PLYWOOD HANDBOOK

OF RESIDENTIAL CONSTRUCTION

BY
OSCAR FISHER
& L.H. MEYER

UNITED STATES PLYWOOD CORPORATION

Contents

The PLYWOOD Short-Cut to Economical Building . . .

"PLYWOOD" is the accepted answer to the question of low-cost residential construction.

That explains why the plywood mills, despite their production of more than two billion square feet per annum, are working at capacity, yet are far behind on orders.

For building with plywood means "long cuts in costs" and "short cuts to profit" and the erection of homes structurally sounder and esthetically superior to anything ever produced by traditional methods.

This book is designed to give architect and practical builder a brief summary of the best practice in planning and building with plywood. It represents an accumulation of the experience of practical men together with the studies of engineers at the U.S. Forest Products Laboratory at Madison, Wis. and other notable laboratories. All of this data is supplemented by the field experience of the authors, all of whose suggestions (both in text and in plan drawings) have actually been proven "on the job".

It will be well for the reader to bear in mind the fundamental principle that *wherever plywood is used, it cuts down labor costs and material waste* and produces a sounder job. While economies in construction are assured wherever plywood is used, the all-plywood house, embodying "dri-wall" construction, represents the *maximum* in economy which architecture and engineering have been able to develop to date. Prompt recognition of that fact gives an enormous advantage to the operator in the field of residential construction regardless of whether he is working on a $2,000 working man's village project or the $30,000 unit on a country estate.

While the economies pointed out in this booklet are of vital importance to the building trades, they are equally important to the home owner, as the plywood house requires a minimum of maintenance and resists the vagaries of wind and weather far better than houses of traditional construction.

Plywood meets all low-cost building requirements: it is durable, low in price, beautiful in itself and has splendid finishing qualities. Its range of usefulness is astonishingly broad. It is tough and permanent, easy to install without special tools or special skill, cuts down labor costs and eliminates all but the most trifling waste of material. The house constructed of plywood not only goes up more quickly (giving the owner speedier occupancy) but it will stand up better than one of conventional construction. There is nothing to deteriorate. Indeed, in its construction, many of the factors which tend to shorten the life of a house built along traditional lines, have been eliminated.

"OLD"—but NEWS

While the application of plywood to large scale residential construction is a comparatively recent development of the building trades, plywood, itself, is not new. The rapidity of its acceptance in the field of low-cost housing doubtless is due to the fact that it so completely fills a long-felt need.

Plywood is figuratively as "old as the hills", and dates back several thousand years. But not until chemists and engineers went to work on it and applied modern laboratory knowledge and technique to its fabrication did it assume those properties of uniformity, durability and low-cost which now make it entirely suitable for general use. Once its nature is understood, the desirability of using plywood for frame construction can not be questioned.

Plywood is lumber whose natural defects have been eliminated. Lumber is exceedingly strong along the grain but subject to weakness and faults across the grain. By cutting lumber into thin sheets and binding these sheets together with the grain of each at right angles to that of the adjacent sheets, the long fibre reinforces the wood across its weaker dimension and produces a panel which is substantially as strong in one direction as the other.

Actual engineering tests prove that this "engineered" lumber is the strongest material, pound for pound, to be found in the world. By varying the types of adhesive used between the veneers, plywood is made to meet the wide variations in humidity encountered in different climates and under different applications. "USP" plywood panels are normally fabricated to stand up satisfactorily within the humidity range of normal interiors. "USP" WELDBORD, both Blue Label and DeLuxe, are bonded with resin in hot-plate presses to make them extraordinarily water-resistant. "USP" WELDWOOD, on the other hand, is hot-pressed with phenolic resin and is completely WATERPROOF.

