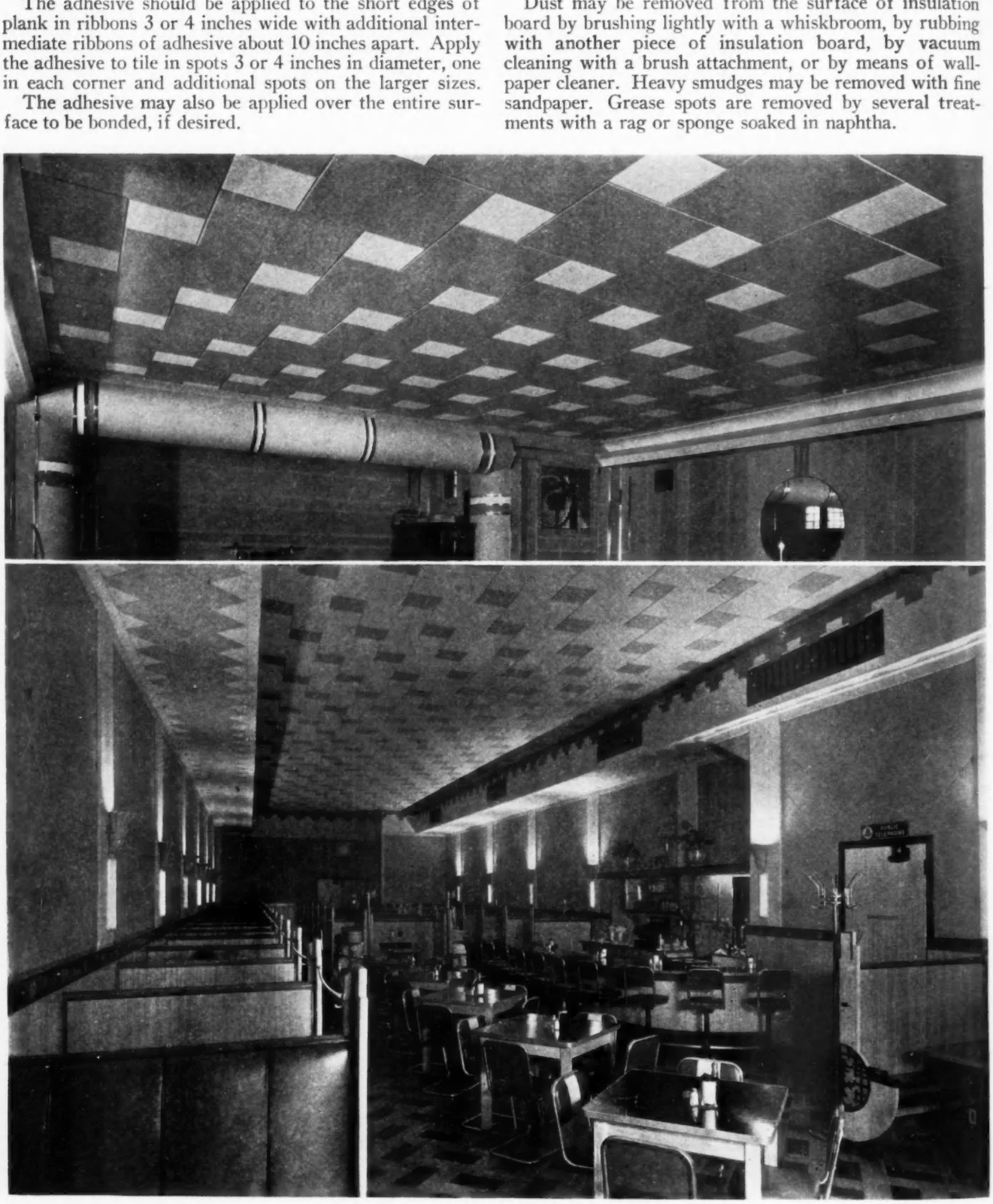
The adhesive should be applied to the short edges of plank in ribbons 3 or 4 inches wide with additional intermediate ribbons of adhesive about 10 inches apart. Apply the adhesive to tile in spots 3 or 4 inches in diameter, one in each corner and additional spots on the larger sizes.

The adhesive may also be applied over the entire surface to be bonded, if desired.

It is particularly important that sufficient adhesive be used, especially in the case of rough surfaces, for which a heavy-bodied adhesive is preferable. Intimate bond is obtained by sliding the units in place, using a pressure sidewise and against the surface to be finished.

Cleaning and Maintenance

Dust may be removed from the surface of insulation board by brushing lightly with a whiskbroom, by rubbing with another piece of insulation board, by vacuum cleaning with a brush attachment, or by means of wallpaper cleaner. Heavy smudges may be removed with fine sandpaper. Grease spots are removed by several treatments with a rag or sponge soaked in naphtha.



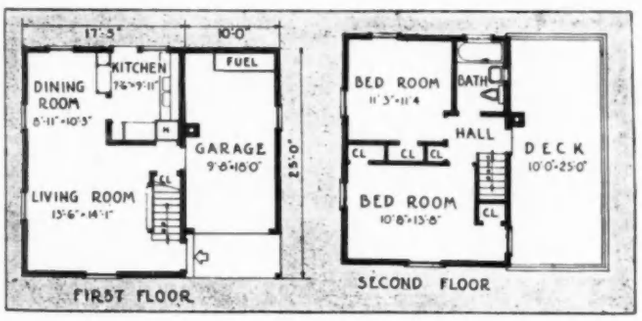
RESTAURANTS gain patronage when quieted and stylized by insulation board finish. The SooChu (Minneapolis) shows a ceiling of two-tone tile, while the Point Pleasant (New York) Hotel Dining Room, above, uses the same design but reversed in color.

Insulation Board Adapted to Demonstration Houses

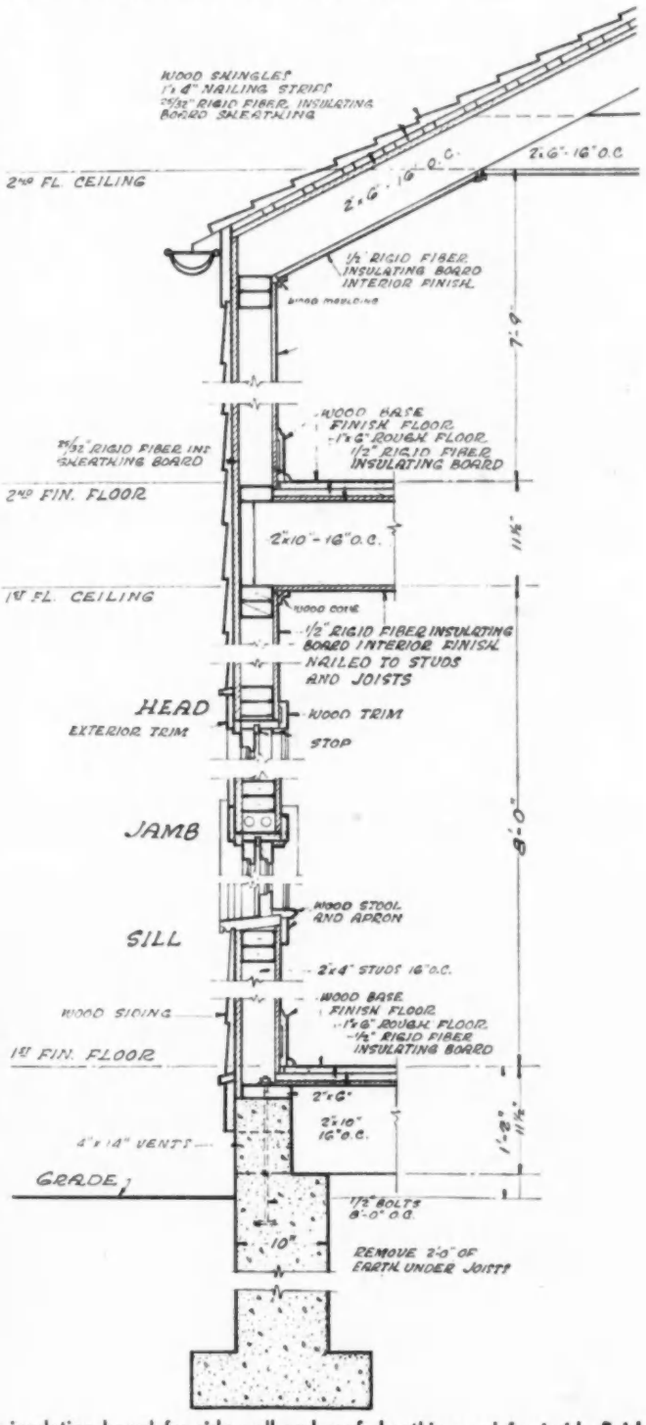
THE National Small Homes Demonstration, Inc., is an informal, non-profit organization established by the National Lumber Manufacturers Association and the National Retail Lumber Dealers Association in cooperation with manufacturers and distributors of home building materials and equipment, to "work together toward better homes" and "to interest progressive and alert dealers and builders . . . in the production of demonstration homes from the designs" which the NSHD has prepared.

With the idea of cooperating with this movement, the engineers of the Insulation Board Institute have analyzed design 1-D of the current portfolio, a 5 room two-story house, for the purpose of showing how insulation board may be adapted to a house of this type. Thus builders who propose to construct homes of this design are enabled readily to make use of insulation board throughout if they so desire. This material is particularly suitable where dry-wall construction is preferred. The details shown herewith are more or less typical and may be adapted to any of the NSHD designs.

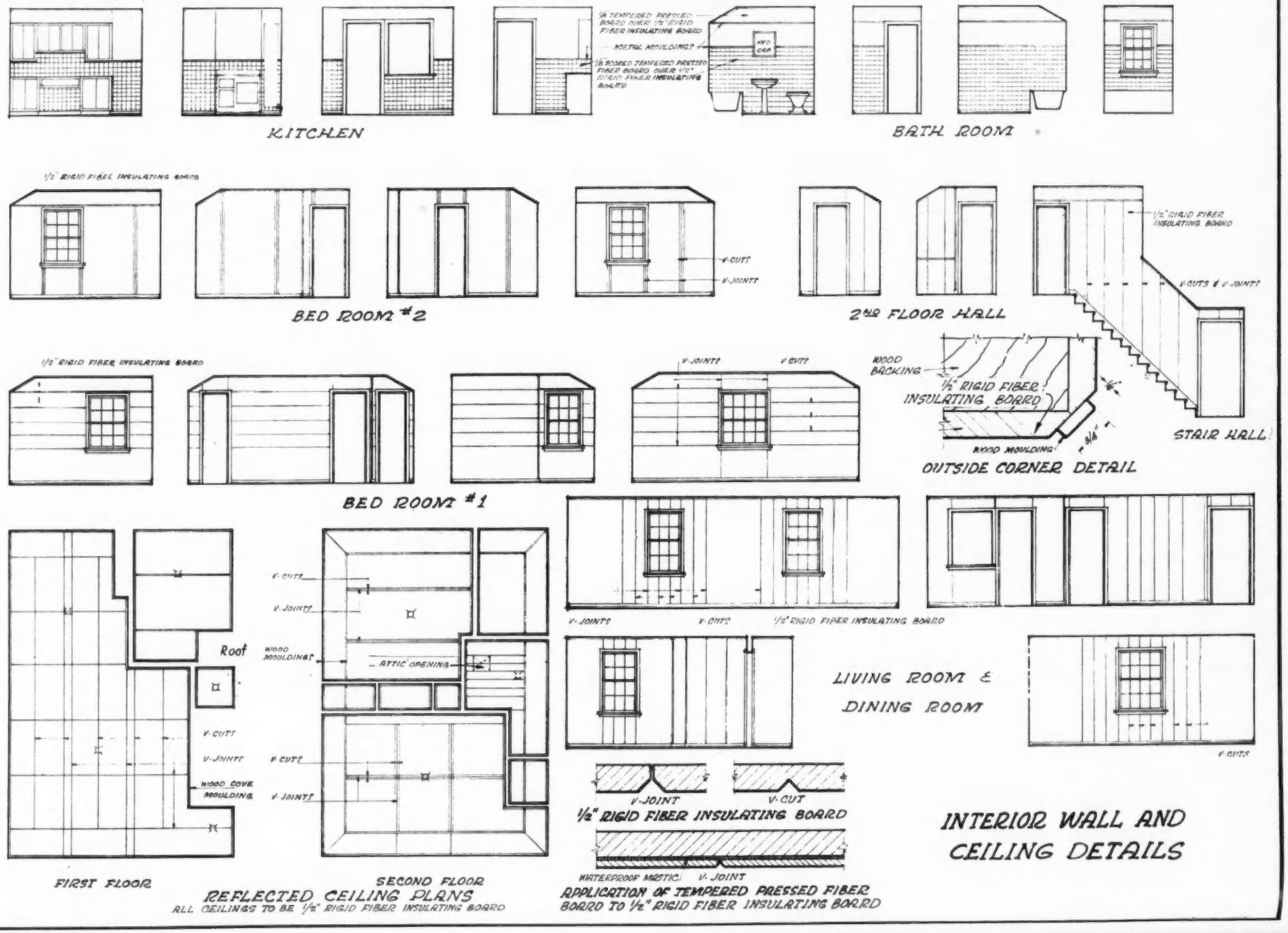
In this design, insulation board is used principally as exterior wall sheathing, as interior finish, as sound insulation between the rough and finish floors, and as roof insulation between the roof rafters and nailing strips for the shingles. Where used as interior finish on exterior walls and top floor ceilings, the insulation board serves also as insulation. Therefore, all exterior members of the house have a double thickness of insulation board.



The wall and roof section shows the application of various types of insulation board to both sides of studs, rafters and floor joists and to the underside of ceiling joists. The interior finish details illustrate typical uses of insulation board for this purpose. The living room and dining room wall designs are based on the use of the large building boards V-grooved vertically as shown to produce the desired effect. Similarly attractive designs could also be obtained by the use of insulation board plank in regular or random widths.



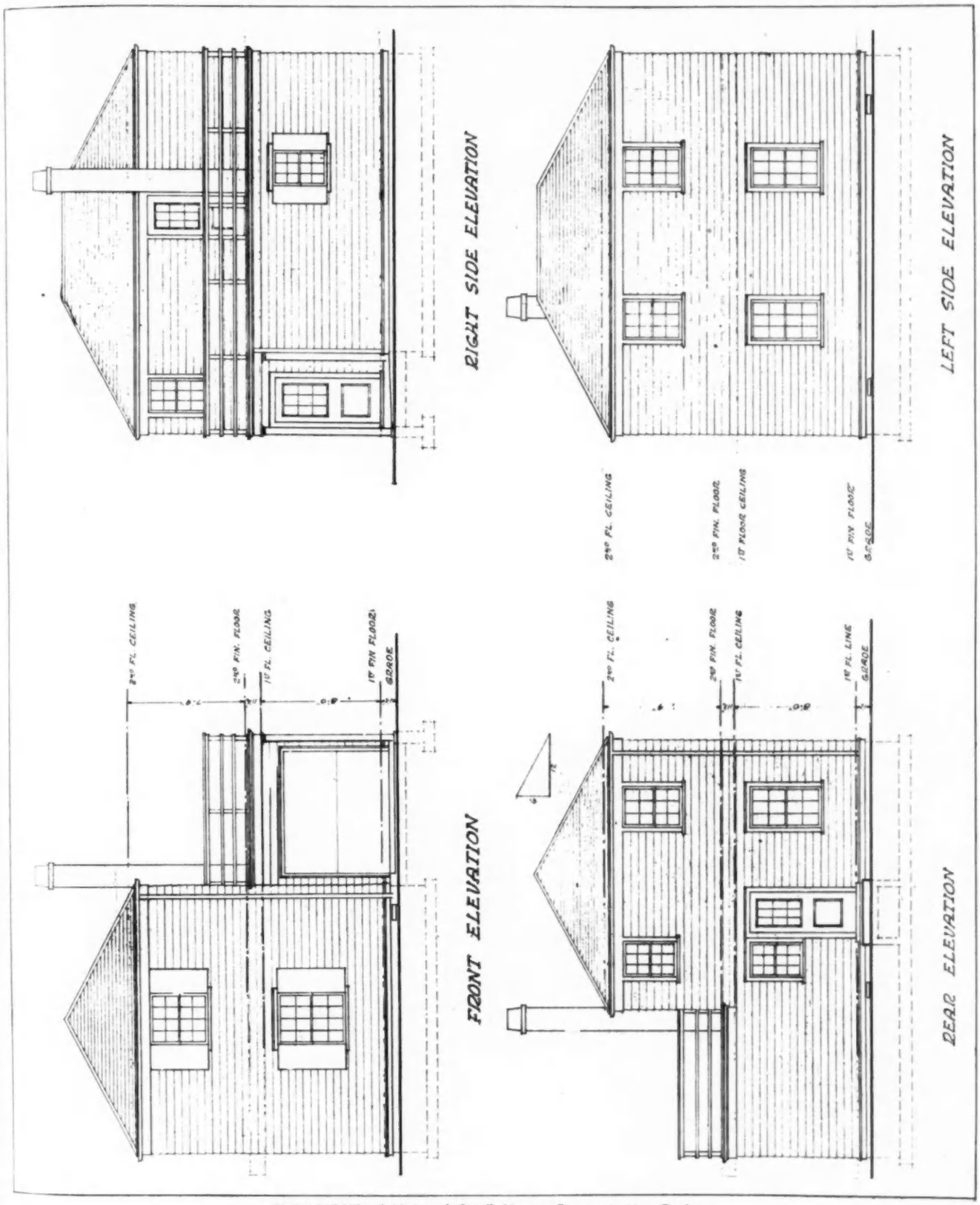
HOW to build the Nat. Small Homes Demonstration Design 1-D using insulation board for side wall and roof sheathing and for inside finish (walls and ceilings) of all rooms.


KITCHEN
BATH ROOM
BED ROOM #2
2ND FLOOR HALL
STAIR HALL
BED ROOM #1
OUTSIDE CORNER DETAIL
LIVING ROOM & DINING ROOM
INTERIOR WALL AND CEILING DETAILS
FIRST FLOOR
SECOND FLOOR
REFLECTED CEILING PLANS
ALL CEILINGS TO BE 1/2" RIGID FIBER INSULATING BOARD
APPLICATION OF TEMPERED PRESSED FIBER BOARD TO 1/2" RIGID FIBER INSULATING BOARD
1/2" RIGID FIBER INSULATING BOARD
V-JOINT
V-CUT
WOOD BACKING
WOOD MOULDING
WATERPROOF MASTIC
ATTIC OPENING
Roof
WOOD COVE MOULDING

The ceiling layout for the first floor is also based on the use of the large building board, the proper design effects being obtained in this case also by the use of V-joints, as illustrated. Desirable ceiling patterns may also be obtained by using insulation board tile instead of the building board V-grooved. Insulation board ½ inch thick is used as insulation on the walls of kitchen and bathroom. These walls are finished with tempered pressed board, the insulation board tile being applied as wainscoting and the smooth-surfaced board above the wainscoting.

The various patterns for the bedrooms and halls, involving the use of insulation board, are also shown. These designs are readily obtained by means of the standard insulation board grooving, beveling and cutting tool referred to in the interior finish article.

As the insulation board serves a double purpose in many instances, the insulation value thus obtained is derived at a cost emphasizing the low-cost purpose of the design.



ELEVATIONS of National Small Homes Demonstration Design.

Insulation Board Ideal Base for Paint and Wall Coverings

WHERE dry wall construction is preferred, insulation board may be used in the natural colors as interior finish (as described in the preceding chapter) or it may be used as a base for decorative finishes of various types including paints, stains and wall coverings. In either case, it serves at least two purposes, since it also functions as an insulation when used on outside walls and top floor ceilings.

Calcimines, Casein and Water Paints

Calcimine and water paints may be applied directly to unsized insulation board although calcimines may also be applied to varnish sized surfaces to facilitate removal by washing. Water paints of the casein base class are washable to a certain degree but not quite so much so as oil or varnish paints.

A single coat of good casein base water paint will usually give good coverage on insulation board, although two coats are recommended. Some of these paints are available tinted in a variety of attractive pastel shades. Others can be tinted from the white by the addition of dry colors in accordance with manufacturers' directions.

Stains

Stains may be used where the natural color of the insulation board is to be modified without destroying the texture and where its sound absorbing properties are of importance. While a variety of stains are available, glue stains usually give the best results on insulation board. A satisfactory glue stain may be made by dissolving ½ pound of flake or ground glue in a gallon of boiling water.