Both WELDBORD *and* WELDWOOD *are guaranteed by United States Plywood Corporation for the life of the building in which they are installed.*

COUNT THE PIECES

The simplest explanation of the remarkable economies affected by plywood construction, probably can be found in considering the fact that it takes far fewer pieces to make a plywood house. The standard plywood panel for residential construction is 4′ x 8′—that is, 32 sq. ft. Standard lumber is available in greater length but in maximum practical widths of not more than 8″. Thus it takes between 300 and 400 pieces of lumber for sheathing and sub-flooring a small house whereas fewer than 70 plywood panels are required for the same job. Fewer pieces mean less cutting, less nailing (see page 22), quicker erection and simpler yet more sturdy construction.

Further substantial savings in material are accomplished by designing with the "plywood module" in mind (see page 6). That is, plans are laid out in units of 4′ x 4′ or 4′ x 8′. By this simple device, all cutting of sheathing, siding, underflooring and wall-paneling is eliminated (except for openings) and waste of material is reduced practically to nothing. Consider this economy against the standard waste allowance of 33⅓% on sheathing and subflooring!

PLAN AHEAD

Wherever plywood enters into the building picture, it spells economy and structural superiority. The practical

builder will grasp every opportunity to avail himself of these qualities as they mean more business and more profit for him. Full advantage of plywood's superior qualities cannot, however, be taken unless the plywood house is viewed as a unit and all the necessary preliminary steps given due consideration. This does not mean that money cannot be saved by using plywood for siding *or* for sheathing *or* under-flooring *or* any other one element of building construction. But if the *most* is to be made out of plywood, proper consideration must be given to it in *every* step in planning and building.

Plan your steps to make the most of your opportunity. Study the "Sequence of Operation Schedule", on page 16. Here are the progressive steps whereby speed can be made without sacrificing any element whatsoever of stability or beauty.

A WOOD for EVERY WANT

In considering plywood, it is well to bear in mind the two great divisions of this industry:

No. 1—Fir Plywood
No. 2—Hardwood Plywood

The production of Fir plywood is limited to a group of mills in the Pacific Northwest in close proximity to the virgin forests of Douglas Fir with which this region abounds.

Douglas Fir is one of the strongest and most serviceable woods known to the lumbering industry. The trees grow to great heights and are devoid of branches for a great part of their height. From the finest of these trees come the old growth, yellow peeler logs which alone are used in the fabrication of "USP" Douglas Fir plywood. These logs—some of them 7′ and 8′ in diameter—are cut to lengths and mounted on lathes which, on being rotated against sturdy knives, are literally unwound into sheets of veneers quite similar to the unwinding of a roll of wrapping paper. One such log may yield a mile of veneer ⅛″ thick. After clipping and careful drying, these veneers are assembled and glued together under pressure, trimmed and sanded to yield the high quality low-priced plywood panels, available in a large variety of sizes and thicknesses and suitable for almost limitless applications in frame construction and cabinet-making. (See page 39 for the schedule of sizes.)

HARDWOOD PLYWOOD has a range as wide as the woods of the world's forests. Some 250 of these woods can be supplied in the American market, ranging in color from the palest corn-gold of Prima Vera and DeOro to the deep rose color of Indian Rosewood and the extremely dark brown of Macassar Ebony. Between these extremes come many of the beautiful popular woods such as Walnut, Oak and Mahogany, Knotty Western Cedar, Bayott and Duali, Knotty Pine, Birch and Maple. Hardwoods are sometimes unwound from the logs much as Fir veneers are produced but the finer qualities are produced by slicing the veneers from the logs. By varying the angle at which slices are made, a wide variation in figure is obtained. Selected log sections such as crotches and burls yield the exquisite feather and oyster figures which are found in the finest furniture and in some unusual paneled installations. Arranging these veneers into matching patterns to create artistic and charming effects calls for the skill of a master craftsman. Owing to the rarity of these woods and the labor involved in fabricating them into plywood, the "economy" residential market has, until recently, been unable to avail itself of the charm inherent in these fine woods.

CONCENTRATED PRODUCTION LOWERS PRICES

But, by concentrating production in one of its mills, "USP" has produced DeLuxe WELDBORD in Walnut, Oak and Mahogany at a price well within the reach of every prospective home-owner.

DeLuxe WELDBORD is particularly attractive, not only for its beauty, strength and economy of installation, but for its adaptability to the requirements of practically every home of moderate price. Stocks are carried in all "USP" warehouses in both natural and pre-finished panels. There is an extra charge for the pre-finished panels but where finishing is a problem, factory pre-finishing actually presents an additional economy.

★

USP
WELDBORD
Blue Label
for
UTILITY
DeLuxe
for
STYLE

Priced to meet the requirements of low-cost Housing

Conform with F.H.A. standards for interior paneling

Guaranteed for the life of the building in which they are installed

★

Of course, the outstanding achievement in hardwood plywood production is Blue Label WELDBORD. This panel has some native decorative value but it is essentially a utility product. Only Blue Label WELDBORD can effect the economies previously described for Dri-Wall construction, as this panel, in addition to its normal strength as plywood, has a smooth even face without grain or tendency to check which makes it suitable for the direct application of wallpaper or the finest paint or enamel finishes. Its decorative properties consist in the presence in many panels of dark mineral streaks which, under bright finish, i.e., clear wax or varnish, give a charming appearance to the home.

Highly characteristic rooms, particularly libraries, dens or recreation rooms, can also be developed economically in Knotty Western Cedar. This wood has a much warmer tone than Knotty White Pine and can be finished in its native color by the simple application of filler and successive coats of wax. (See page 37 for finishes.)

The finest Idaho Knotty White Pine logs are used in the production of Knotty White Pine panels. Early American interiors installed with these panels have a soft delightful decorative effect and, as panels cannot split nor knots fall out, results are permanent.

Bayott and Duali are fine imported hardwoods. Both carry a delicate rosy tint against an exceedingly light-brown background. Bayott carries a stripe figure and Duali a broad sweeping grain figure characteristic of rotary-cut panels.

DeOro is the lowest priced figured, light-colored (blonde) wood on the American market. The wood is exceptionally close grained and takes a wonderful finish.

SERVICE FOR ARCHITECTS AND BUILDERS

The United States Plywood Corporation produces its own Fir panels at its mill at Seattle, Washington. These panels are rated the finest produced in the United States and are exported to all quarters of the globe. Although "USP" Fir panels sell at identically the same price as all other Fir panels, there is a plus-value of quality in "USP" Fir of which the Fir user can take advantage. Lumber dealers throughout the United States stock "USP" panels or can obtain them from anyone of the "USP" warehouses which dot the country from coast to coast. The services of the Engineering Division of the United States Plywood Corporation are always available for consultation on any problems involving the application of plywood.

U. S. Plywood technical staff includes three engineers, two chemists, two plywood technicians, an architect and a consulting architect. Whenever, in the development of a project, unusual or intricate problems involving the use of plywood are encountered, the services of any or all of this group are available for consultation without charge. As these men represent a group of qualified experts in a highly specialized field, users of plywood are urged to avail themselves of their advice and suggestions.

"USP" plywood has been used in many of the great low-cost housing projects of the last five years as well as in a number of the country's finest plywood installations. Notable among the low-cost projects are those of the American Houses, Inc., the County Homes development, Fulton Park, White Plains, N. Y. sponsored by David Swope and the Gilbert & Varker project at Steelton, Pa. Among the notable fine architectural installations are the Mellon Institute at Pittsburgh, the Waldorf-Astoria Hotel, New York City, the New England Telephone Building at New Haven, Conn., and hundreds of bank and office buildings and hotels throughout the United States.

U. S. Plywood Corporation maintains permanent exhibits of all its products in show rooms at 103 Park Avenue, New York City, and the Merchandise Mart, Chicago. Its mills are located at Seattle, Washington, Algoma and Birchwood, Wisc. and Orangeburg, S. C. A complete list of branch offices and warehouses will be found on the back cover of this booklet.

The plans and exterior views of the houses reproduced on the following pages are presented to demonstrate the versatility of plywood and the possibilities of producing better houses at lower cost than has heretofore been possible. The cost figures will vary somewhat between localities although those cited are based upon actual experience in the eastern states where labor and material costs are well above the average for the United States.