After the glue has been thoroughly dissolved, dry color is added in amounts depending on the depth of tone required. The dry colors are best added by mixing them with a small amount of water, stirring to a thin paste which is more easily taken up by the glue solution. Glue stains of this type must be used promptly after preparation. They should, if possible, be applied while they are still warm. Alcohol stains are not recommended—they dry too rapidly, leaving brush marks.

Oil or Varnish Paints

Insulation board must be properly sized before application of oil or varnish paints. A satisfactory glue size may be made by dissolving 1½ pounds of chip or flake glue in a gallon of boiling water. Various prepared oil or varnish sizes, ready mixed and properly proportioned for direct application to insulation board, may be obtained. The best results are obtained if the surface is sanded lightly after the size coat has dried thoroughly. The paint may be applied to the surface thus prepared using the desired number of coats for satisfactory results.

Covering Joints for Applying Plastic Paint & Wall Coverings

Where plastic paint or wall coverings are to be applied over insulation board, some authorities are recommending that all joints between boards should be reinforced, using wire screen or buckram tape. The wire mesh or tape should not be nailed or tacked in place except when starting a joint and occasionally on ceiling strips to hold in place while applying cement.

Hold one end of strip while the bonding cement is applied to the surface of the reinforcement and press through the mesh with a 4 inch painter's scraping knife. Spread the bonding cement beyond the edges of the reinforcement for not less than 1 inch so that the edge of the mesh will not show through the plastic paint finish. In bonding the reinforcement over the joints, press firmly against the insulation board and fill mesh well with the bonding cement applied in the consistency of putty. Apply, similarly, a strip of reinforcement bent around all corners and re-entrant angles. For more detailed information, refer to manufacturer's specifications.

Applying Plastic Paints

Plastic paints are thick paints which can be textured by manipulating the brush or various tools to produce various textures and effects. They are divided into two groups—those prepared by the addition of water to a powder and those having a linseed oil base furnished prepared for use. Water base plastic paints, unless excessively alkaline, can usually be applied directly to unsized insulation board. For oil base plastic paints, the insulation board should be sized in accordance with the instructions under the heading, Oil or Varnish Paints.

Wall Coverings

Wall papers, canvas, fabrics such as Sanitas, leather and even thin plywoods and thin metal sheets may be applied to certain insulation boards. Wall paper may be applied over a lining paper if desired. Manufacturers should be consulted for specific recommendations as to this use of their product.

Stencil Decoration

Where a light touch of color is desired or where a means of accentuating a design is sought, stencils are recommended. Border stencils are particularly attractive on insulation board interiors, and are approved by leading decorators.

Stencil designs may be cut in oil paper or metal. They are held in position by hand or by thumb tacks while the color is applied with a stiff stencil brush. Colors ground in Japan are recommended. The Japan color paint should be thinned to the desired consistency with a mixture of six parts turpentine, three parts linseed oil and one part Japan drier.

Artistic decorative effects may be produced by carving the surface of insulation board, particularly in the case of large relief carving where detail is not required. A design is first laid out in pencil and razor blades or a sharp knife are then used to carve the insulation board.

Procedure for Installing Insulation Board

The framing or furring is installed in the usual manner on 12 or 16 inch centers. Headers are cut in between framing members at the ends of the insulation board to provide a nailing base and also in back of chair rails and all other heavy mouldings. Where paints and

stains are to be used, the insulation board is attached by means of finishing nails, driven at an angle and set flush. Otherwise 1½ inch box nails are used, except where 1 inch insulation board is to be installed, in which case 2 inch box nails are used.

The insulation board should be placed singly around the room for at least 24 hours prior to erection to allow adjustment to atmospheric conditions. Boards should be of sufficient length to span completely between sills and plates or other structural members. A space of ⅛ inch should be left between boards and at the ends of boards. Most products are cut scant for this purpose. The insulation board is nailed first to intermediate framing members, and then the edges are nailed. On intermediate framing members, nails are spaced 6 inches apart. Nails are spaced 3 inches apart at edges and ⅜ inch away from edges and driven in until the heads are flush with the insulation board surface.

Insulation Board Sheathing

FOR many years, lumber ranging in width from 6 to 12 inches and applied horizontally or diagonally has been considered the standard wall sheathing. In recent years, however, insulation board has also been used extensively for this purpose and at the present time is rapidly increasing in popularity among architects and builders.

Purpose of Sheathing

What is the purpose of wall sheathing or boxing? In the first place, it provides a measure of protection against the weather—heat, cold and wind. Another purpose is to tie the framework together and to provide a base for the exterior finish. A third and extremely important function is to increase the rigidity of the building so that it will resist distortion by wind stresses, thus minimizing cracks and other damage.

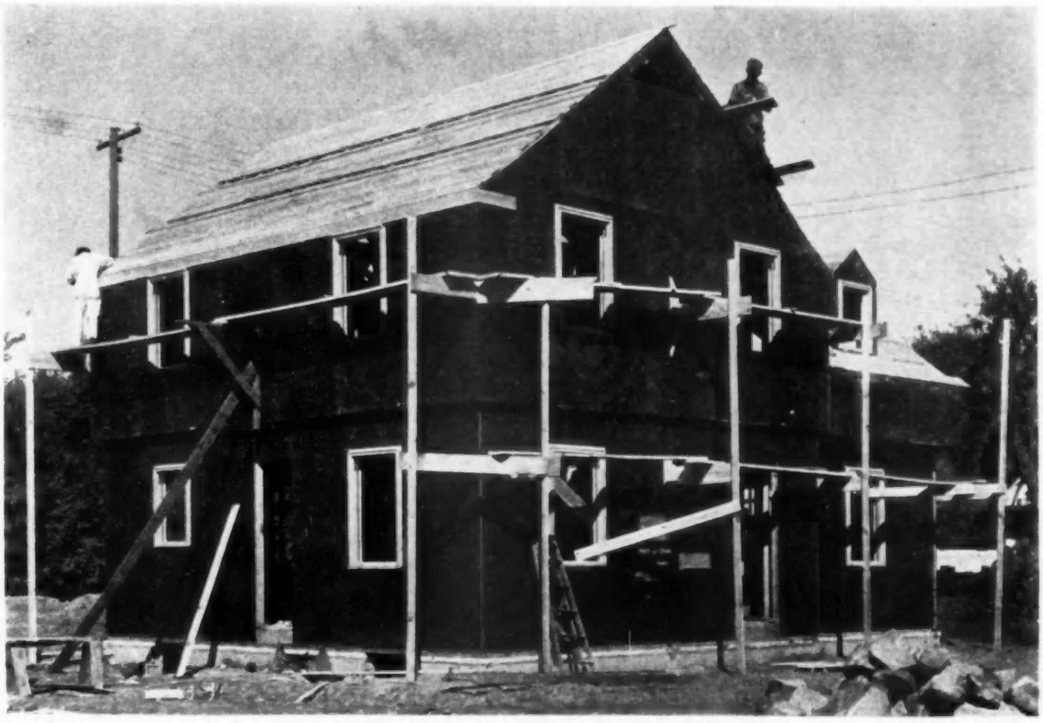
Let's analyze these reasons for using wall sheathing to determine the fitness and adaptability of insulation board for this purpose. Insulation board sheathing is available in large units, 4 to 8 feet wide and up to 14 feet long and 25/32 inch thick. Special sheathings two feet wide and 8 feet long, applied horizontally, are also available. Various supplementary waterproofing treatments are used in connection with some of these products such as asphalt applied to all surfaces, with or without an additional aluminum coating on one surface, an integral asphalt treatment, and paper applied to the surfaces.

As an insulating material this type of sheathing more effectively resists the passage of heat which means greater year round comfort—cooler in the summer and warmer in the winter, plus fuel economy. It is not only devoid of knotholes and cracks through which air leakage due to wind pressure can take place, but the board itself is practically impervious to air infiltration. Insulation board in the large units is applied vertically and is nailed to the framing on all four edges. Thus it provides a smooth, continuous surface for the exterior finish.

Bracing Strength

The average individual will readily concede these points, but may perhaps ask if this type of product has sufficient strength. He may pick up a piece of insulation board and find that he can break it, and thereby conclude that it is not strong enough to be used for wall sheathing.

The answer to this question involves a principle with which few people, especially those unfamiliar with building construction, are aware. It is that although one material may be "stronger" than another when individual



INSULATION board used as wall sheathing. Waterproofing and vapor barrier features make this material extra serviceable in these days of humidification.

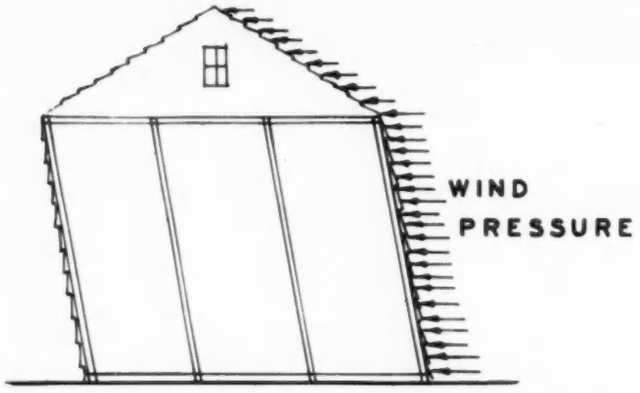


Figure 1. Sheathing removed from end; building distorted.

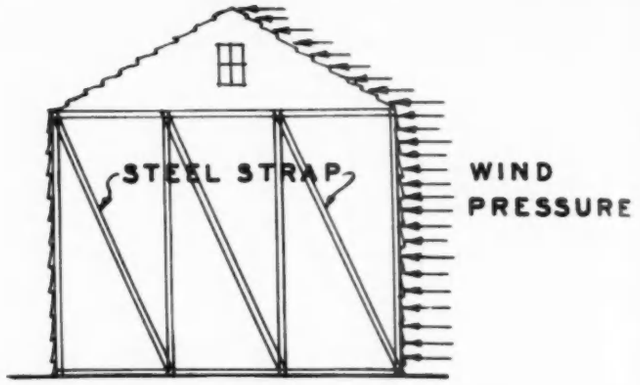


Figure 2. Sheathing removed from end; diagonal steel bracing straps under tension; building not distorted.

Figure 3. Insulation board sheathing under diagonal tension, same as steel straps in Figure 2; building not distorted.

Figure 4. Conventional sheathing on ends; very little diagonal bracing obtained; boards tend to slip edge upon edge, distorting building.

pieces of the same size are considered, the reverse may be true as far as the entire wall is concerned when the two materials are installed in the usual commercial sizes in which they are available. A wall sheathed with large units of insulation board possesses far greater bracing and stiffening properties than a wall sheathed with narrow units of any material applied horizontally.

The accompanying diagrams illustrate this point. Figure 1 shows the effect of wind pressure on the side of a building from which the sheathing at the ends of the building has been removed. The ends are distorted. If now the building should be braced with diagonal steel straps as shown in Figure 2, the building will not be distorted but will remain upright. These straps are subjected to pulling as tensile stresses.

If the steel straps are removed and the ends of the building are sheathed with insulation board, the insulation board is pulled diagonally subjecting it to tension as shown in Figure 3. The effect of wind pressure on a horizontal sheathed building is shown in Fig. 4. The sheathing boards tend to slip edge upon edge, due to the wind pressure. It is apparent therefore that the bracing contributed by insulation board means that a building sheathed with this material is not distorted under the same wind pressures that distort a horizontally sheathed building or under the same forces set up due to settling of the foundation.

Many laboratory and field tests have been made to verify the rigidity or resistance to distortion of wall sections sheathed with insulation board. A convincing field test which has been conducted thousands of times is known as the tug-of-war. In this test, similar panels of insulation board and lumber are bolted to a heavy framework, and a turnbuckle placed between the two panels. The U. S. Forest Products Laboratory at Madison, Wisconsin, has made a series of tests extending over a period of years. These tests were based on large room sized panels and proved conclusively that walls sheathed with insulation board 25/32 inch thick are substantially more rigid than walls sheathed with lumber applied horizontally.

Has Stood Test of Time

While tests and statistics prove beyond doubt the merits of insulation board sheathing, some may question whether a material of this type will stand up indefinitely. The original sheathing installations of this product were made 25 years ago and since then hundreds of thousands of buildings have been constructed using this type of sheathing. A large percentage of these were sheathed with ½ inch insulation board, whereas at the present time the 25/32 inch thickness is commonly used, the latter thickness being especially developed for this purpose. The results over this period of time have been entirely satisfactory and there is no evidence that there is any limit to the length of service of insulation board sheathing.

Comparative Costs

The next consideration is cost. No matter what the merits of a material, if the cost is out of line, the contractor or the home owner or the architect is not likely to be interested. The material cost of 25/32 inch insulation board sheathing is usually slightly higher than that of lumber sheathing. But this is offset in a measure by the greater amount of waste in the case of lumber which is usually 20 or 25 percent, as compared with practically no waste when insulation board is used because the pieces cut out from openings are large enough to be used elsewhere. Many contractors who use insulation board sheathing say that when they get through with a job they do not have a bushel basket full of pieces left.

The application cost of insulation board sheathing is less because the large boards can be handled and nailed faster. Most contractors agree that they can apply insulation board in about 60 percent of the time required for wood sheathing. Furthermore, building paper is not needed over insulation board, except under stucco. This, of course, means a saving on the labor of application as well as on the paper.

How these figures will add up of course depends on the locality and the specific job involved. In some sections of the United States, material and labor costs are such that 25/32 inch insulation board sheathing actually costs no more in place than lumber sheathing and building paper. The maximum difference between the two seldom exceeds $10.00 a thousand square feet of wall area covered.

Application

The procedure for applying insulation board sheathing is in general the same as that for wood sheathing, there being a few minor respects in which the methods differ. Studs should be erected as in ordinary frame construction on 12 or 16 inch centers and two by four headers inserted between framing members at the ends of all insulation boards to serve as a nailing base. Use 2 inch galvanized nails with ⅜ inch or ½ inch heads, or 8d common nails for 25/32 inch insulation board. For ½ inch board use 1½ inch galvanized roofing nails with ⅜ inch heads. Apply the large insulation board units lengthwise (vertically) and directly to all framing members, with ample bearing for nailing along all edges. Nail to intermediate framing members first, spacing nails 6 inches apart; and then along the edges, spacing nails 3 inches apart and ⅜ inch in from the edge. Drive nails until the heads are flush with the surface of the insulation board.

Never force insulation boards in place. Leave a ⅛ inch space between adjoining boards and at ends of boards. Most insulation boards are cut scant in width and length to allow for this space. Where 2 foot by 8 foot sheathing is used, it should be applied horizontally in accordance with manufacturers' specifications. Bring sheathing into close contact with frame around windows. Certain boards should be moistened lightly in dry weather, the day before application, as directed by the manufacturer. Flash windows, doors and other cased openings with strips of metal or prepared roofing.

Application of Exterior Finish

Wood siding may be applied directly over the insulation board, nailing through to the studs. Siding boards should butt over studs. Where shingles are to be used, nail 1 x 2 furring strips horizontally over insulation board to studs, spacing to fit the shingles. Nail shingles to furring strips. For brick or stone veneer, properly space anchors and nail through the insulation board into the studs. Lay the brick or stone in the usual manner. Allow not less than ½ inch space between the insulation board and the brick or stone. If stucco is to be used as exterior finish, it is generally considered good practice to apply a layer of asphalt saturated roofing felt over all surfaces to receive stucco. Self-furring and non-furring stucco bases should be applied in accordance with the manufacturers' specifications.

Insulation board serves the double purpose of sheathing and insulation. As an insulation it saves fuel in winter and provides greater year-round comfort which means cooler interiors in summer. In addition to its insulation value, insulation board eliminates air leakage because there are no cracks or knot holes. Structurally a wall sheathed with insulation board is much stronger because it has bracing and stiffening properties.

As to cost, there is little difference in most cases between insulation board and wood sheathing, as applied. This is because there is little or no waste with insulation board and it can be applied faster. Furthermore, it is not necessary to use building paper in most cases.

This type of sheathing has stood the test of time.

HORIZONTAL sheathing units 2' x 8' make shiplap joints on long edges.

RESIDENCE in Los Angeles braced and insulated with structural fiber board.

Insulation Board Lath Solves Many Plaster Base Problems

INSULATION board lath is an ideal plaster base. It provides a smooth, beautiful wall free from lath marks and serves the dual purpose of insulation and plaster base.

The thicknesses available—½ inch and 1 inch—make it possible to vary the amount of insulation to meet the specific requirements of each job. Insulation board lath of the proper thickness applied to the inside of the studs together with insulation board sheathing on the outside of the studs provide a well-insulated wall of sufficient heat resistance for practically any climatic condition or type of fuel. This construction also provides the all-important breathing space between the studs. Plaster on the surface of insulation board lath does not in any way impair its insulating efficiency. This type of lath plus the plaster makes a tight wall that is practically impervious to wind infiltration.

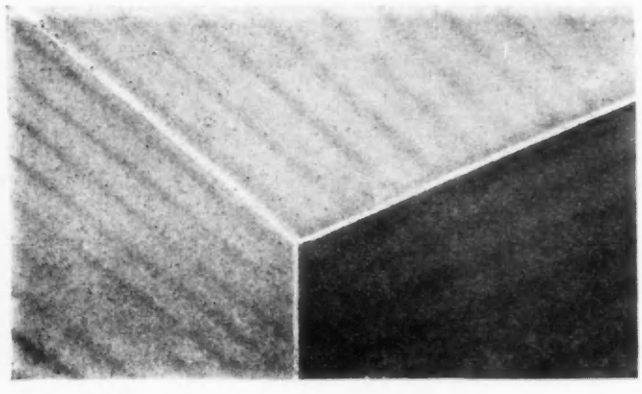
Insulation board lath are manufactured with special joints for reinforcing the plaster at the joints. The types available include the following: long edges shiplapped, galvanized wire reinforcing between framing supports; V-lap edge on the long sides, beveled on all edges; long edges tongued and grooved; beveled-shiplapped edges; and shiplapped on long edges with a 3 inch diamond mesh metal lath strip the full length of the long edge. There are also various modifications and variations of these edge treatments, but all are intended to perform the same function, namely, to reinforce the plaster at the joints between the individual lath units.

Plaster adheres permanently to insulation board lath due to the combined mechanical and suction bond. Millions of fibers protrude from the surface of the lath and when the plaster sets, an effective mechanical bond is created. A suction bond between the insulation board and the plaster is also obtained. According to laboratory tests, a direct perpendicular pull averaging 1,000 pounds per square foot is required to separate the plaster from the lath. As the plaster load of a ceiling amounts to only about 5 pounds per square foot, there is a factor of safety in the use of insulation board lath as a plaster base of about 200. This strength is greatly in excess of the strength of bond of plaster to wood lath.

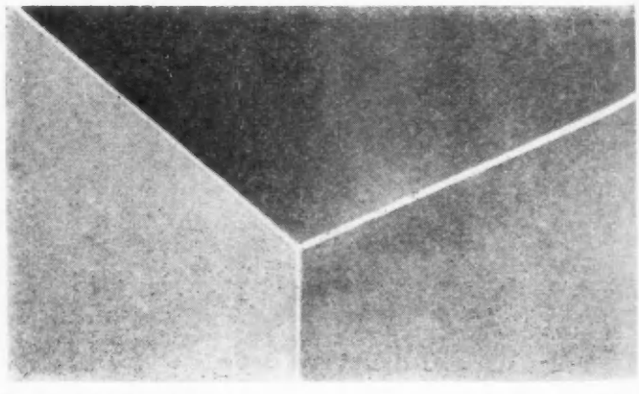
Reduces Plaster Cracks

Plastering introduces from 200 to 300 gallons of water into a house, all of which must be evaporated. When "open" lath are used much of this moisture inevitably finds its way into or between the framing members, creating unnecessary dampness between the walls. This situation is further aggravated by the droppings of wet plaster which accumulate between the studs. This is followed by a slow drying-out process of the framing members which may extend over many months, accompanied by the twisting and warping which produce plaster cracks and other faults in construction. Insulation board lath solves this serious problem because it constitutes a highly moisture-resistant barrier between the plaster and the framing. The moisture dries outward into the room and is carried away by proper ventilation.

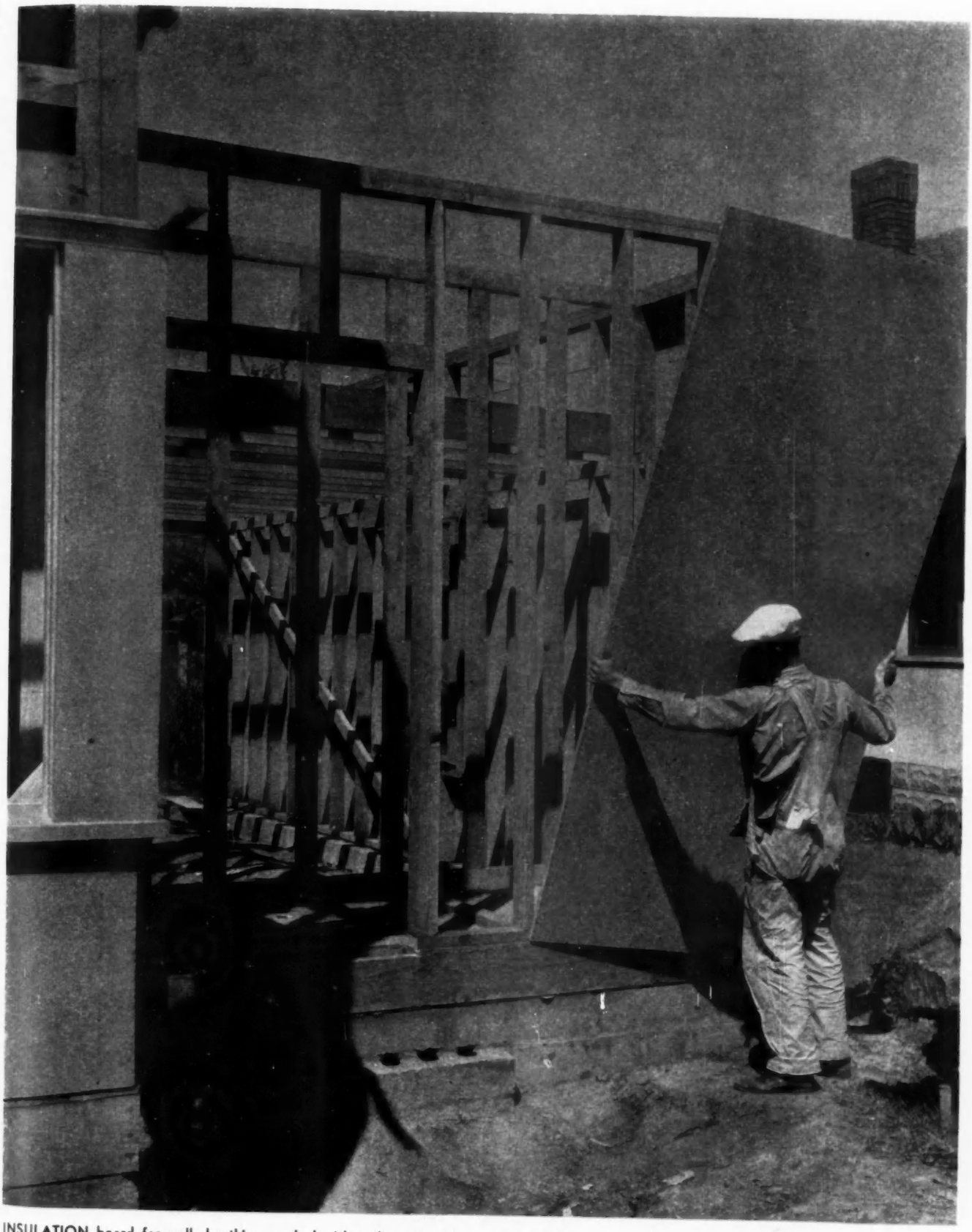
The unbroken surface of insulation board lath not only



UPPER CORNER of a room in which wood lath was used underneath the plaster. The marks are the result of moisture and dust deposit on the cooler plaster between laths.



THIS PHOTOGRAPH shows a corner of a room plastered over Insulation Board Lath. The clean, unmarked plaster results from the fact that the entire surface has a uniform warmth.



INSULATION board for wall sheathing marked with nailing spots for studs 16 inches o.c., so that workmen are helped to use enough nails and to put them in the proper places to hit the studs. Strong and well braced walls result from the use of these large sheathing units.

eliminates lath marks and minimizes plaster cracks, but, since no keys are necessary, less plaster is required for the scratch coat. This fact, plus the elimination of droppings between the studs, results in a worthwhile saving in plaster.

Flexibility and Strength

The strength and flexibility of insulation board lath permit it to be bent around arches, alcoves and circular stair walls without having to be scored or broken. This is a distinct advantage because every break in the plaster base is a potential crack in the plaster. This flexibility also acts as a safety valve when the framing starts to twist and strain. The insulation board yields and takes up the strain or pull on the nail and does not readily transmit the pressure to the plaster.

Easy to Apply

The convenient size of insulation board lath—16, 18 or 24 inches wide by 48 inches long—facilitates the application of this product by the lather.

The studs, joists and rafters should be erected as in ordinary frame construction on 12 or 16 inch centers. For exterior solid masonry walls install 1 x 2 furring strips vertically on 12 or 16 inch centers and shim to a true, level plane. Special 1⅛ inch blued plasterboard nails with 5/16 inch heads are recommended for ½ inch lath and 1¾ inch nails of the same type for ¾ inch and 1 inch lath.

Insulation board lath should not be moistened prior to, during or after application. Lath should be applied with long edges at right angles to the framing or furring strips. Center all end joints on framing and stagger the vertical joints of each course of lath with the joints of the preceding course. Manufacturers' instructions should be followed where lath with special joints is used. Nail lath securely to framing, using five nails at each stud or furring strip; that is, twenty nails for each lath when framing is on 16 inch centers. Use strips of insulation board lath where piecing out is necessary; do not fill out with wood lath or wood strips. To cover arches, curves and sweeps, first nail lath at the end, bending it to the required contour and then nail to each successive stud, joist or furring strip.

All outside corners should be reinforced with metal corner beads. Reinforce all re-entrant angles with standard expanded metal lath strips 6 inches wide bent into the angle and secured in place by nailing. Use 6 inch strips of expanded metal lath to reinforce all joints between frame and masonry construction.

Standard gypsum cement plaster or gypsum wood fiber plaster containing no lime should be used for scratch and brown coats. Both coats should be mixed to a wet consistency to allow for application with light trowel pressure and to facilitate darbying. Any standard plaster finish may be used over the brown coat such as gypsum, lime or lime gauged with gypsum.

The plaster should be applied in three coats to full ½ inch grounds. Rod and trowel surface to a true plane. All corners and angles should be plumb and true and darby strokes should be in the direction of framing members with the darby spanning two or more studs or joists.

Provide adequate ventilation for proper drying of the plaster. Proper ventilation is necessary in winter as well as in summer. Adequate heat should be provided in winter to prevent injury to fresh plaster by frost.

PLASTERING lath of insulation board goes on fast and is economical of plaster.

Roof and Ceiling Insulation of Primary Importance

THE importance of roof and top floor ceiling insulation has become so well recognized that seldom is there any question as to the advisability of insulating at these points. And whether the roof is flat or pitched, insulation board is rapidly becoming an accepted standard for this purpose because of its economy, convenience of application and general utility.

Why Roof Insulation?

Roof and ceiling insulation is essential for several reasons. In the first place, the roof frequently constitutes the largest exposed area, especially in the case of buildings having flat roofs. Next in importance is the fact that the materials used in roof construction as a rule offer relatively little resistance to the passage of heat. Then there is the effect of the intense heat of the sun, the brunt of which must be borne by the roof structure. Insulation at this point is therefore especially important from the standpoint of summer comfort. Finally there is the indisputable fact that heat rises, making the ceiling temperature higher than the living zone temperature and having the effect of literally forcing winter heat through the top floor ceiling, attic and roof.

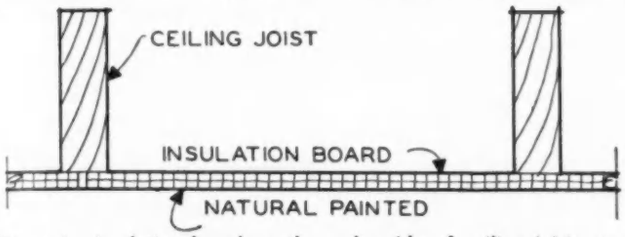


Figure 1. Insulation board on the under side of ceiling joists as a plaster base or interior finish.

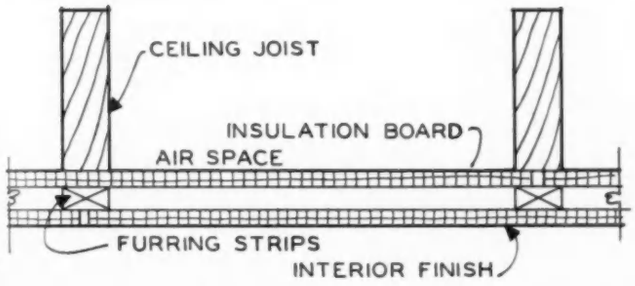


Figure 2. Insulation board on underside of ceiling joists, with furring strips over the insulation board, and interior finish of insulation board or other materials on furring strips.

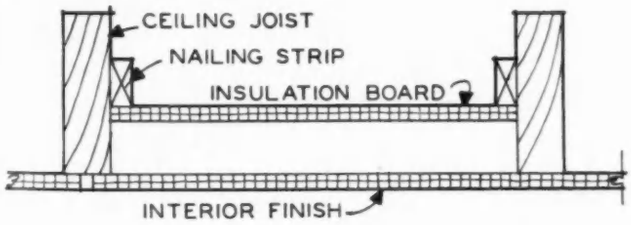


Figure 3. Insulation board between ceiling joists, with interior finish of insulation board or other materials on underside of joists.

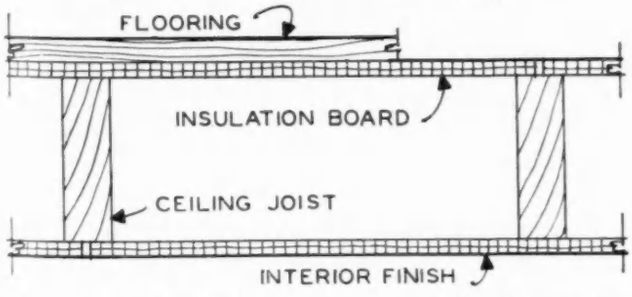


Figure 4. Insulating board on top of ceiling joists, with or without flooring with interior finish of insulation board or other materials. (Note: Flooring must be applied over insulation board where attic floor is to be used.)

Where to Insulate

Roofs may be insulated at either the ceiling or the roof structure, or both. Many heating engineers prefer to place all the insulation in the ceiling. Others prefer to divide the insulation between the ceiling and roof to obtain a more balanced condition, claiming that ceiling insulation alone tends to induce extremely cold attics which must be ventilated to prevent moisture from accumulating in the attic as condensation or frost. Still others believe that the best place to install the insulation in most cases is in the roof structure.

The correct answer depends somewhat on individual circumstances. Therefore a single hard and fast rule to cover all conditions would not be possible. The more common practice is to insulate pitched roofs either by dividing the insulation between the roof and ceiling or by placing it all in the ceiling. With flat roofs, the usual practice is to install the insulation over the roof deck and under the roofing, but in some instances all or part of the insulation is installed in the ceiling.

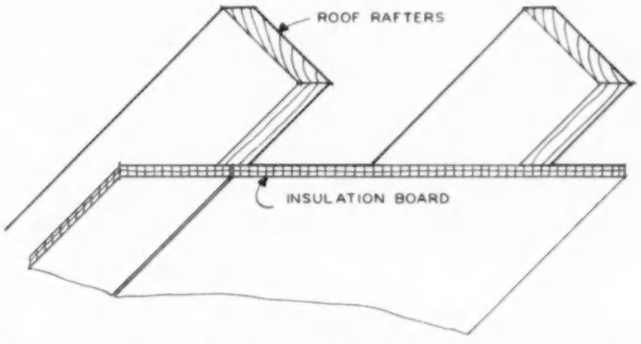


Figure 5. Insulation board on underside of roof rafters as attic lining.

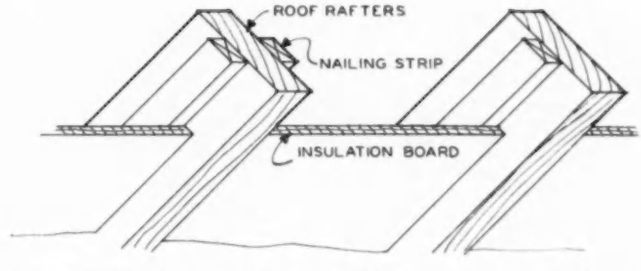


Figure 6. Insulation board between roof rafters, nailed to wood strips.

ROOF INSULATION Board being applied in two layers in hot asphalt on large industrial plant at Ottawa, Ill.; C. R. Dick, Architect.

Pitched Roofs

In the case of pitched roofs there are many places in the ceiling or roof where insulation board may be installed. The accompanying Figures 1 to 8 inclusive illustrate these applications.

Figure 1 shows insulation board applied to the under side of the ceiling joists either as a plaster base or as interior finish. In Figure 2 the insulation is applied in the same location as in Figure 1, the large board being used in this case, but furring strips installed over the face of the insulation board and the finished ceiling then applied to these strips. This finished ceiling may consist of another layer of insulation board of either the interior finish or plaster base type, or of ordinary lath and plaster.

In Figure 3, the insulation board is shown between the ceiling joists, cut to size and nailed to wood strips. The exposed finish may be the same as in Figure 1. The fourth location for the insulation board is on top of the ceiling joists as shown in Figure 4. The insulation board should be covered with wood flooring if the attic floor is to be used. Figures 5 and 6 show the insulation board applied respectively to the underside of the roof rafters as attic lining, and between the roof rafters, nailed to wood strips.

Where insulation board is to be applied directly to roof rafters of pitched roofs (Figure 7) either the wall sheathing or building board may be used. The boards should be applied lengthwise and directly to all framing members with ample bearing for nailing along all edges. Nail to

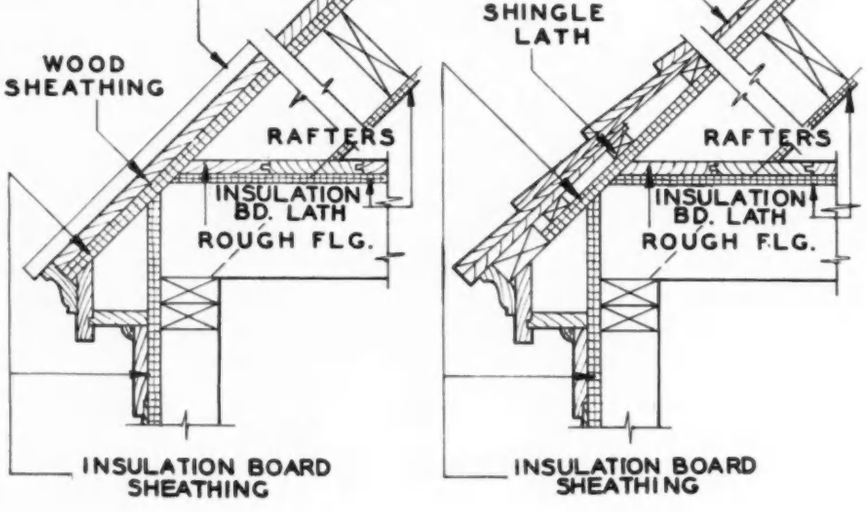
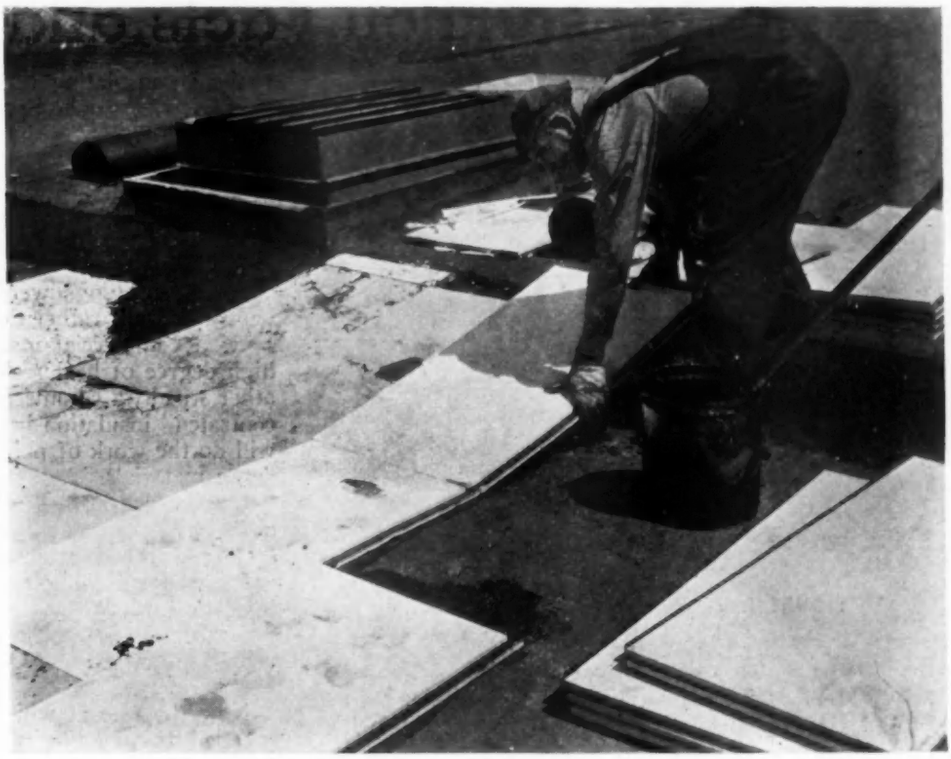


Figure 7. Insulation board on top of roof rafters with roof sheathing or nailing strips (roofers) over the insulation board.



ROOF INSULATION board is often used in thick built-up units with interlocking joints.

intermediate framing members first, spacing nails 6 inches apart, and then along all edges, spacing nails 3 inches apart and ⅜ inch from edges. Wood sheathing or wood strips (roofers) to which the roofing is to be secured should be applied directly over the insulation board, driving nails through to the rafters. Roofing should be applied to the sheathing or wood strips in accordance with manufacturers' specifications.

Where insulation board is to be applied over continuous wood surfaces as in Figure 8, either the building board, wall sheathing or the smaller roof insulation units may be used. Each board should be secured in place by nailing along each edge and staggered along the longitudinal center line, spacing nails 12 inches apart. Roofing may be applied over the insulation board or to wood strips as indicated in Figure 8, following the manufacturers' instructions.

Much of the preceding discussion relative to pitched roofs, particularly that referring to top floor ceilings, applies also to flat roofs, the essential difference being in the application of the insulation to the roof deck. Roof insulation intended specifically for application over flat roofs is supplied in small units, usually about 22 x 47 inches and is available in thicknesses of ½, 1, 1½ and 2 inches or more. This roof insulation board is applied to wood roof decks by nailing directly thereto or over a layer of roofing felt or resin-sized building paper. Where high humidities are to be maintained in the building, it is customary to apply a vapor cut-off over the roof deck before installing the insulation. This vapor cut-off usually consists of saturated roofing felt nailed to the roof deck. Subsequently, the roof insulation is stuck to the felt with a mopping of hot asphalt.

Roof insulation board is applied to concrete, gypsum, unit tile and steel roof decks by imbedding the insulation units in a mopping of hot bitumen. The insulation is then covered or waterproofed by means of alternate courses of saturated roofing felt and hot pitch or asphalt.

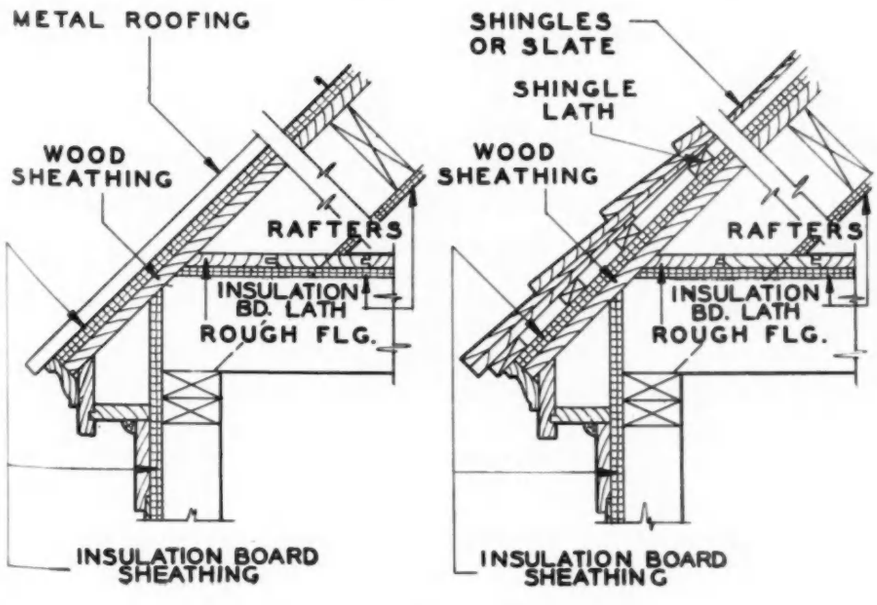


Figure 8. Insulation board over wood sheathing.