"USP" PLYWOOD

for LOW-COST HOUSING

WELDWOOD (*Waterproof*) PLYWOOD	***for***	**Siding or where extreme conditions of moisture or heat are encountered**
***Blue Label* WELDBORD . . . .**	***for***	**ceilings and for walls to be stained, painted or papered**
***DeLuxe* WELDBORD . . . . .**	***for***	**fine decorative effects in Oak, Walnut or Mahogany**
DOUGLAS FIR PLYWOOD	***the***	**major all-purpose panel of the building field**

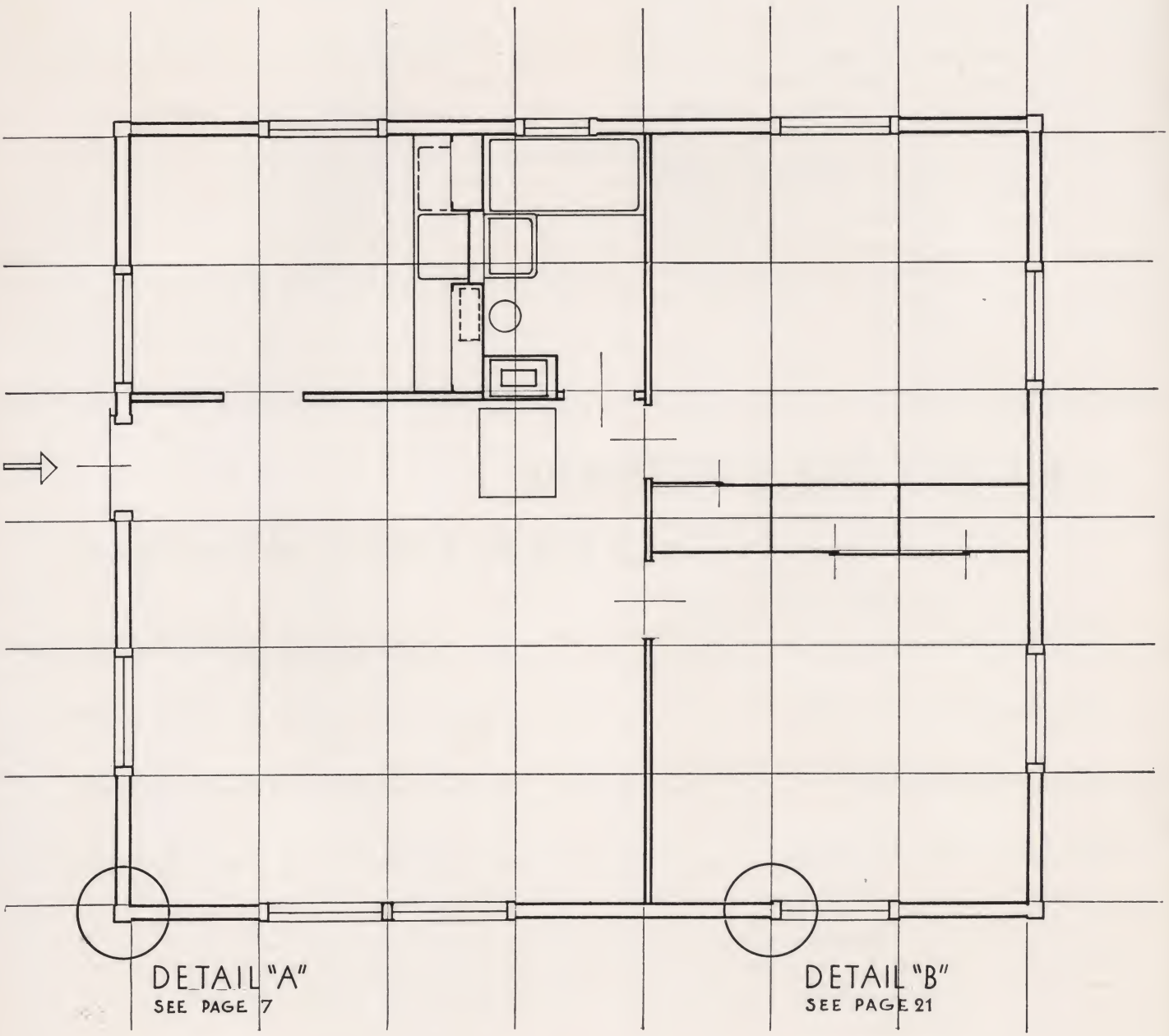
In the application of these four plywood products lies the solution to the problem of economical residential construction—the all-plywood house goes up more speedily, stands the years better, requires less maintenance and costs less.

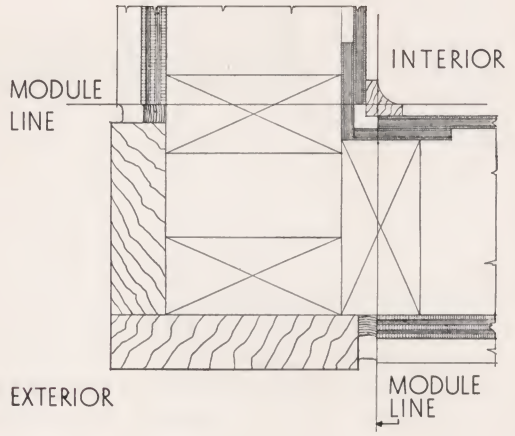
Modular Planning

Modular planning represents the first economy step in the use of plywood for frame construction. It eliminates a great deal of the material waste encountered in standard construction and reduces the amount of labor involved in cutting and fitting. A 4′ module was selected for this demonstration because most construction materials in plan elements can be made to fit this module. The few elements which do not fit, i.e., bath tubs, closets, etc., can be so planned that they will not conflict with the modular system. Framing lumber is sold in multiples of 2′. There is a definite tendency toward standardization in the size of doors, windows, stairs, mill work, etc. WELDWOOD (exterior plywood), WELDBORD (interior paneling), Plyscord (sheathing) and other plywood items are available in 4′x 8′ sheets.

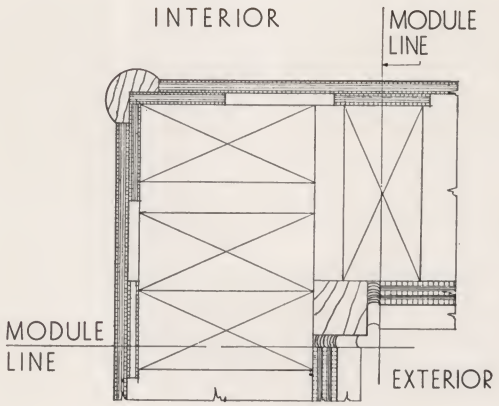
The adoption of the 4′ module does not mean that all houses will look alike. The unit is small enough to give unlimited latitude to design. It resolves itself into the simple proposition of laying out a room 12′ wide instead of 12′-6″ or 20′-0″ long instead of 20′-3″—a simple adjustment in plan which assures economies and in no way mars the general effect which the architect or designer may desire. The marked economy in this procedure is obvious when consideration is given to the accepted estimates for which such authorities as the Federal Housing Administration are responsible:—"20% waste in framing lumber" and "33⅓% waste in sheathing and sub-flooring".

This plan demonstrates a proven method for retaining flexibility in room sizes yet sustaining the major factors which enter into economical frame construction.