Heat Insulation Facts and Figures

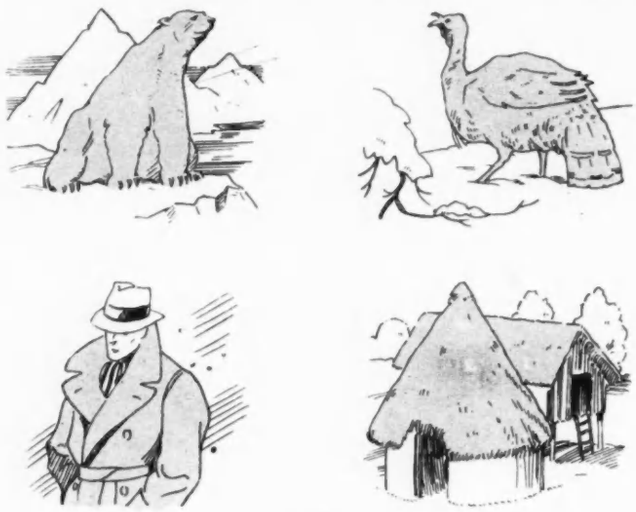


FIGURE 1. Examples of insulation in nature.

WHAT is an insulation—a *heat* insulation?

A heat insulation is a material having a high degree of heat and wind resistance and which when installed in a wall effectively retards or prevents the passage of heat through the wall. A smaller amount of heat will therefore pass through an insulated wall during any period of time than during the same period if the wall were not insulated. Consequently, less fuel will be required in the winter to maintain the desired temperature, and the room or building or space involved will be cooler in the summer, or if cooled by refrigeration, less refrigeration will be required to cool the space.

How about "cold" insulation? Strictly speaking, all insulations of this type are *heat* insulations and are so called because cold is simply the absence of heat. In either case, winter or summer, the object is to prevent heat from passing through the wall. In the winter it keeps the heat in and in summer it keeps the heat out.

Insulation Idea Not New

The principle of insulation is as old as creation. There are many examples of insulation in nature. Fur is one of the best insulations known; hence fur-covered animals may be considered to be insulated. If it were not for the fur covering of the polar bear he could not withstand the cold blasts of the arctic regions, sleep on ice floes and bathe in icy water. Feathers provide a degree of insulation and therefore birds are insulated.

The insulation idea is the main reason for wearing clothing. Judging from modern abbreviated swimming suits, modesty is no longer an impelling factor. The purpose of clothing during cold weather is really to prevent heat from escaping from the body. The body can be kept warm with its own heat if it is properly "insulated." Of course, in the warm weather, we wear less "insulation" in the form of clothing because we want the body heat to escape.

Even insulated dwellings are really not new. The thatched hut of Northern Europe was for all practical purposes insulated because it was built with walls of clay and stone several feet thick and with a correspondingly thick straw roof. The stone castles of the middle ages might be considered insulated because of the thickness of the walls, although stone is not ordinarily considered to be an insulating material for reasons which will be explained later. The Spanish mission houses of the southwest desert, where the temperature sometimes rises to 140 degrees in the daytime were amazingly cool because they also had thick walls built of clay and stone.

Commercial Insulation

These dwellings were insulated mainly because they had thick walls rather than because of the materials used. Now a commercial insulation is such because it has a high degree of heat resistance per unit of thickness. In other words, a commercial insulation is in a sense "concentrated" insulation because an inch of such a material will do the work of perhaps several feet of certain hard, dense materials.

Commercial insulations are frequently classified as (1) rigid or structural, (2) semi-rigid, (3) flexible, (4) fill and (5) reflective insulations. Insulation board comes under the classification of rigid fibrous or structural insulation.

Conductivity

Now the rate at which heat flows through a material is called its *conductivity* and this is simply the number of Btu's (British thermal units) that will pass through one square foot of the material one inch thick in one hour when there is one degree temperature difference between the two surfaces. The average conductivity of insulation boards of production-line dryness is 0.33, which means that about 1/3 of a Btu will pass through one square foot an inch thick in one hour for a one degree temperature difference between the two surfaces. By way of comparison, concrete has a conductivity of 12, which means that heat will pass 36 times more rapidly through concrete than through insulation board, thickness for thickness. The conductivities of most building and insulating materials are given in reference volumes such as the Guide of the American Society of Heating and Ventilating Engineers.

Heat Transfer Coefficients

If one is to be familiar with this subject, there is another unit to be taken into consideration, namely, the *heat transfer coefficient*. This is similar to conductivity but instead of referring to a single material it has to do with the rate of heat transfer through a compound wall or roof and may therefore involve a combination of materials. This unit is very useful to the heating man in computing the heat losses through the walls, roof and other parts of a building for the purpose of estimating the size of heating plant required.

In order to illustrate the meaning and significance of this unit, consider the ordinary frame wall without insulation which has a heat transfer coefficient of about

FIGURE 2—Methods of heat transfer

0.26. This is the number of heat units (Btu) that will pass through a square foot of the wall in one hour for each degree temperature difference on the two sides. If the average temperature difference is 30 degrees, the amount of heat transferred will be 30 times 0.26 or 7.8 Btu and if the net wall area is 1,000 square feet, the heat loss will be 7.8 times 1,000 or 7,800 Btu per hour. If instead of one hour, there are 5,000 hours in a heating season, the heat loss through this 1,000 square feet will be 5,000 times 7,800 or 39,000,000 Btu.

Probably it will mean nothing to the average individual to say that 39,000,000 Btu will pass through (and thus be lost) 1,000 square feet of uninsulated wall area during the heating season, but if this quantity is translated into tons of coal it will be more readily understood.

Coal has an average heat content of about 13,000 Btu per pound, but because it isn't possible to utilize all the heat in the coal, due to unburned fuel and other factors, it is necessary to make an allowance. Let's say that the efficiency of combustion in this case is 60 percent. Therefore, we will get 60 percent of 13,000 or 7,800 Btu out of each pound of coal.

Now the 39,000,000 Btu lost through the 1,000 square feet of wall previously referred to would be equivalent to $\frac{39,000,000}{7,800}$ or 5,000 pounds of coal. This in turn divided by 2,000 to change to tons, represents a fuel requirement of 2½ tons of coal to replenish the heat lost through this 1,000 square feet of wall area. Of course, much more fuel, perhaps 7 or 8 tons—will be required to take care of all of the heat lost through other parts of the building in order to maintain the desired temperature.

Fuel Saving

Suppose instead of uninsulated construction, insulation board were used for sheathing and plaster base. What would be the fuel saving? The heat transfer coefficient in this case would be about 0.15 if ½ inch insulation board were used for plaster base and 25/32 inch for sheathing. Using this coefficient instead of 0.26 for the uninsulated wall and making the same calculations, the fuel required for the 1,000 square feet of wall area under the same conditions will be $\frac{0.15 \times 30 \times 5,000}{13,000 \times 0.60 \times 2,000}$ or 1.45 tons.

Thus there is a saving of over a ton of coal per heating season for the 1,000 square feet of wall area under consideration. If the total net wall area were 2,000 square feet the saving would be over 2 tons of coal whereas if the roof or top floor ceiling were insulated there would be an additional saving. These calculations show how it is possible to determine the fuel saving due to insulation in any given case. The heat transfer coefficients for all common types of construction are also given in engineering handbooks, or they may be calculated by means of a simple formula when the conductivities of the materials used in the construction are known.

Reduction in Heating Plant Size

It is apparent that if less fuel is required to heat the building, a smaller heating plant or less radiation (if this type of heating is used) will suffice. In arriving at the heating plant size, the heating engineer calculates the heat loss for the entire building for one hour during the coldest weather and selects a heating plant of sufficient capacity to supply this heat loss. By using insulation board throughout, the heat loss may be reduced sufficiently to permit the use of a smaller sized heating plant or less radiation. For example a building may have a heat loss

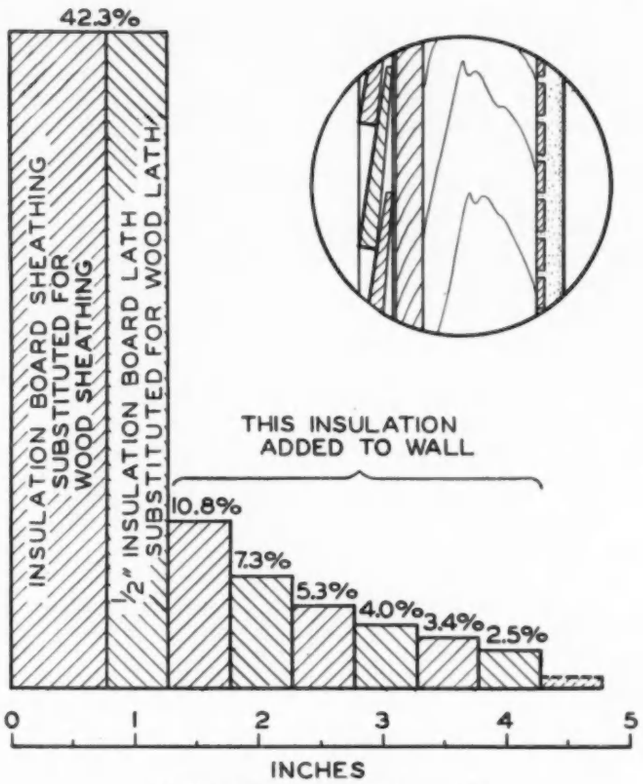


FIGURE 3. Diminishing returns chart

without insulation of say 100,000 Btu per hour, and only 70,000 Btu per hour if insulation board is used. If a certain heating plant is made in two sizes, namely 120,000 Btu and 80,000 Btu, it would obviously be possible to use the smaller size in the case of the insulated structure, which would undoubtedly represent a satisfactory saving in cost. But regardless of whether advantage is taken of the reduction in the size of the heating plant, there will be an annual fuel saving which will continue as long as the building is used and heated.

Diminishing Return

An important insulation principle is known as diminishing return. In every day language, this means that the first inch of insulation saves the most fuel, the next inch less, the third inch still less, and so on. So it is apparent that the first inch of insulation is the best investment because it does the most good—it saves the cream, so to speak, while the remainder to be saved is, figuratively speaking, skimmed milk.

This fact can best be illustrated by the accompanying chart. By using insulation board sheathing (25/32 inch) and plaster base (½ inch) in place of other sheathing and lath, there is a saving of 42.3 percent of the heat that would otherwise pass through the wall. Now suppose another half inch of insulation were added; there would be an additional saving of 10.8 percent. The next half inch would save an additional 7.3 percent, the next 5.3 percent and so on. The total additional saving of six half inch layers (3 inches) is 33.3 percent. Although the first 1¼ inch of insulation used in place of other materials saved 42.3 percent, the next three inches (which did not replace any materials) saved only 33.3 percent additional.

These figures do not apply to the building as a whole, but to the wall only, and are introduced simply to illustrate the principle of diminishing return. So far as the entire building is concerned the percentages would be about ¼ or 1/3 of the figures given above, since the heat

loss through the walls usually represents from ¼ to 1/3 of the total. Let's take 1/3. The sheathing and lath would then save about 14.1 percent of the total heat loss whereas the additional three inches would save only 11.1 percent additional.

Insulation Required

Insulation board sheathing and lath will provide sufficient wall insulation for all ordinary requirements. If desired, the 1 inch lath may be used instead of ½ inch where additional wall insulation is warranted, and this, plus an inch or an inch and a half of insulation board in the ceiling and/or roof, plus storm windows, will provide a well-insulated structure, suitable for any type of fuel—coal, oil or gas.

Surface Condensation

Condensation of moisture on interior surfaces of buildings, particularly ceilings, is often a serious problem. It is caused by moisture-laden air coming in contact with cold wall or ceiling surfaces. This condensation or sweating can be prevented by installing the correct thickness of insulation in the wall or roof structure.

In order to arrive at the proper thickness of insulation board to prevent condensation, it is necessary to know the relative humidity and temperature of the air in the building, the wall or roof construction and the lowest outside temperature likely to be encountered in the locality. Using these data and referring to charts furnished by insulation board manufacturers, it is a simple matter to arrive at the amount of insulation necessary to stop the "sweating."

Air Conditioned Buildings

Air conditioning involves among other things, humidification and heating in the winter and dehumidification and cooling in the summer.

In the winter the introduction of additional moisture into the building may present certain condensation problems. In industrial buildings where exceptionally high humidities are sometimes maintained, ceiling condensation frequently becomes a serious problem. This can be overcome by the use of the proper thickness of insulation board applied to the roof structure.

Surface condensation, so far as walls and ceilings are concerned, is not a problem in humidified residences, if insulation board is used in the walls and ceiling. Condensation on windows, however, is quite common and can be prevented by means of storm windows or by reducing the humidity in cold weather.

The amount of insulation required for winter air conditioned buildings is in general the same as for winter heating, except so far as additional insulation is required to prevent condensation, as already indicated.

In the summer, condensation is not usually a problem in air conditioned buildings. While it might appear that a greater thickness of insulation would be justified where summer cooling is used, because of the higher cost of refrigeration as compared to heating, practically this is not so. Actual calculations to determine the economic thickness of insulation for summer cooling indicate that approximately the same thickness as for winter conditions will suffice.

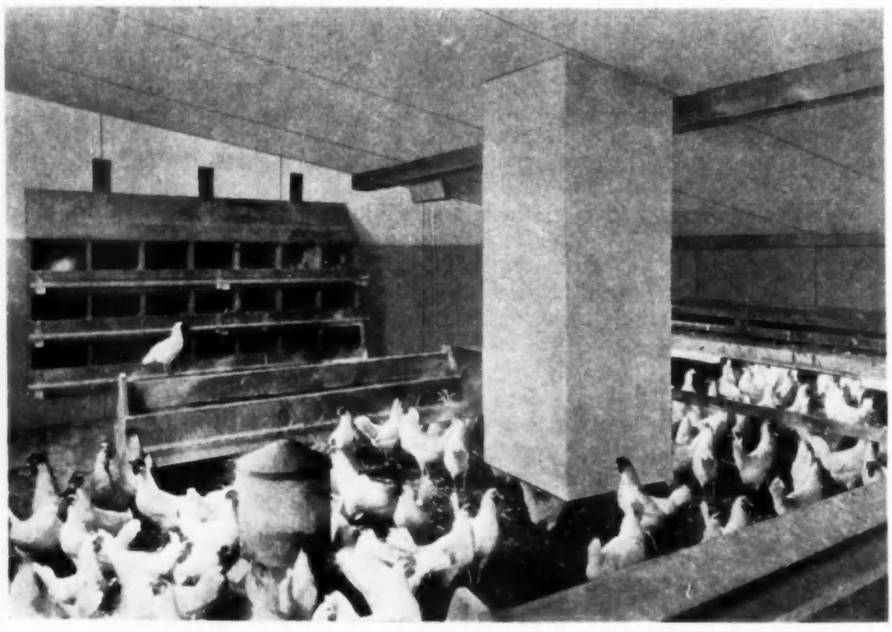
Summer Comfort

Insulation board definitely reduces summer air temperatures in buildings by reducing the rate of heat flow through the wall and roof structure. However, without mechanical cooling it is not possible to predetermine the exact number of degrees of cooling which will be produced by a given thickness of insulation board.

The value of insulation board can be most accurately stated in terms of the percentage of heat kept out. For example, the insulation board sheathing and ½ inch lath previously referred to would keep out 42.3 percent of the heat that would otherwise pass through the wall. This, of course, is the same as the percentage of heat that would be retained in the cold weather because the efficiency or effect of the insulation is the same regardless of which way the heat travels.

Insulation board has another effect on comfort. It lowers the surface temperature of the walls in the summer and this has an indirect effect on the sensation of warmth, because the hotter the walls, the warmer one feels. Consequently, the cooler walls due to insulation board, help to increase the sensation of coolness.

In the winter this phenomenon has the reverse effect. The walls are warmer when insulation board is used and hence the occupants of the room feel warmer than they would if the walls were cold.



INSULATION Board is highly regarded by poultrymen; assures warm, dry hen houses.

Sound Conditioning with Insulation Board

THE subject of sound conditioning as it relates to insulation board is divided into four separate and distinct phases. The first is sound insulation or the prevention of sound transmission through walls and floors, the second is architectural acoustics or the improvement of hearing conditions in auditoriums, the third is sound quieting or the reduction of noises in offices, shops and restaurants, and the fourth is machinery insulation or the control of machinery noises. It is the purpose of this article to submit practical suggestions for the control of sound by means of insulation board rather than to enter into a technical discussion of the theory of sound and sound transmission.

Sound Insulated Partitions

To meet the requirement of good sound insulation construction a partition or floor separating two rooms is expected to act in such a way that sound created in one room shall not be loud enough to be heard in the other room, or, if heard at all, shall not be markedly disturbing.

Four types of sound insulating partitions are illustrated in the accompanying figures. In the furred sound insulating partition shown in Figure 1, the studs are spaced on 16 inch centers and a double layer of insulation board applied to each side with furring strips between as indicated. Uniform, straight studding should be selected. The staggered stud sound insulating partition, consisting of insulation board lath, and plaster, on both sides, is shown in Figure 2.

An efficient sound insulating partition involves the double stud construction shown in Figure 3. A double row of 2 x 2 studding, or 2 x 4 studding with the long dimension parallel to the face of the partition, should be spaced on 12 or 16 inch centers and nailed to 2 x 6 sills. A layer of insulation board is nailed between the double row of framing to further increase the sound insulating efficiency. This type of partition is not recommended for load-bearing purposes.

The auxiliary partition shown in Figure 4 illustrates a method of sound insulating existing partitions. A free standing auxiliary partition is erected on one or both sides of the existing wall, the 2 x 2 studding being placed on 12 or 16 inch centers. The addition of a layer of insulation board nailed between the old and new portions improves results. Partitions consisting of plain 2 x 4 studding with insulation board nailed directly to both sides, are not recommended where high sound insulating properties are desired.

Sound Insulated Floors

The sounds transmitted by floors are either air-borne sounds, such as those of speaking, or sounds having their origin in some physical impact such as walking or the moving of furniture. Air-borne sounds seldom pass through floors to such an extent as to be of annoyance to the occupants of the room below or above the floor, due to the fact that floors are usually heavier, for structural reasons, than walls. Sounds due to physical impact are usually the most serious floor problem.