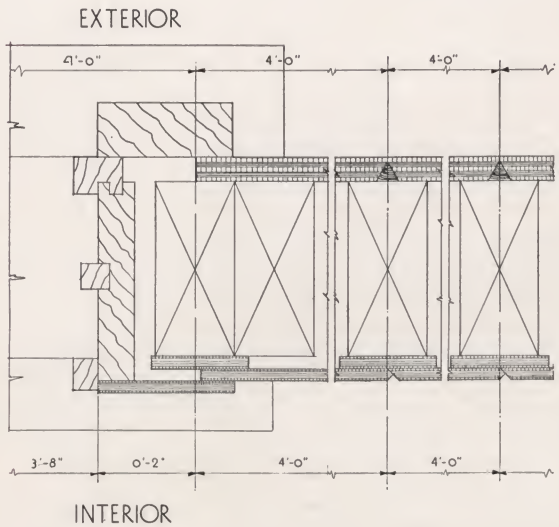
Outside Corner



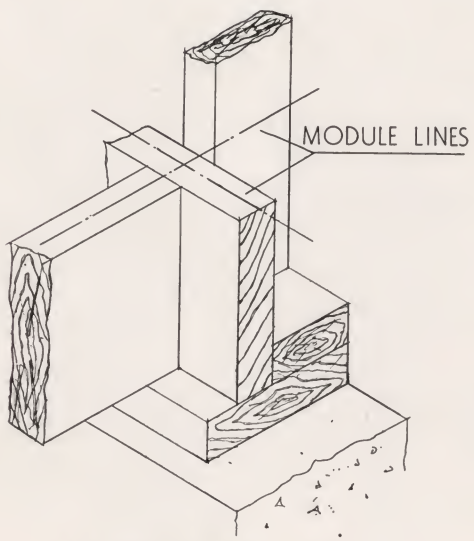
Inside Corner

It should first be noted that the four foot module line begins at the *inside* face of the exterior wall. This is done for the purpose of making it possible to have the floor beams, exterior and interior plywood, plywood sub-flooring and interior wall and ceiling plywood all start from a single point and continue thru the house in multiples of four feet. The special sill detail shown is one way to bring the floor beams, sub-flooring and ceiling plywood into line. The corner details both outside and inside demonstrate a method to bring the exterior and interior plywood into line so that they may be used in four foot units throughout the house. The closets which act as dividing partitions are purposely made non-bearing so that the sizes of rooms retain their flexibility. The window detail shown demonstrates the possibility of utilizing existing stock sizes within the system employed. The interior of the house employs stock panels of plywood for the side walls, eight feet high, within which limitation a variety of effects may be achieved by utilizing the many beautiful woods available in plywood and the variety of methods of joining and trimming illustrated in this book. The roof pitch can be varied according to stock sizes of framing lumber for the rafters and of plywood for the sheathing. See page 16 for sequence of construction.

If full advantage is taken of this method of planning, a saving of twenty to thirty percent in the cost of materials and of a similar amount in labor should result. A tighter, more rigid and better house will be the outcome.