The simplest way to insulate masonry floors against impact sounds is to deaden the sound at the source. This is accomplished by the use of ½ or 1 inch insulation board placed on top of the masonry and covered with a

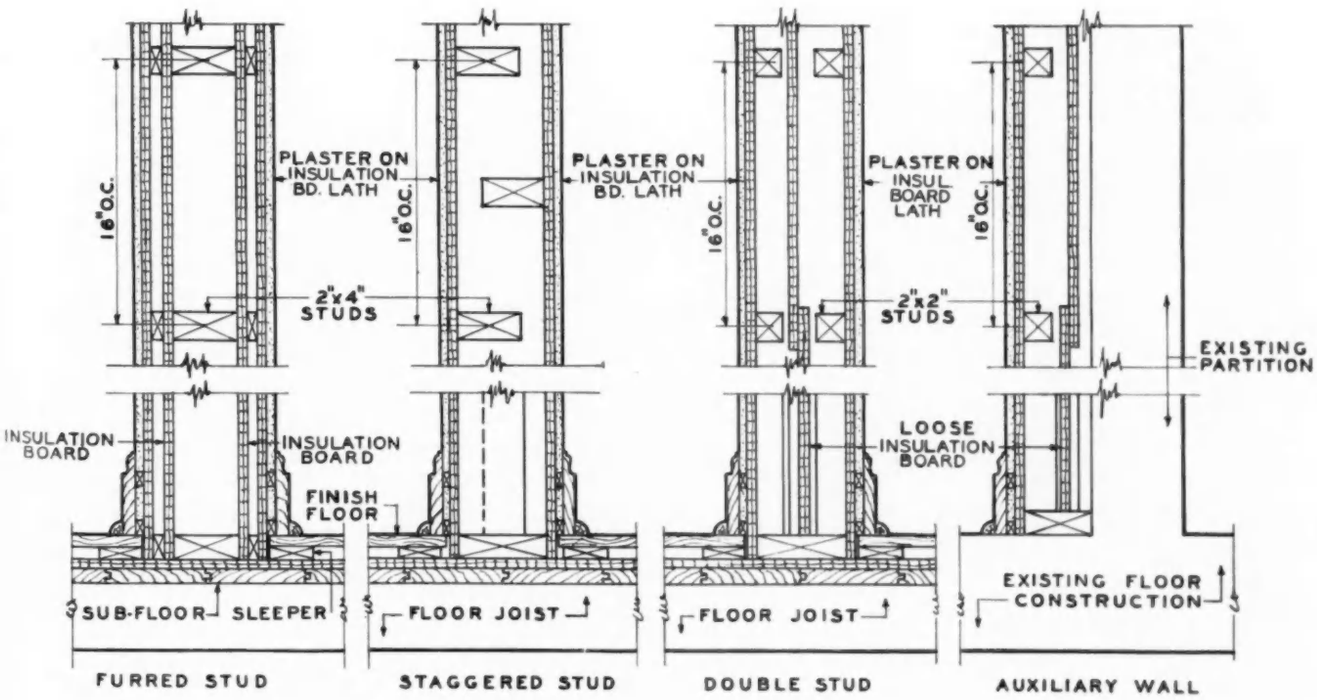


Figure 1. Furred stud construction.

Figure 2. Staggered stud construction.

Figure 3. Double stud construction.

Figure 4. Auxiliary wall construction.

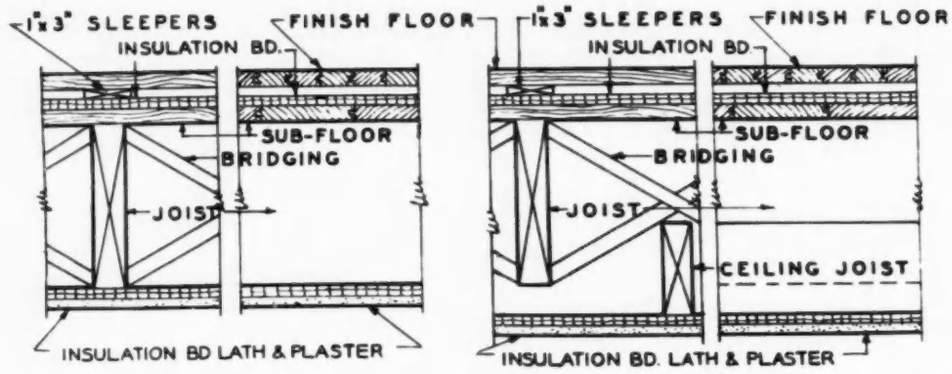


Figure 5 (Left). Floating floor construction.

Figure 6 (Right). Suspended ceiling construction.

suitable wearing surface such as battleship linoleum, parquet flooring, masonry of various types, or D. and M. hardwood flooring.

The simplest method of sound insulating wood floors consists of applying a continuous layer of insulation board upon the rough flooring, followed by 1 x 3 sleepers or furring strips on 16 inch centers to receive the finish flooring as shown in Figure 5. Sleepers or furring strips shall be securely nailed through to the sub-floor or to the joists.

For superior sound insulation, the suspended ceiling construction shown in Figure 6 is recommended. In addition to the floating floor construction referred to in the preceding paragraph, the ceiling below is supported by independent ceiling joists as shown. Floor joists should also be bridged to prevent twisting and they should fall midway between the ceiling joists. The suspended ceiling structure may be finished with insulation board lath and plaster.

Architectural Acoustics; Sound Quieting

The decorative features and application details of insulation board used for architectural acoustics and sound quieting are covered in the article on interior finish, beginning on page 4.

The acoustical requirements of building enclosures, used for speech and music vary over a wide range. For example, the convention hall seating thousands of people is used for both speech and music and has different acoustical requirements than the court room where speech

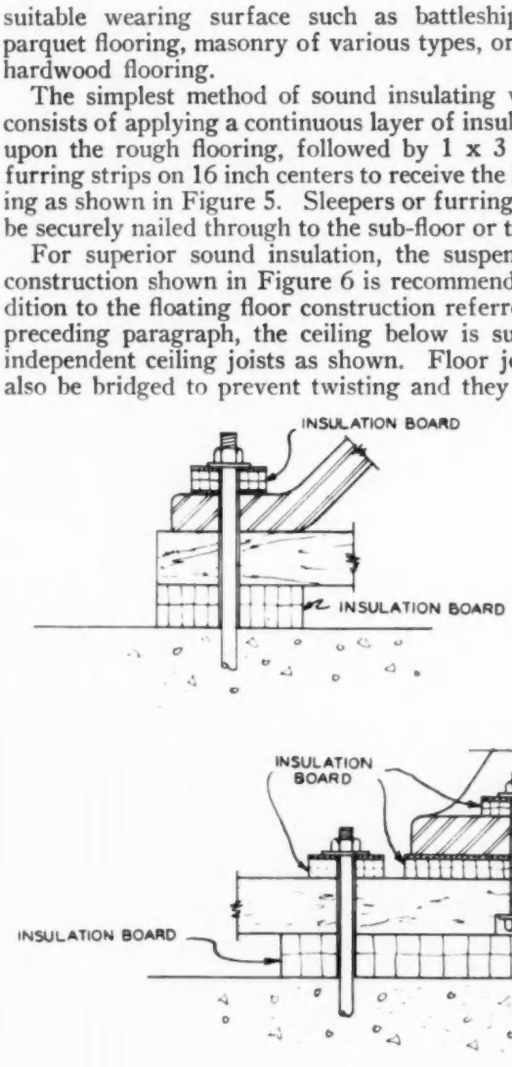


Figure 7. Methods by which insulation board can be used for isolating machinery.

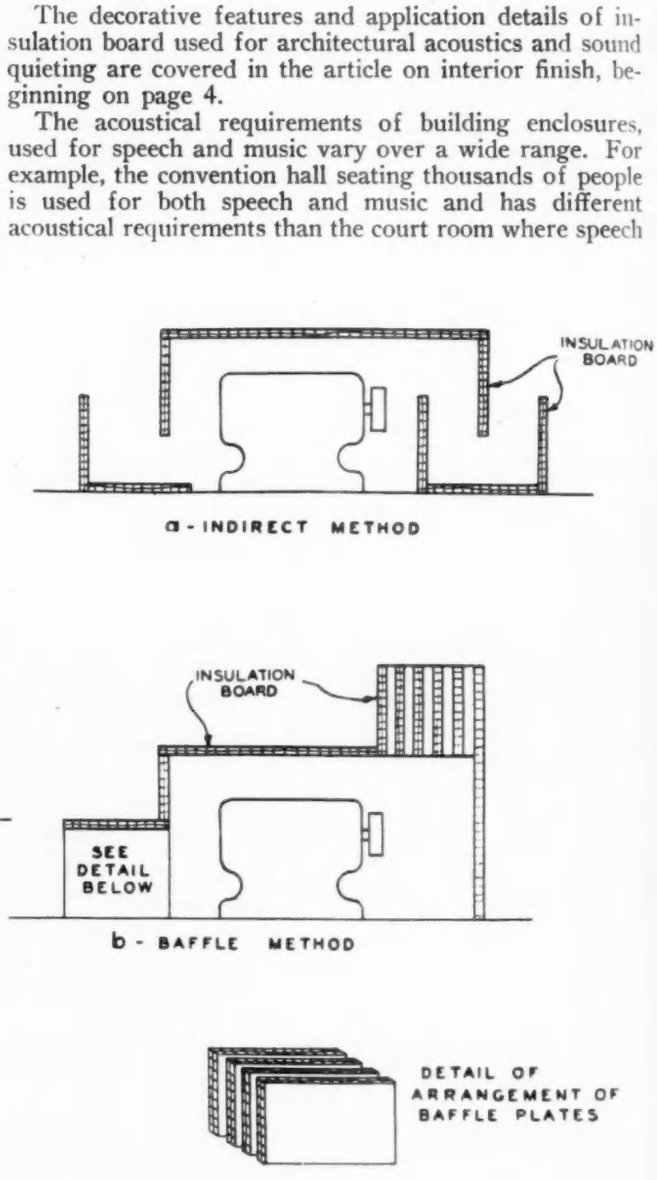


Figure 8. Methods of constructing insulation board hoods for motors and machines.

only is heard, or the music hall where speech is a minor consideration. The acoustical requirements of churches differ, and lecture room treatment is inadequate in broadcasting studios or sound movie theatres. Quieting noise in general offices is a different problem from quieting restaurants, kitchens, swimming pools, gymnasiums and hospital corridors.

Because of the foregoing factors, acoustical and sound quieting problems should be referred to manufacturers of insulation board products for recommendations. Some concerns offer special acoustical materials having high sound absorbing qualities, for this purpose.

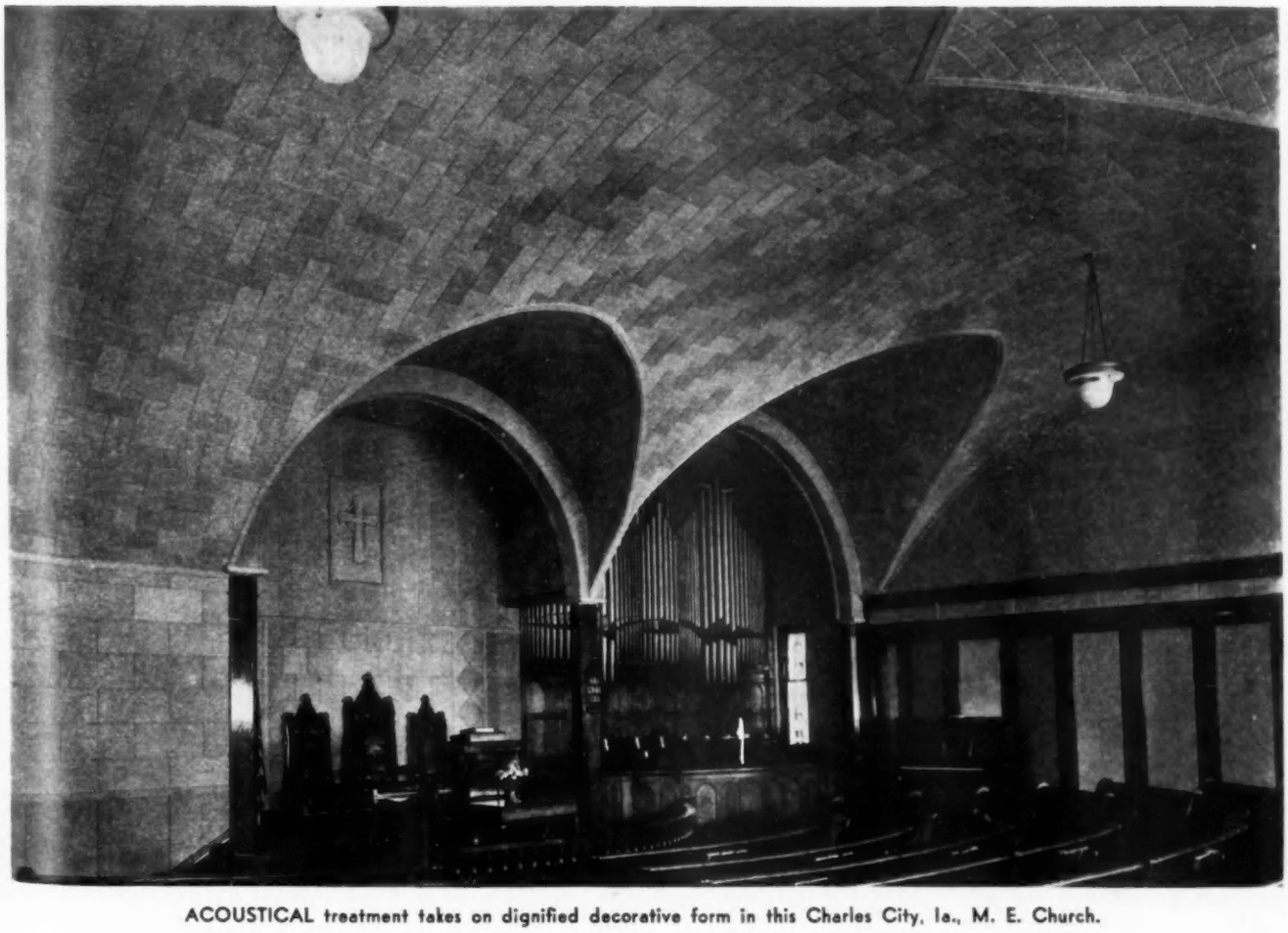
Machinery Insulation

The problems of relieving the vibration and noise due to machinery is divided into two parts, (1) that of cutting down the vibration transmitted by the machine to the building structure and (2) that of cutting down the air-borne noise. The methods required to solve these two problems are entirely different.

Machinery vibration. In general, the transmission of vibration in existing machinery can be reduced by mounting the machines upon a correctly designed resilient base. Figure 7 shows methods by which insulation board can be used for isolating machinery.

Air borne noises can often be cut down by building a hood lined with insulation board. This type of material is especially satisfactory for this purpose because it is light, provides the necessary sound absorption on the inside of the hood, and does not tend to vibrate. Such hoods should be constructed so as entirely to cover the machine or motor in question. Two suggested constructions are shown in Figure 8.

BUSINESS offices are attractively finished in insulation board, and quieted at the same time.



ACOUSTICAL treatment takes on dignified decorative form in this Charles City, Ia., M. E. Church.

Insulation Board for Summer Cottages, Cabins and Camps

SIMPLE structures such as summer cottages, tourist cabins and camps differ primarily from larger and more expensive residences in the fact that the exteriors of the walls are not usually finished with other facing, nor are the interiors generally plastered. Such houses are generally built at minimum cost consistent with satisfactory service for the particular use.

Insulation board has been found by many users to be ideally suited to such types of buildings because when painted the material itself permits exposure to rain without injury and the side exposed to view on the interior makes an attractive interior finish. Where the least ex-

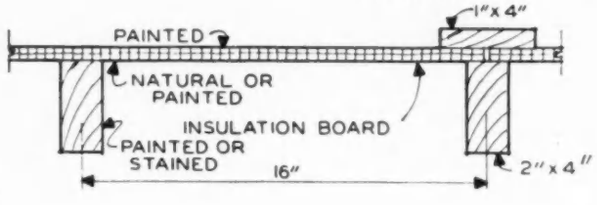


FIG. 1.

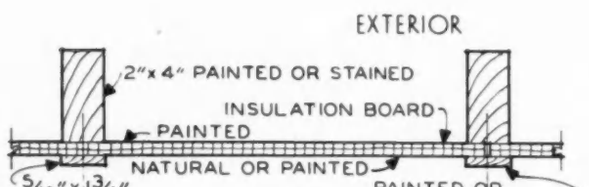


FIG. 2.

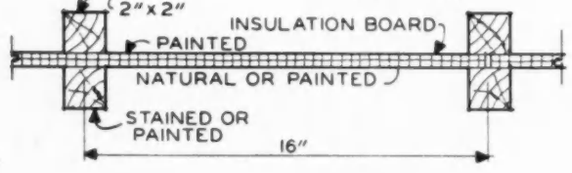


FIG. 3.

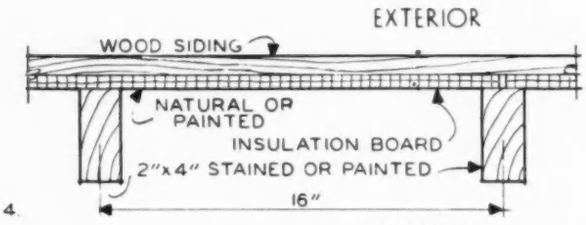


FIG. 4.

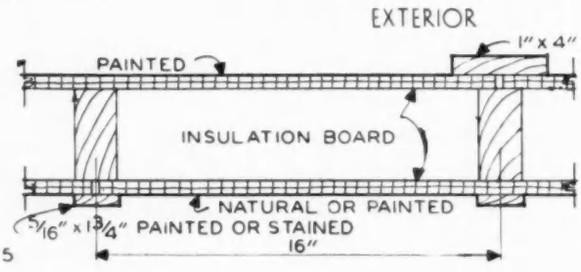


FIG. 5

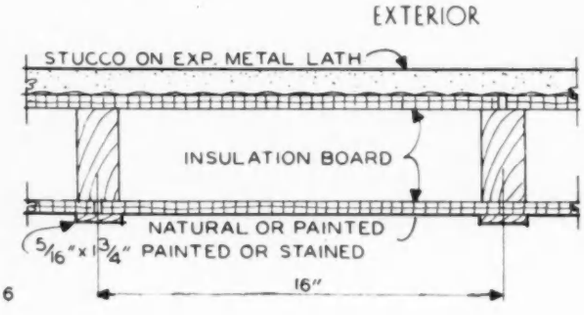


FIG. 6

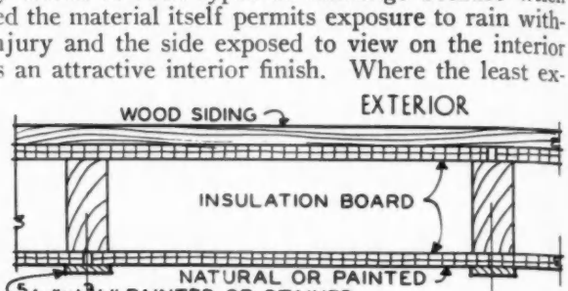


FIG. 7.

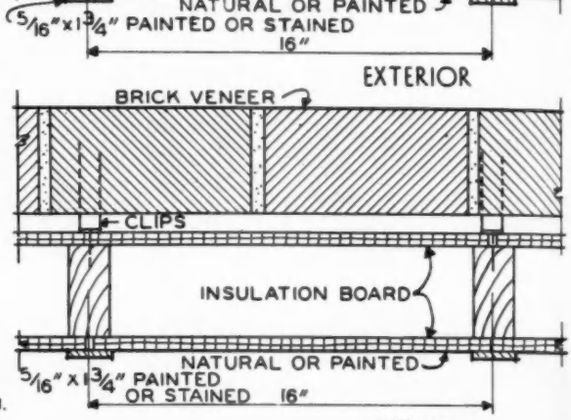


FIG. 8.

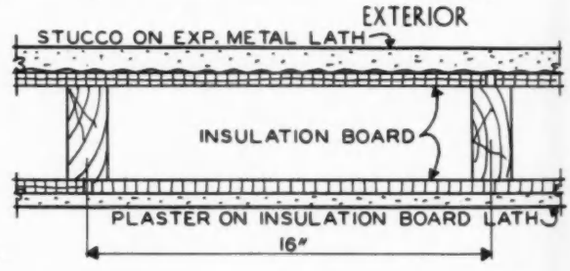


FIG. 9.

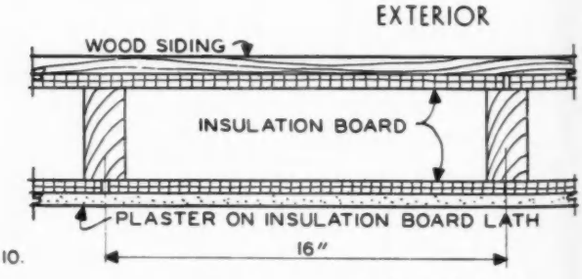


FIG. 10.

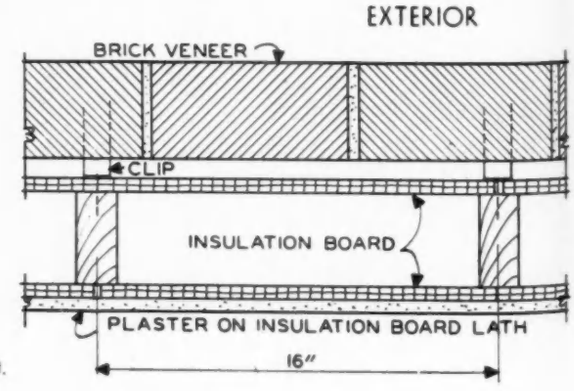


FIG. 11.

pensive structure is desired, only one thickness of insulation board is used, but in most cases two thicknesses are preferable, one on each side of the studding.

Walls

Figures 1 to 11 show some of the more common methods of using insulation board for such buildings as cottages, cabins and small bungalows. The most elementary type of wall is shown in Figure 1 and consists of ordinary 2x4 studding placed 16 inches on center with one thickness of insulation board on the outside, painted on the exterior and with 1x4 inch strips over the joints. No insulation board is used on the interior. The 2x4 studs and the interior surface of the insulation board may be painted or stained or left in their natural colors. The construction shown in Figure 1 may be modified by applying plaster to the inside surface between the studs with the plaster surface sand floated or painted, or by applying stucco to the exterior over reinforced steel fabric.

The construction shown in Figure 2 differs only from that in Figure 1 in that the 2 x 4 studding is exposed on the outside of the building. On the interior thin strips of wood are nailed vertically over the insulation board to each 2 x 4. When this is done all complications that arise in panelling the wall surface are eliminated. The narrow strips may extend from the base board to the picture molding. A modification of this wall is to omit the strips and to apply plastic paint directly to the inside surface of the insulation board. Joints are reinforced with 4 inch strips of galvanized wire door screening. The construction shown in Figure 3 has many advantages for simple houses. The 2 x 2 vertical members on each side of the insulation board made an attractive exterior as well as interior finish.

The wall shown in Figure 4 differs from that shown in Figure 1 by the addition of wood siding nailed through to the studding. The 2 x 4 studding is exposed on the interior of the building.

Figure 5 shows a frame wall using two thicknesses of insulation board. Figures 6, 7, 8, 9, 10 and 11 are standard frame wall constructions which are included for comparison but which are also suitable for the more expensive summer cottages. Application details for these walls will be found elsewhere in this issue of *American Builder,* as well as instructions for painting the surface of insulation board, and for applying special interior finish products.

Roofs

Insulation of cottage or cabin roofs is important as such buildings are usually occupied in summer when the summer heat beats down on the roof, often making the rooms uncomfortably hot. With insulation board in the roof or the ceiling this condition is immediately changed.

There are three places in which insulation board is used to advantage in the tops of simple dwellings: (1) on top of the roof rafters; (2) under the roof rafters and (3) on ceiling joists as a ceiling. For better insulating effect insulation board should be used in at least two of these places. It should not be used on top of roof rafters without wood sheathing in case of flexible roof covering or without wood nailing strips in case of rigid roof covering such as wood shingles.

NEWEST effects in summer homes are achieved with decorative insulation board side walls and ceilings.

How to Estimate Accurately

In the Series on Estimating, This Final Article Covers Cabinets, Floors and Hardware

By J. DOUGLAS WILSON

Head, Building Trades Dept., Wiggins Trade School, Los Angeles, Calif.

THE remaining units of estimating in this series to be discussed are cabinets, floors, and hardware. If the floor plan can be scaled cabinet sizes are determined by using the architect's scale. Exact sizes are not given until the building is framed ready for plastering, as spaces for cabinets will not always work out to the scale dimensions on the blueprint.

MILL MADE CABINETS: When ordering, there are several important facts which must always be given.

Number of Units: Items identical in size, shape, and kind of wood should be grouped together.

Name of the Unit: Several standard cabinets are used in an average house, their names being based either on location or use.

The linen closet is usually in the hall.

Bookcases are found in the living room.

Dish cupboards and the sink cabinet are in the kitchen.

Medicine cabinets are in the bathroom.

A broom closet is usually constructed on the back porch.

A chest of drawers may be found in the bedroom, dressing closet, bathroom, or powder room.

Size of the Unit: There are three main dimensions required when ordering a cabinet—width, height, and depth, as shown in Fig. 1. It is advisable to see that the mill is provided with a sketch or architect's detail which will indicate the number of drawers and doors required, the location of the shelving, etc.

Kind of Lumber: The kind of lumber used for a cabinet will vary according to its location in the building and the painting specifications.

Special Information: The following special information must be given:

(a) Kind of drawer required, whether lip or flush.

(b) Size of stock for the stiles and rails of the doors.

(c) Whether the doors are to have wood or glass panels; and, if glass, the kind of glass, such as clear, frosted, art, 21 oz.; 16 oz., and the grade, as AA, A or B.

(d) If the shelves are to be adjustable.

(e) Kind of material to be used for the back of the cabinet. This might be 1" x 4" or 1" x 6" T&G stock or 3-ply paneling.

JOB MADE CABINETS: Sometimes cabinets are made on the job by the carpenter, in which case he orders the proper lengths and sizes of stock necessary.

Parts of a Cabinet

Carcass: The main body of the cabinet includes two sides, top, bottom, back, shelves and partitions.

Front Frame: The frame into which the doors and drawers are fitted.

Drawers and Doors: Glass, or wood panel.

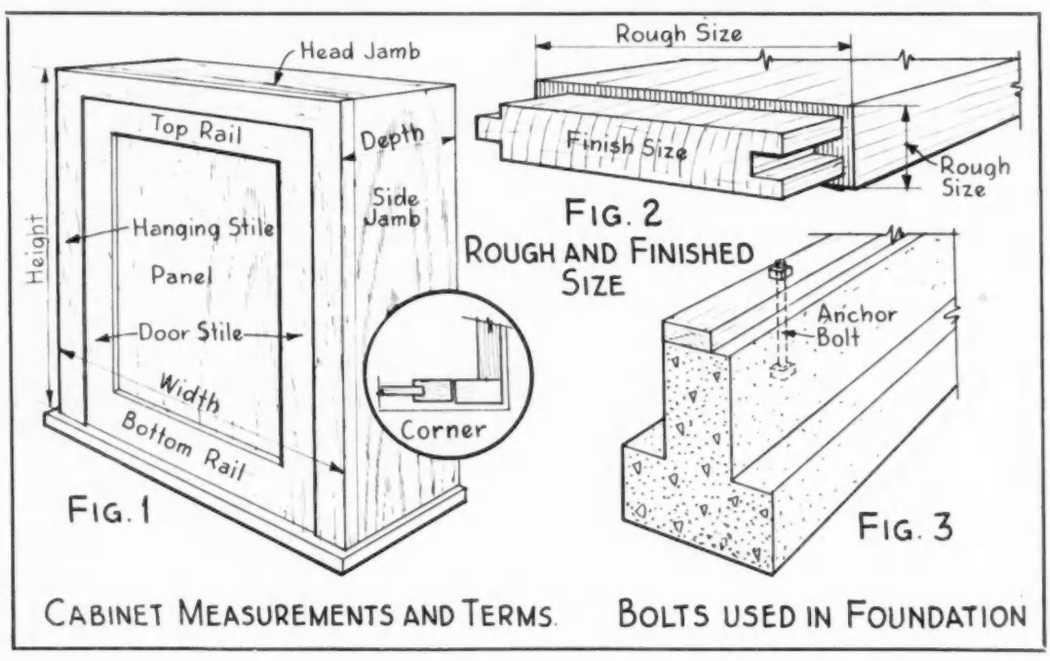
Hardware: Pulls, knobs, fasteners, locks, and hinges.

Rule: Make an itemized list of each part of the cabinet. Combine into lengths that will cut without waste.

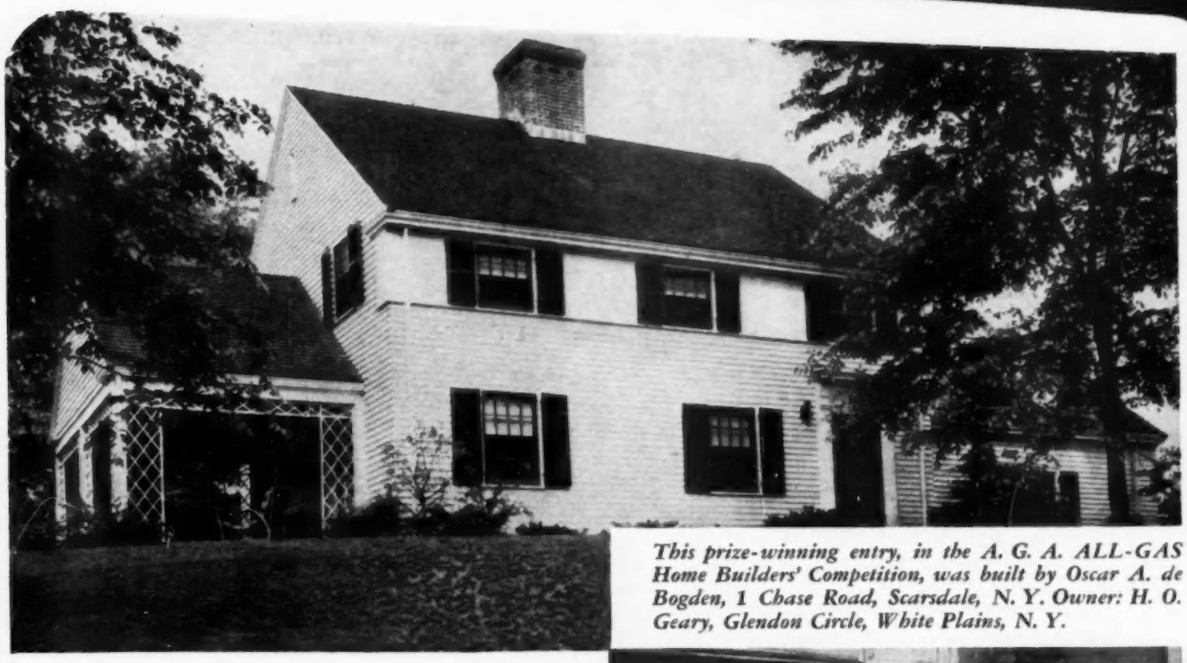
Flooring Unit

HARDWOOD FLOORING: Hardwood flooring is T&G stock made from different hardwoods. There are many grades of material that may be purchased. The factory grade is made from short pieces of discolored lumber with small worm holes in them, while the best grade is of an even color and has a beautiful grain.

(Continued to page 88)



DRAWINGS showing main dimensions for ordering cabinets (Fig. 1.), relation of rough and finish sizes of flooring (Fig. 2.), and bolts needed for foundations.



This prize-winning entry, in the A. G. A. ALL-GAS Home Builders' Competition, was built by Oscar A. de Bogden, 1 Chase Road, Scarsdale, N. Y. Owner: H. O. Geary, Glendon Circle, White Plains, N. Y.

GAS COMPLETES THE PICTURE OF THIS PRIZE-WINNING HOME

All-Gas kitchens like this give housewives that "I-want-to-move-in" feeling...and a very grand feeling it is, because it turns prospects into purchasers!

HOMES used to be sold on their "good looks," but today buyers are being swayed more and more by modern living comforts and conveniences.

This is the reason *Gas,* and *Gas Appliances,* so often "complete the picture" that makes the sale . . . Gas, because everyone recognizes it as the up-to-date fuel! Gas Appliances, because they are so sleek and handsome in appearance —so compact, so perfectly adapted to *smooth living!*

Thus it is something more than just *good design*—it is sound sales psychology to equip houses with Gas for the four big jobs of cooking, water-heating, house-heating and refrigeration. The proof of this you'll find in any test you care to make. "All-Gas Homes" sell faster, easier and at a better profit than those lacking in these up-to-date "comforts of home."

For full information on gas appliances consult your local gas company

AMERICAN GAS ASSOCIATION

LET *Gas* DO THE 4 BIG JOBS

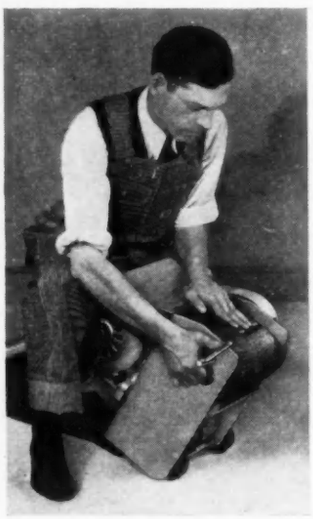
COOKING
WATER HEATING
REFRIGERATION
HOUSE HEATING

Be sure the gas appliances you specify bear the Approval Seal of the American Gas Association Testing Laboratories.

New Equipment for Builders

New Floor Sander

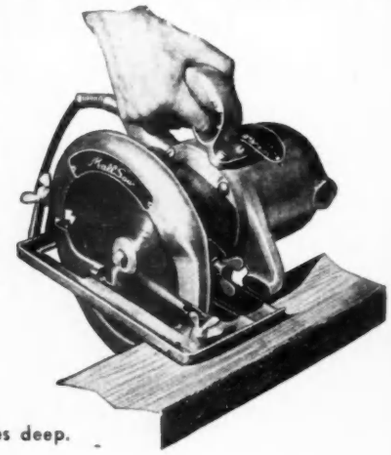
SKILSAW, Inc., Chicago, has added a floor sander, named Rotoglide, to its line. It is built to high standards of construction for trouble-free operation, and features compact, convenient, efficient design. The Rotoglide sanding drum eliminates vibration with a paper attachment made for each half the width on opposite sides; thus sanding surface is always touching the floor. The drum is covered with a sponge rubber pad, and changing is quick and easy. Other features include one h.p. ball-bearing motor, rigid one-piece frame, high efficiency dust collector fan, handy switch, flush sanding edge, and quiet V-belt drive. Weight 163 lbs.



LEFT: Comfortable position for easy paper change; below, smooth-running sander in use.

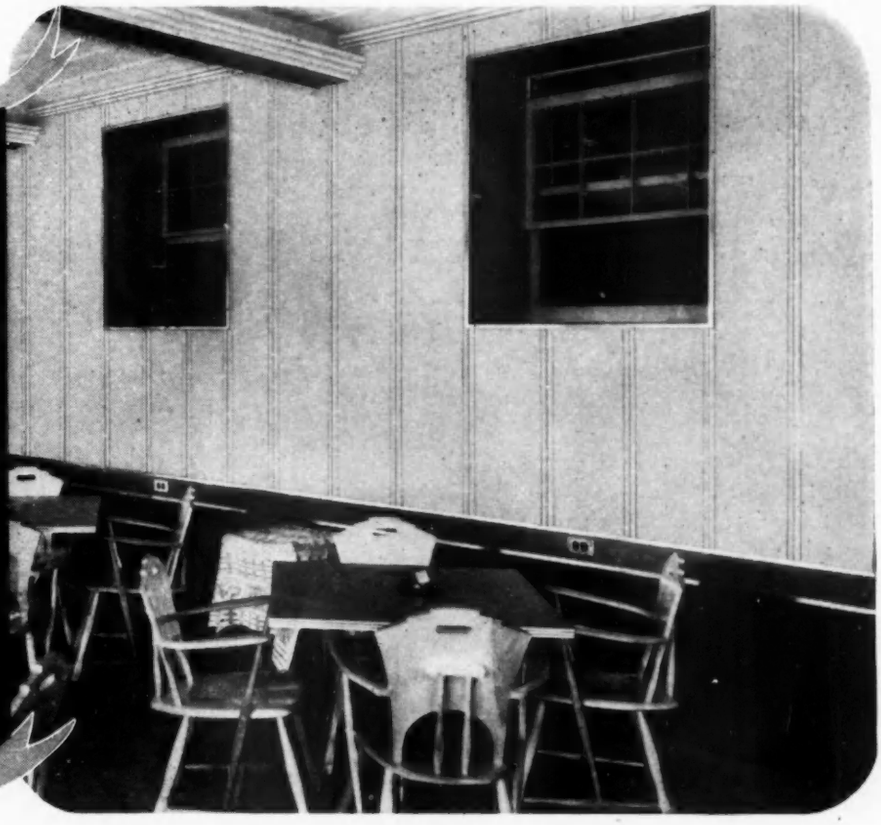
New 6½" Electric Hand Saw

THE Mall Tool Company, Chicago, Ill., has announced the addition of a new Model 65 6½" Mallsaw to its line. It has a cutting capacity of 1⅞", and cuts full 2" dressed lumber on straight cuts and 1 11/16" on 45 degree angle cuts. A powerful motor, adjustable base, chrome plating for long wear, sturdy construction, lightweight casting to withstand severe usage and abuse, special alloy chrome nickel steel hardened gears, grip handle with trigger switch, extra large bearings, rip fence guide, and the Mall patented approved spring operated safety guard are features.



HAND saw cuts 1⅞ inches deep.

Beauty that NAILHEADS DO NOT MAR



Exclusive new J-M Lightning Joint conceals nails, speeds up application . . . makes J-M Insulating Board a leader in sales and profits . . .

AGAIN J-M gives you a product that offers greater value at no extra cost—the new J-M Insulating Board! Consider these advantages:

The new Glaze-Coat finish is smoother, more durable, easier to clean, has high light-reflection value.

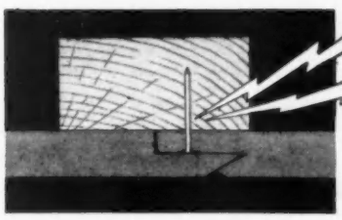
4 new pastel colors selected by a noted decorator appeal to every buyer, permit a wide variety of decorative treatments.

New exclusive J-M Lightning Joint conceals ugly nailheads, speeds up application, assures a better job.

No wonder dealers and builders say that this new all-wood fiber board is easier to sell! No wonder demand for it is sweeping the country!

Owners say the new J-M Insulating Board is just what they are looking for to build extra rooms . . . to cover old, cracked plaster walls. It's ideal for almost any type of room in homes or commercial buildings. For full details, samples and our new full-color brochure, call your J-M office or write Johns-Manville, 22 E. 40th St., New York.

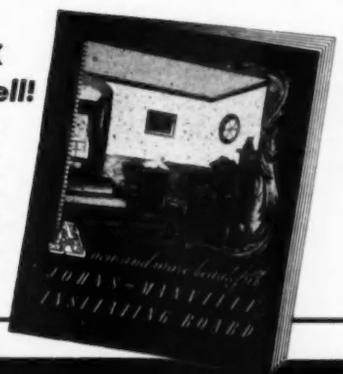
HERE'S HOW THE EXCLUSIVE J-M LIGHTNING JOINT HIDES NAILS . . .



Just nail the tongue. The adjacent panel fits snugly into the groove and stays firmly in place. *Nailheads are completely concealed.* Only the new J-M Insulating Board has this important feature . . . yet it costs no more!

This FREE BOOK will help you sell!

Send for your copy of this beautiful full-color J-M Insulating Board brochure. You'll find it the best sales presentation you ever had for selling decorative interiors! Ask for copy NOW!



JM JOHNS-MANVILLE Building Materials

INSULATING BOARD · ASBESTOS AND ASPHALT SHINGLES · SUPER-FELT ROCK WOOL HOME INSULATION · STEELTEX · FLEXBOARD · ASBESTOS WAINSCOTING · HARDBOARD · ROLL ROOFINGS, etc.

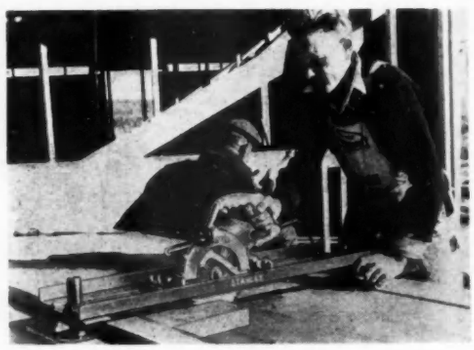
Powerful Low-Cost Shaper

MANY unusual features in the new low-cost shaper just announced by the Delta Manufacturing Co. of Milwaukee include: Large husky spindle, lubricated for life, measuring 3¼" long, ¼" in diameter, with full 3" travel, made of manganese steel, with its bearings diamond bored to .0003"; can be instantly replaced with ½" or ⅝" spindles. With addition of another wing, table can be increased to 27" x 36". Fully adjustable fence; rear half of fence can be adjusted in a few seconds, without disturbing other settings. Powerful motor drive with motor completely enclosed in sturdy cabinet, light enough to be portable, heavy enough to "stay put," with efficient fool-proof V-belt drive. Massive main bearing housing—a complete unit carrying the spindle and bearing is bolted to the table so that there is nothing to get out of alignment.

SHAPER has good-sized table, 27" x 28".

Cutting Frame for Electric Saw

A SAW frame offered by the Stanley Electric Tool Div., New Britain, Conn., makes its possible to cut many pieces of lumber to exact size desired without having to lay out and mark each piece separately. The saw frame is structural steel and is used with Stanley safety saws Nos. W7, W8, W9, for square, bevel and bevel mitre cuts. It is adjustable for height from minimum to maximum capacity of saw by moving clamp nuts on each end of frame. A stop pin in front clamp drops into bored holes in bench at any angle for other than straight cuts.