STOCK WINDOW
IN FOUR FOOT MODULE

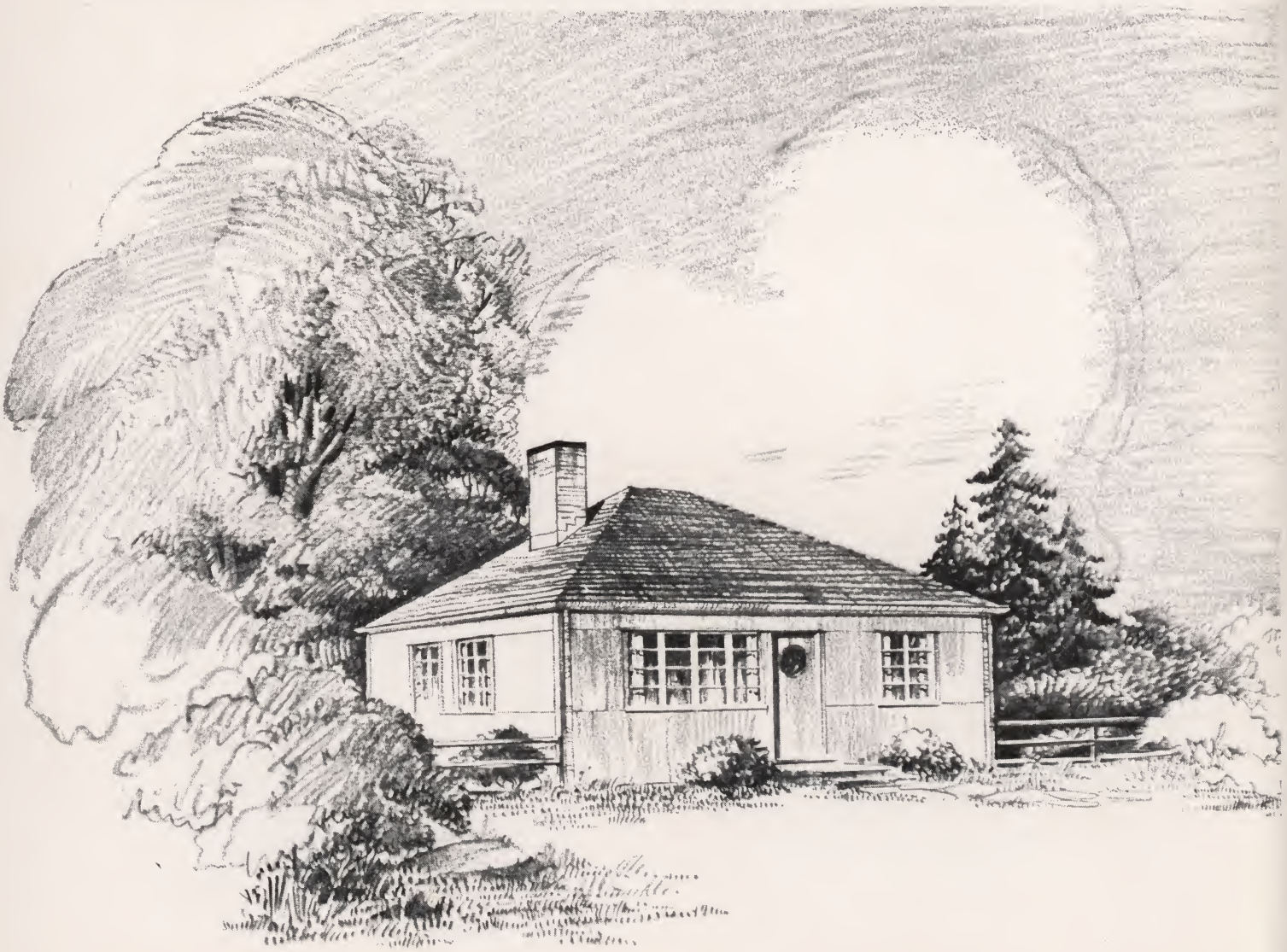


MODULAR SILL

It Costs Only $28.00 Extra to Panel the Walls of This Living Room with Oak, Walnut or Mahogany De Luxe WELDBORD

A $2,000 Residence

This plan of a $2,000 residence was selected after careful study of hundreds of low-cost house plans because it apparently represents the average requirements in that price class. It is neither a miniature mansion nor a cardboard box. It fulfills the functions of a home required by the average American family—a group which is beginning to demand the same household efficiency as it is accustomed to expect from its automobiles. The modular system of planning has been employed throughout.