FRAME saves time in cutting a number of pieces to the same size.

Gear-Drive Universal Saw

EFFICIENCY, capacity, power and compactness of design are highlights of the new No. 11 universal saw developed by J. D. Wallace and Company, 136 S. California Ave., Chicago.

Motors constructed of G-E parts incorporate the Wallace gear drive, which brings the saw spindle away from the center of the motor and close under the table to permit a great cutting depth with small diameter saw blades, 9" in

(Continued to page 78)

FULL line of accessories may be added to standard equipment of saw.

OUR HATS ARE OFF TO YOU..
THE HOME BUILDERS OF AMERICA!

You Architects — Contractors — Speculative, Operative, or Merchant Builders — you are brave men! Of all the sales jobs in merchandising, yours is perhaps the toughest. You are the only men who dare to build such a large product and offer it for sale to the public. You take real chances on public acceptance. And the fact that you are successful is a tribute to your ability.

We believe you have achieved success because you are always looking for ways to give better values and to reduce the chances you must take. And we believe — on the basis of impressive sales records by typical builders who have used G-E Home Bureau service — that we have a way to help *you* gain even greater success. Because others have proved the value of this specialized service time and again in every part of the country, you can be confident that the plan is at least worth your consideration. Write for details now. There is no obligation.

This service includes:

1 *A Tested House Merchandising Plan* — an aid in selling which builders everywhere are using successfully.

2 *An Architectural Engineering Service* — The G-E Home Bureau does not furnish plans, but its staff of experts will check yours and make suggestions — wiring, heating, air conditioning, lighting, kitchens and laundries.

3 *An Advertising Service*—Tested advertising campaigns, layouts and copy adaptable to your use.

Why don't you give it a trial? Check and mail the coupon below today for complete information.

GENERAL ELECTRIC HOME BUREAU
Dept. AB12—1285 Boston Avenue, Bridgeport, Connecticut
Please send details of General Electric's House Merchandising Plan.

☐ I am building to sell to others
☐ I am building my own home

Name.....
Address.....
City.....State.....

GENERAL ELECTRIC

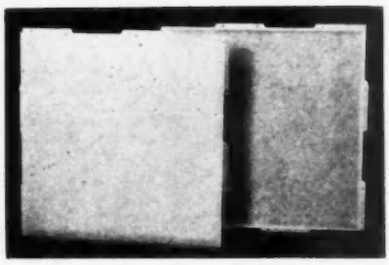
(Continued from page 76)

diameter cutting 3" deep. Removing the standard guard, blades up to 11" in diameter cutting 4" deep may be used. The motor speed is 1800 r.p.m.; spindle speed, 5200 r.p.m.

The table top is an accurate steel plate, graduated to show width of rip cut, and mounted on a 4" deep-ribbed grid of cast-iron that has been ground to close limits. Fence grooves are eliminated on the table surface, the fences sliding on machined flanges on the under side of the table where they are protected against the accumulation of sawdust. Motor tilts, raises and lowers in the frame with large adjusting handwheels; the table remains horizontal for all cuts. Two throat inserts are provided, one for saw blades and one for dado heads.

New Plastic Block Building Material

A NEW plastic block with revolutionary possibilities in the building field has been designed and patented by Alden Dow, Dow Chemical Company, Midland, Mich. These new blocks, 12 inches square and less than ⅛ of an inch thick, offer a small construction unit for interior and exterior adapted to functional home and office design. A ½" lip equipped with two nailing flanges provides for fastening to a framework; caulking compound seals the joints between blocks. The plastic materials, Ethocel and Styron, give these units translucency, ease of handling and cleaning, permanent, beautiful finish in colors.

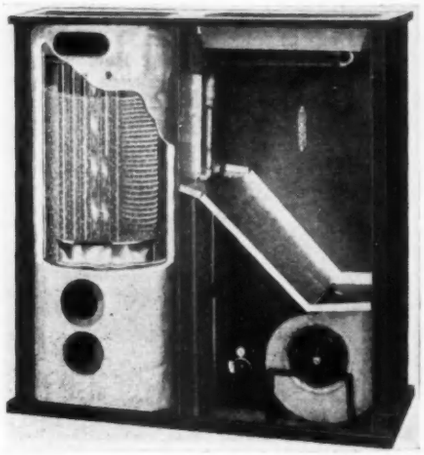


NEW plastic building units, one foot square, developed for use inside and out, nailed over light frame construction.

"3 in 1" Small Home Heating System

THE heating system of the future, a "3 in 1" unit of comfort, convenience and economy, has just been placed on the market by the York Oil Burner Company, Inc., York, Pa. It is a split system unit, compactly designed to include complete (1) winter air conditioning, (2) year 'round tankless hot water, (3) economically remote radiation, and (4) summer cooling. This new unit, the "Radi-Aire," is designed to give perfectly balanced heating comfort for both new and old, small and medium-sized homes. By combining forced warm air with remote steam radiation, it is possible to eliminate the cold-catching draft at windows, to isolate the undesirable odors in the kitchen and bathroom, and to maintain balanced heating comfort in rooms that are isolated, such as the sun porch, maid's quarters and garage.

Also included is an instantaneous domestic hot water heating coil within the boiler, and provision has also been made for the installation of cooling coils for summer air conditioning if desired. Floor area required is a minimum of 27 x 60 inches and a maximum of 33 x 72 inches for the three available sizes. Overall height does not exceed 62 inches.



HEATING unit combines comfort of forced warm air, radiation, domestic hot water supply and, if desired, summer cooling.

Sears Roebuck Store, Nashville, Tenn.
General Contractor: Rock City Construction Company
Plaster Contractor: P. H. Reynolds Company
Hawk Spread White Finish supplied by C. W. Kempkau & Co.

Fresh, Fat and Fluffy

Hawk Spread White Finish is absolutely uniform and therefore preferred by thousands of plasterers from coast to coast. Write for illustrated booklet explaining our manufacturing process.

The Ohio Hydrate & Supply Co.,
Woodville, Ohio

OHIO PRODUCTS SOLD EVERYWHERE IN FAMOUS ZIG ZAG BAGS
Ohio White Finish—Hawk Spread White Finish—Ohio Ritewall Fibered Lime Plaster—Ohio Sanlime Finish—Mastite Masonry Mortar—Ohio Masons Lime—Ohio Ground Lime.

The Original HAWKSPREAD WHITE LIME FINISH

THE "OVERHEAD DOOR"
Trade Mark
WITH THE
MIRACLE WEDGE

Use The "OVERHEAD DOOR" with the MIRACLE WEDGE for *every* installation, from the least expensive to the most pretentious. Only The "OVERHEAD DOOR" of Hartford City, Indiana, has the MIRACLE WEDGE closure . . . a feature worth more than its low cost—in *customer-satisfaction!*

Backed by
A NATION-WIDE SALES-INSTALLATION SERVICE

OVERHEAD DOOR CORPORATION, Hartford City, Ind., U.S.A.

MAIL NOW AB-1239

Please send full information and free literature on doors for the purpose checked:

☐ Private Garage	☐ Greasing Station	☐ Hand Operated
☐ Public Garage	☐ Other Buildings	☐ Electric
☐ Warehouse	☐ Wood Sections	☐ Standard Model
☐ Factory	☐ Steel Sections	☐ Master Model

NAME.....
ADDRESS.....
CITY..... STATE.....

LETTERS from Readers on All Subjects

Facts, opinions and advice welcomed here

For a "Job Wanted" Department

Centerville, Ia.

To the Editor:

I would like your opinion on the labor situation in the home building industry. Most public comment on the subject would have us believe that there is a shortage of skilled labor in this field.

I have been a reader of *American Builder* for the past year and I agree with you that it is the world's greatest building paper. But there is one service which you are overlooking. I think you should have a department or column where workmen from all parts of the country could attract the attention of progressive builders and state their qualifications. I believe there are many men in different parts of the country who, like myself, wish to and could become expert building craftsmen but who experience difficulty in finding employment in the line of work which they like best to do and are most capable and best fitted to do. I also believe that there are many builders whose business is expanding so that they find it necessary from time to time to add to their crews, who would use this department in making their selections. It would be a great help in putting the right man into the jobs he likes best and can do best, which after all is one of the best ways of increasing the efficiency and quality of workmanship.

If you had such a department I would send an ad that read something like this:

> Young Man, experienced in operation of power woodworking machinery, blueprint reading and drawing and small home construction. A very careful and accurate workman, honest, steady, reliable. Wishes connection with contractor specializing in building small homes. Would be willing to start as helper if chance for advancement.

Any comments or suggestions on the subject would be greatly appreciated. LAWRENCE BURKHART

Note: How many other readers think a job wanted column would be a valuable addition to *American Builder*?—EDITOR.

Wants More Farm Buildings

Pewaukee, Wis.

To the Editor:

I am sending my renewal for the *American Builder*. I wish that you would have more plans for farm buildings. While your house plans are good, yet we builders in the rural districts need other building plans. Let's have some. I have taken your paper most of the time since 1912 and we have had some good farm building plans in the past. EMERY H. HARDY, Carpenter

Likes Editorial on "Stateism"

Orland, Calif.

To the Editor:

Your editorial on "Stateism" in the November *American Builder* is the clearest and best put statement of the existing conditions that we have seen. How we wish that every paper in the land would print such.

If we could obtain 25 or more copies of this editorial we would put them in the hands of as many California editors.

While we are not actively in politics we do believe and practice resistance to government increases in control of business. In NRA days we were the one lumber yard in this section which flatly defied the NRA and told State Director George Creel if they did not like the way we were doing business, "to make the most of it." They tried to take us to the federal courts, but got nowhere with it. We found a great preponderance of opinion was with us and I am only relating the above to make the point that I believe the public would approve and follow such argument as your editorial so plainly gives. MACY LUMBER COMPANY, By W. H. Macy.

News of the Month

Building Activities and Meetings

Residential Building Promises Best November Since 1929 Which It May Equal

FOR the first half of November, residential building volume in 37 eastern states amounted to $53,762,000, according to F. W. Dodge reports. This compares with $40,928,000 for the same period last year, and on that basis should show a total monthly volume of over $100,000,000 or the best November since 1929, which amounted to $113,000,000.

Statistics for the four classes of construction as recorded during October are as follows:

37 Eastern States	Oct. 1939	Oct. 1938	Nov. 1-15, '39
Residential	$118,303,000	$112,673,000	$ 53,762,000
Non-Residential	72,684,000	131,020,000	44,111,000
Public Works	50,359,000	92,829,000	57,697,000
Utilities	20,450,000	21,176,000	8,460,000
Total	$261,796,000	$357,698,000	$164,030,000

NEWS BRIEFS–

BUILDING will get a nationwide check-over when the U.S. Census Bureau starts its decennial task on Jan. 2, 1940; housing, farms, businesses and employment will be covered. . . . **DANIEL J. YOUNG** has been appointed vice president and general manager of Wheeler-Osgood Sales Corp. . . . Andersen Corp. has given the job of sales manager to its oldest salesman in point of service, **JOHN B. ROWLAND.** . . . A small home building service program furnishing complete architectural service, including supervision, for less than $100 has been announced by the Chicago Chapter, A.I.A. . . . **A. L. O. SCHUELER** is the newly appointed assistant manager of the Shevlin-Hixon Co. at Bend, Ore. . . . Certain-teed Products Corp. has named **JOHN M. HUGGETT** advertising manager. . . . The Land Developers and Home Builders Div. of the National Assn. of Real Estate Boards at the annual convention in Los Angeles elected **JOHN McC. MOWBRAY,** Baltimore, Md., as 1940 chairman. Regional vice-chairmen for the year are: Forris W. Norris, Harold W. Cheel, E. B. Busbee, Harry S. Kissell, Jesse L. Schroeder, John W. Coyle, Hugh Russell, and David D. Bohannon. . . . Celotex Corp. has announced the appointment of **G. D. ANDREWS** as sales promotion manager.

LEFT: D. J. Young, Wheeler-Osgood V. P. and General Manager. RIGHT: J. B. Rowland, Andersen Corp. Sales Manager with 20-year service record.

Lumber Dealer Conventions Announced

THE dates and locations of retail lumber dealer association conventions scheduled for the 1940 season which have been announced are as follows:

Date	*Assn.*	*Location*
Jan. 9-11	Indiana	Claypool Hotel, Indianapolis, Ind.
Jan. 16-18	Northwestern	Municipal Auditorium, Minneapolis.
Jan. 16-19	Ohio	Memorial Hall, Dayton, O.
Jan. 22-24	Mountain States	Shirley-Savoy Hotel, Denver, Colo.
Jan. 22-25	Kentucky	Brown Hotel, Louisville, Ky.
Jan. 23-25	Northeastern	Hotel Pennsylvania, New York, N.Y.
Jan. 24-26	Southwestern	Auditorium, Kansas City, Mo.
Jan. 28-30	West Virginia	Daniel Boone Hotel, Charleston, W.Va.
Jan. 30-Feb. 1	Middle Atlantic	Bellevue-Stratford Hotel, Philadelphia.
Jan. 30-Feb. 2	Michigan	Book-Cadillac Hotel, Detroit, Mich.

(Continued to page 84)

Herzim

METAL MOULDINGS for use with WALL BOARD WALL TILE and INSULATION

Write Today for This Catalog

Here's the *complete line* that builders and contractors like. There are mouldings for every purpose—wall-board, insulation board, sink and counter edging, stair nosing, decorative treatment, linoleum application. All are easily applied. All are highest quality, precision products, designed especially for the building industry.

HERRON-ZIMMERS MOULDING CO.
3904 E. Outer Drive, Detroit, Mich.

TWO GOOD ESTIMATING FORMS

The Old Builder's Estimator

A complete estimating form for one residential job, with a 300 item check list, 7 pages of estimating data and memo sheets for use on the job. With this booklet you can prepare a complete, itemized, accurate estimate. Three columns are provided for checking every line of the detailed estimate. The forms follow the order in which a residential job progresses.

48 pages, 4 x 7½, stiff paper binding, $.25

5 for $1.00 or 12 copies for $2.50

The Small Job Estimating Kit

This Kit contains 10 complete sets of forms for quickly and accurately estimating 10 modernization, repair, maintenance or other small job projects costing under $500. You fill out the list of items covering labor, materials, sublet, etc., and when the estimate is complete you transfer the figures to the detachable form which is the Letter of Proposal. This is given to the prospect. The record of actual costs of each job is kept on the back of the stub which remains in the Kit.

10 sheets, 11 x 8½ inches, folding to 4¼ x 8½, stiff paper cover, $.35. 4 Kits for $1.00; 12 Kits for $4.00.

BOOK SERVICE DEPARTMENT

AMERICAN BUILDER AND BUILDING AGE

30 Church Street **New York, N. Y.**

Give Yourself This Christmas Present!

YOUR NAME PRINTED HERE!

Send for Your FREE Copy of This Money Making Book

Here's a "big" little book crammed with information gathered from expert craftsmen, laboratory experiments and fifty years of manufacturing experience. It answers your questions about exterior and interior painting on all types of surfaces. Note these comments of some enthusiastic owners:

You really did something when you got up the Reardon QUIZ BOOK. C. A. S., JONESBORO, ARK.

Best book of the kind—very comprehensive—a little giant of information. E. W. Y., EASTON, PA.

Very complete and concise—fills a much-needed want. E. F. G., ST. LOUIS, MO.

One of the most outstanding booklets ever put out for salesmen. R. S. M., COLUMBUS, OHIO

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NEWS—

(Continued from page 82)

Jan. 31-Feb. 2	Iowa	Coliseum, Des Moines, Ia.
Feb. 6-8	Illinois	Stevens Hotel, Chicago.
Feb. 7-9	Western Pa.	Hotel William Penn, Pittsburgh, Pa.
Feb. 13-15	Wisconsin	Auditorium, Milwaukee, Wis.
Feb. 14-16	Virginia	Roanoke Hotel, Roanoke, Va.
Feb. 21-23	Nebraska	City Auditorium, Omaha, Nebr.
Feb. 22, 23	Tennessee	Hotel Hermitage, Nashville, Tenn.
Feb. 22-24	Western & Utah	Hotel Utah, Salt Lake City, Utah.
Mar. 5, 6	South Dakota	Carpenter Hotel & Coli'm, Sioux Falls.
Mar. 12, 13	North Dakota	Auditorium, Fargo, N. Dak.
Mar. 15, 16	Florida	Undecided—Orlando, Fla.
Apr. 8-10	Texas	Undecided—Ft. Worth, Tex.

* * *

New Trend Toward Half-Acre Homesites

(Continued from page 29)

tioned heating plant is from the American Gas Products Company. Plumbing fixtures are of both Standard and Kohler of Kohler manufacture. Reading hardware is used throughout. All electric fixtures are from Lightolier.

Alfred T. Rhodes, construction engineer for North Shore Acres, who formerly directed the building of a community of $15,000 to $25,000 homes, reports that the same quality of workmanship and supplies is being adhered to in this $7,500 to $10,000 project. He says that gas heat has won widespread popularity among the home owners in North Shore Acres because, in spite of the general impression that gas is expensive, the insulated construction and complete metal weatherstripping make it economically expedient.

Exteriors at North Shore Acres are fieldstone, brick, or frame depending on the architectural style of the house. Roofs are shingled in cedar or slate depending largely on the preference of the buyer. Grade A No. 1 lumber is used throughout. Three coats of plaster are applied to a rock lath base with wire reinforced corners. Foundations are poured concrete in accordance with the FHA specifications for Long Island. Mr. Rhodes reports that costs per cube range 33 percent lower than on his former job because of the efficient management setup and minimum overhead involved.

No expensive show office is maintained, all business being transacted in a field office shanty, from which 34 dwellings were sold in the first nine months of this year. Eight more are being built to order at present.

Gravel roadways perpetuate the country home atmosphere in North Shore Acres. There are no sidewalks. The property, an old estate dating from the original grant from the King of England, is abundantly planted with old shade trees.

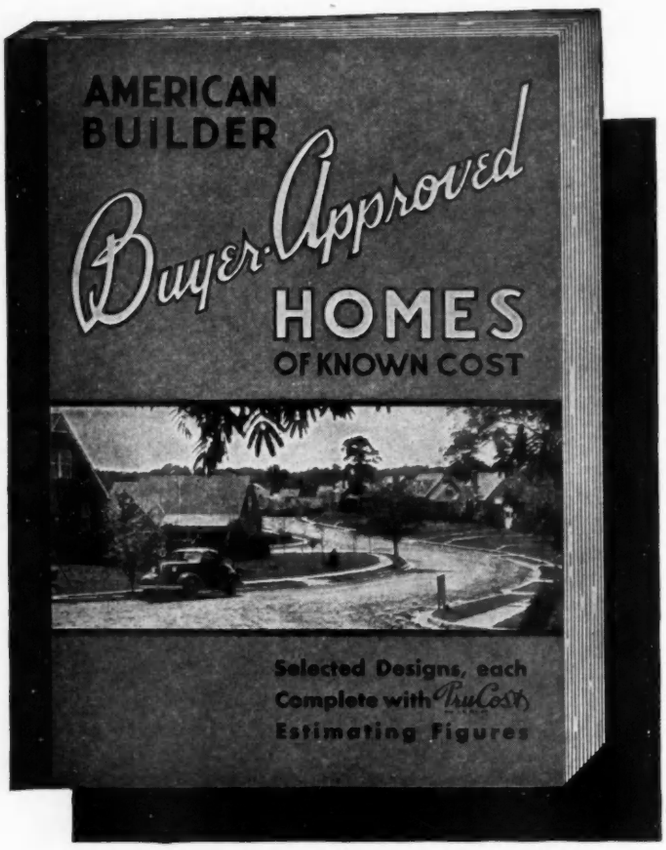
An interesting outcome of this liberal land division has been the introduction of the California ranch house style of dwelling into the New York architectural repertoire of Colonial, English, and other much used designs.

A home of this western type has recently been completed among Mr. Uhl's Flower Hill Estates for Mrs. Ethel Burnside. Occupying a plot of 180 feet in frontage, this house spreads to an over-all width of more than 85 feet. Yet it nestles comfortably on its site with side yards more than 45 feet wide. Although the house is set back on a front lawn 65 feet deep an expansive rear garden is afforded by the plot which is 150 feet in depth. The property abuts on the golf course of the North Hempstead Country Club which can be seen through the trees.

This California ranch house, designed by Henry W. Johanson, registered architect of Roslyn, Long Island, is planned in such a way that wings wrap around three sides of a rear garden patio. It creates a virtual outdoor living room—a flagstone terrace as large as the indoor living room 15 x 24 feet—affording secluded privacy. At the base of the large outside chimney is a fountain gold fish pool.

Walter Uhl also uses Johns-Manville rock wool, as well as Celotex insulation. Every house in his Flower Hill Estates is equipped with a Chambers range. Air conditioned heat is supplied by Gar Wood equipment. Plumbing fixtures are Standard. Armstrong linoleum is supplied in kitchens. Roofing, on the California ranch house type of dwellings, is Ludowici tile.

The consensus of opinion in building and real estate circles is that the developer who purchased and improved his land in recent months now stands in a strong position to benefit by the growing stampede among home buyers to purchase before building costs are skyrocketed by any wartime boom.



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*

Carefully planned 5-room Indiana home with numerous built-ins.

*

A brace of 5-room Florida Bungalows in concrete masonry, well done throughout.

*

Modern Version of New Orleans Colonial, presenting an interesting pattern of bright surfaces and deep shadows.

*

Two Related River Forest Homes, admirably planned for light, air and view.

*

A Builder's Own Modern Cottage, with Plywood interior.

*

7-room California Bungalow designed for a 50-foot lot.

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The Colonial Charm of Old Williamsburg re-lives in an especially attractive Port Washington home.

*

A 6-room Los Angeles home with two terraces and an outdoor fireplace.

*

New England Colonial in Ohio, with interior views that show how correct details give charm and value to homes.

*

A "Set-Back" home with the rooms all on one floor, styled from an Early California Ranch House.

*

A Two-Level 24′x45′ providing a large Game Room with above-grade windows underneath bedrooms.

*

Cozy "Comfort" Cottage overlooking Lake Candlewood, Conn.

*

Small "Economy" home with compact 5-room layout in 25′x23′ plan.

*

All Hardwood Home in Montgomery, built to stand for 300 years.

*

Two Rambling Colonial Homes with fine details, one each for city and country.

*

An Olsen "Utility" home in Pittsburgh, showing great progress in the planning of basementless homes.

*

A popular home in Detroit has breakfast room and first floor bedroom.

*

One of Cheel's latest New Jersey homes crowds a large amount of charm and roominess into relatively small space.

*

Four pages of well-planned small "Plymouth Haven" homes grouped about a court, featuring historical Puritan setting.

*

Compact 8-room house with cubage of 35,000. 5 bedrooms and 3 baths.

(More on Next Page)

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Continued from preceding page

Homes of a Type that Influence Design Trends wherever Homes are Built

Reading, Pa., Colonial, by placing garage in rear, makes space for extra rooms that add to its value.

5-room California Home built on a hillside.

Modified French Norman home of 7 rooms a builder put up for himself.

Two Cedar Rapids houses featuring spacious interiors, efficient kitchen and good styling.

Impressive Rambling Colonial Home in Rural Connecticut, 30,000 cubage.

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Every April, "The Spring Building and Directory" issue of American Builder — The Two Big Events of Each Year in the Building Industry — Every October "The Fall Design and Planning" issue of American Builder

How to Estimate Accurately

(Continued from page 72)

Lumber association rules permit a certain percentage of an order to be short lengths. The poorer quality of material will have more short lengths.

Hardwood flooring may be bought in various widths and thicknesses. As the proportion of stock milled away varies with the original size of different widths of stock, as shown in Fig. 2, so the percentage or fractional increase varies. The table below gives the percentage increase for some standard widths of flooring.

Rule: (1.) Find room area which is width of room multiplied by length of room. Use inside measurements as scaled on the blueprints, increasing fractional room measurements to next quarter foot before computing.

(2.) Fireplace areas should be deducted.

(3.) Then add to the room area the correct percentage increase as indicated.

(4.) Repeat for all rooms.

(5.) Then add two square feet for each door opening.

Percent Increase for Standard Sizes of Hardwood Flooring Hardware

ROUGH SIZE OF STOCK	THICKNESS & FACE WIDTH	PER CENT INCREASE
1" x 2"	3/8" x 1½"	36%
1" x 2½"	3/8" x 2"	28%
1" x 2"	½" x 1½"	36%
1" x 2½"	½" x 2"	28%
1" x 2¼"	13/16" x 1½"	52½%
1" x 3"	13/16" x 2¼"	36%

PINE FLOORING: The best grade of pine flooring is made from vertical grained lumber as it will not sliver from the wear of walking on it.

Rule: (a.) Floor area plus ¼ equals board feet of 4" stock. Then add 5% for end waste.

(b.) Floor area plus 1/6 equals board feet of 6" stock. Then add 5% for end waste.

(c.) Short-cut method:

Room width measurement (expressed in feet) divided by 3 and multiplied by 11 equals number of 4" pieces.

Room width measurement divided by 3 and multiplied by 7 equals number of 6" pieces.

For 4" flooring add one extra board for every 12 linear feet of surface.

Length of flooring is same as room dimension increased to an even foot length.

T&G CEILINGS FOR WALLS AND CEILINGS: Sometimes walls, partitions, and ceilings are covered with T&G ceiling in order to make a finished surface.

Board Foot Rule: (a.) Find area of wall or partition by multiplying the height by the length.

(b.) Deduct openings of 10 square feet or more.

(c.) Add 1/6 to the remaining area. Result is board feet of 6" T&G stock. If 4" stock is used, add ¼ instead of 1/6.

Piece Rule: Use short cut rule as given for pine floors above for figuring T&G ceiling by the piece. Length of ceiling is same as height of wall or room dimensions increased to an even foot length.

Rough Hardware

A building contractor's responsibilities include ordering all fasteners such as nails and bolts required to hold different parts of a building together and the numerous items required for interior finish work, such as locks and hinges.

Builders' hardware is divided into two groups, rough and finish. Rough hardware includes such items as common nails, finish nails and bolts. Finish hardware includes hinges, butts, and locks for doors and windows, and hinges and fasteners for cabinet doors and pulls for drawers.

NAILS: Common nails are used for framing work and finish nails for interior finish. The economical way to buy nails is by the keg. Nails left from one job are always usable on the next one.

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How to Estimate Accurately

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Rule: Allow 2 kegs of 8d box, ½ keg 10d box, 1 keg of 16d box, and 15 pounds 20d box for 1,000 square feet of floor area. An approximation only can be given for finish nails. 20 lbs. of 8d finish, 15 lbs. of 6d finish, 1 lb. of 4d finish, and one package (1 lb.) each of 1" and ¾" brads will be required for an average job.

NOTE: Many persons are puzzled as to the meaning of the term 8d, 10d, etc. The letter "d" is an abbreviation for the English term "penny." One explanation is that "six penny" means 6 lbs. to each 1,000 nails of this size; 8d meaning 8 lbs. to each 1,000 nails of that size, etc.

The number of a nail denotes its length; the larger the number the longer the nail.

BOLTS: To securely fasten mudsill to a concrete foundation, bolts from 6" to 8" in length and ½" diameter are incased in the concrete before it sets or hardens. (See Fig. 3.)

The spacing of the bolts varies according to building ordinances and requirements of an architect. The usual practice is to place them 6' on centers (o.c.).

Rule: Allow one bolt for each 6' of mudsill; then add one for each corner or angle.

Finish Hardware Unit

The carpenter-estimator must have a broad knowledge of finish hardware if he is to take off a bill of hardware correctly. Many kinds of locks can be purchased; hinges and butts come in various shapes and sizes; cabinet door fasteners are available in many forms; and all can be secured in different finishes.

The following basic information applies to all finish hardware items.

Quantity Desired: This is determined by counting the units which require hardware and estimating the number of pieces of hardware needed.

Catalogue Number: To simplify the listing of hardware items a hardware catalog should be secured. Each item is numbered and sometimes the number is preceded by one or more letters, usually the code for a certain kind of finish. For ordinary types of hardware a catalog number is not needed. When a special type is required the number is important and should be used.

Manufacturer's Name: For a majority of hardware items required no special make is necessary unless specified by the architect. However, there are numerous standard makes of hardware. When ordering a particular piece or quality the manufacturer's name should be included.

Finish of the Hardware: The term "finish" means the decorative appearance of hardware. There are a number of standard finishes such as old copper, black, sand-brass, dull brass, nickel, and sand copper. Hardware for a residence is ordered the same finish throughout excepting the bathroom and kitchen in which nickel hardware is generally used.

Kind of Material: Hardware material is divided into two kinds: steelplated and solid brass or bronze. Solid brass or bronze is best but more expensive. This quality of hardware is most often used on public buildings or costly residences.

Size of the Item: The size of a hardware item is stated in the following order: length first, width second, and thickness third.

Name of the Item: To list a hardware bill correctly the name recognized in the building industry should always be given.

DOUBLE HUNG WINDOW HARDWARE: Each window requires four pulleys unless sash balances are used. Several standard types are available.

Sash Cords: Each window requires four cords. The length of each cord is estimated to be the same as the window length. Sash cord is ordered by the hank which contains 100 linear feet. The combined results of the total linear feet of cord required for all the windows is changed to full hanks.

Weights: Four weights are required for each double-hung window, one pair of weights balancing the sash to which they are fastened. Sash weight tables are sufficiently accurate for an estimator.

NOTE: The weight of sash varies depending on the kind of wood and the thickness of glass. It is best to weigh each sash to get accurate results, dividing the weight of each by two. This will give the size weight required. Sash weights should not be

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How to Estimate Accurately

(Continued from page 90)

ordered until the sash are actually weighed.

Sash Balances: When a narrow trim is used for double hung windows there is no room for sash weights and a sash balance must be used. Balances are made to fit different window sizes. When ordering them the dimensions of the window must be given. One balance is needed for each sash (that is, upper and lower) of a double hung window. Large windows require two balances to each sash, or four to a frame.

Lifts: A sash lift is hardware fastened at the bottom of a window to raise it. There are several types available. One lift for each window is usually sufficient; wide windows require two each.

Locks or Fasteners: The ordinary window requires one sash lock.

CASEMENT SASH HARDWARE: A casement sash usually requires a special type of hinge known as a parliament butt. It is a wide hinge, designed to permit sash that swing in to be opened to 180 degree angle after the window shades are on. The average sash requires one pair of butts which can be procured in various sizes, the most commonly used being 5" parliament. These butts are loose pin so the sash may be taken off.

If the sash opens out, a 3" x 3" sheradized tight pin butt is generally used. Sheradized means the hinges have a rust-proof finish.

NOTE: "Butt" is the trade term used for a hinge that is screwed onto the edge of a door or window. Hinge means the hardware screwed onto the face of a door or window.

Fasteners: There are two types of fasteners; one in which the strike is fastened to the jamb, known as "jamb strike"; the other used when there are a pair of sash in the same opening, and known as "surface strike." For an average length casement sash one fastener is sufficient. On long sash two are required.

Bolts: A bolt is always required at the top and bottom end of one unit of a pair of sash. There are two types, the flush bolt and the surface bolt. Order two bolts for each pair of sash.

Adjusters: If the window opens out, an adjuster is required to keep the sash open and prevent it swinging. Some operate with a handle through the apron, some with a thumb screw adjustment. Order one adjuster for a single sash and two for each pair of casements.

WINDOW SCREEN HARDWARE: The finish hardware required to hang a window screen is selected on the basis of whether the screen opens out, opens in, is hinged at the side, as a casement sash, or slides vertically.

Screen Opening Out: Hangers are fasteners at the top of a window screen which permit a screen to open and also be lifted off. One pair of hangers is required for each screen.

Hooks and Eyes: Required at the bottom of a screen to secure it in position. Wide screens require two hooks and eyes.

Screen Opening In: If a casement sash opens out, the screen will be on the inside and require a loose pin butt. The fastener will be the same as for a casement sash.

Sliding Screen: One lift is required for each sliding screen. One hook and eye will be needed to lock the screen.

FRONT DOOR HARDWARE: Front door locks may be purchased in a variety of types and designs. Many specifications call for cylinder locks. A lock often used has a night latch instead of a cylinder.

Particular care must be exercised when ordering door locks. A complete lock including escutcheon plates, strike plates, knobs and lock is known as a lock set. Unless the word "set" is used when ordering, the hardware dealer will send only the lock.

Butts: For a front door, butts are usually larger in size than for an inside door. A size commonly used is 4" x 4" and one pair is required. A third butt is often put on at the center to prevent the door from becoming warped or twisted, as the outside face of an exterior door is exposed to the weather. Three butts are known as 1½ pair of butts.

Door Stops or Bumpers: A door stop is a small device which prevents a door handle from striking the wall. There are two types; one is screwed into the baseboard, the other into the floor. The former is preferable. Allow one bumper per door.

SCREEN DOOR HARDWARE: There are two types of screen door spring hinges. One is a non-adjustable surface hinge, the other an adjustable hinge. The latter is the best and is made

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How to Estimate Accurately

(Continued from page 92)

either a surface or edge hinge. A third hinge, placed at the center of a door, prevents the door from becoming warped.

Estimate 1½ pair screen door hinges for each screen door. A pair of screen doors requires three pair of hinges.

Fasteners: Usually one hook and eye is used on the inside of a screen door and a 3" wire handle, or pull, is used on the outside. A small mortise lock is the best type of fastener to buy, one being required for each door.

Note: A screen door spring hinge set is obtainable and includes a surface hinge, wire handle and wire hook.

SINGLE ACTING DOOR HARDWARE: The standard size butt used on inside doors is 3½" x 3½" loose pin (L.P.), one pair being required for each door.

Locks: A complete lock for an inside door is known as an inside mortise lock set. A french door requires a french door lock, as the stile for this door is narrower than a regular door stile and a standard size lock would be too large. A rabbetted lock must be ordered when a pair of french doors is used if the stiles are rabbetted where the doors meet. These locks are purchased either right or left hand depending on the way the door swings. This point should be checked carefully before ordering the lock.

The shape of escutcheon plates varies and must be selected before a lock can be ordered.

Locks may have a different finish on each escutcheon. This is to make the door hardware match in each room. For example, a hall might have brass finish and the kitchen nickel finish. The lock would require one brass escutcheon and one nickel. The butt finish is determined by the hardware finish of the room into which the door opens.

Door stops or bumpers: Allow one stop or bumper for each interior single acting door.

DOUBLE-ACTING DOOR HARDWARE: A double-acting door requires a double-acting hinge to permit it to open both ways. Some hinges are set into the floor, some screwed to the floor, and others are used on the edge of the door. The more commonly used hinge is the floor type. Each double-acting door requires one hinge.

Push Plates: A push plate is the hardware unit screwed to the stile on the opening sides of a double-acting door to keep the door free from finger prints. There are two types, one of steel or bronze and the other glass. One pair is required for each double-acting door.

CABINET DOOR HARDWARE: A cabinet door requires one pair of butts or hinges. A loose pin butt or an ornamental hinge is used; 1½ pairs of butts or hinges are required on long doors.

Cupboard Turns or Fasteners: There are many types of fasteners for a cabinet door. One is required for each door.

Elbow or Friction Catches: When two cabinet doors are fitted and hinged into the same opening (known as a pair of doors) one of them, usually the left, must be locked to the cabinet from the inside. For this purpose an elbow or friction catch is used. Allow one catch for each pair of doors.

Glass Door Knobs: When certain types of catches are used one glass knob will be required for each door.

DRAWER HARDWARE: An ordinary drawer always requires one pull or knob. Wide drawers require two each.

Locks: Allow one lock per drawer when locks are specified.

ADJUSTABLE SHELF HARDWARE: Adjustable shelves require special hardware to support them. A metal shelf rest is often used. Four are required for each shelf.

Shelf Fixtures: Metal adjustable shelf fixtures are sometimes used and placed vertically in each corner of a case, four being required for one cabinet. The length is the same (or a little less) as the distance between the top and bottom jambs. Adjustable supports fit into the fixture. Allow four supports for each shelf.

COAT AND HAT HOOKS: Closets used for hanging clothes required coat and hat hooks. There are several types available to be screwed to the hook strip and spaced from 6" to 9" on centers.

Rule: Estimate the linear feet of hook strip in a closet and divide this number by the spacing of the hooks. Result equals the number of hooks required for one closet. Repeat for all closets. It is not necessary to have an exact count as hooks are usually ordered on the dozen basis.

EDITOR'S NOTE: This completes the series of estimating articles by J. Douglas Wilson.

NEW INFORMATION— CATALOGS OFFERED

Readers Wanting to Receive Any of the Catalogs and Data Sheets Listed in This Department Should Write on Their Business Stationery Direct to the Manufacturer. When Writing, Mention This Department of American Builder and State Your Occupation or Business Connection.

ALL METAL SAW HORSE LEGS—New information and price list has been issued on a new line of all-metal trestle saw horse legs to be used in connection with 2 x 4's, 2 x 6's, or 2 x 8's. They are available in two heights—24 inches for regular saw horses used in building, and 32 inches for banquet tables, displays, ping pong tables, temporary stands, booths, merchandise tables, etc. They have an alligator grip which makes nailing unnecessary unless used for permanent horses. Legs are easily and quickly removed for storage or transportation.—WAGNER MFG. CO., Cedar Falls, Ia.

"SMART HOMES USE EDWARDS CHIMES"—A new 16-page brochure in full color illustrates the Edwards line of door chimes. These include both tubular chimes and the junior chimes which utilize bars instead of tubes. These chimes are beautifully illustrated, their musical notes specified and their prices quoted. —EDWARDS & CO., Norwalk, Conn.

WILSON METAL TRIM—An elaborate new catalog No. 104F contains more than 160 shapes illustrated in full color and in actual size. Pages are also devoted to accessories and detailed installation instructions. Trim is offered in aluminum and other metals that will not tarnish or corrode—the ideal companion for present-day wall and floor materials, such as linoleum, wall board, tile board, wood veneers, etc. Typical installation photographs in this new catalog for smart interiors and decorative effects.—WILSON METAL PRODUCTS CO., Columbus, Ohio.

"CHROMEDGE—THE MODERN METAL TRIM"—Catalog No. 40 is a 40-page handbook of decorative metal mouldings, nosings, corners and coves. Flat strips, wall panels and color insert trims are included. An interesting section of detailed drawings shows good installation practice.—THE B & T FLOOR CO., Columbus, Ohio.

"WERNCO METAL MOULDINGS"—Stainless steel snap-on mouldings and extruded white alloy and brass mouldings are presented in catalogs S 21 and A 20, each a valuable reference handbook. An extensive line of shapes and patterns is illustrated and numerous photographs and drawings outline many uses for this class of material.—R. D. WERNER CO., INC., 21 E. 30th St., New York City.

"NU-WOOD, DECORATIVE, ACOUSTICAL, STRUCTURAL, INSULATION"—A beautiful 30-page brochure in full color illustrates Nu-Wood interior finish products for walls and ceilings in complete color harmony. Numerous decorative schemes are illustrated both for homes and commercial buildings. "Kolortrim" predecorated wood mouldings are also featured in this new catalog.—WOOD CONVERSION CO., First National Bank Bldg., St. Paul, Minn.

"BEAUTY AND PERMANENCE IN CONCRETE"—A de luxe portfolio of 16 pages illustrating and describing architectural concrete slabs of white cement matrix and exposed aggregates in their true colors and textures as used for both interiors and exteriors of buildings and engineering structures. The book includes descriptions of remodeled store fronts, a commercial reception room, a two-story residence, and the Baha'i Temple, in all of which architectural concrete slabs were used.—UNIVERSAL ATLAS CEMENT CO., Chrysler Bldg., New York City.

CEDAR CLOSET LINING—Three new circulars of popular appeal present Brown's Supercedar closet lining. "Defeat the Moth" and "No Moths Allowed" appeal to the housewife to show her the importance of Supercedar closet lining. The other circular for architects, contractors and dealers shows how this cedar closet lining is packed and used.—GEO. C. BROWN & CO., of NORTH CAROLINA, INC., Greensboro, N.C.

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DECEMBER, 1939

NOTICE TO ADVERTISERS—Forms for the January number of the American Builder and Building Age will close promptly on December 15. New copy, changes, order for omissions of advertisements must reach our business office, 105 West Adams St., Chicago, not later than the above date. If new copy is not received by the 20th of the month preceding date of publication the publishers reserve the right to repeat last advertisement on all unexpired contracts. AMERICAN BUILDER AND BUILDING AGE.