OUTLINE SPECIFICATION

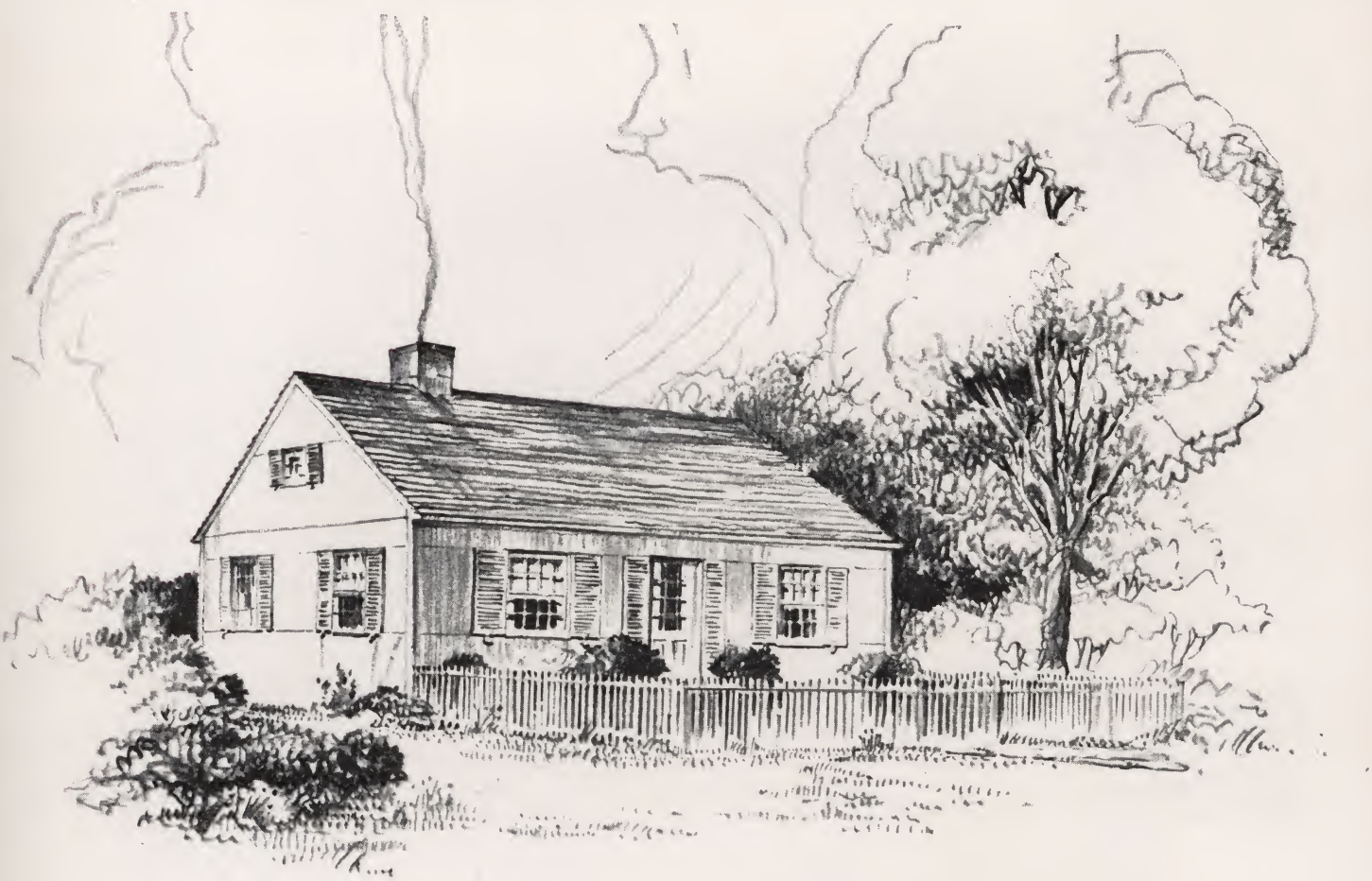
FOUNDATION: Concrete block 8″.

STRUCTURE: No. 1 Common Douglas Fir framing lumber. Sub-floor ½″ Plyscord sheathing. Roof-sheathing, 5/16″ Plyscord. Exterior siding, ½″ WELDWOOD 5-ply waterproof plywood. Roofing, Asphalt strip shingles. Insulation, 1″ over ceilings.

Interior—¼″ Blue Label WELDBORD. Doors, Flush-type Unilite. Floors, Oak or edge-grain Pine. Kitchen and bathroom, linoleum over ¼″ plywood. Cabinets, built-in of cupboard-door stock.

PLUMBING AND HEATING: Due to the efficient layout of the plumbing and heating installation, a good job with standard grade fixtures is possible within the budget. Bath, recessed type; Toilet, washdown type; Lavatory, wall-hanging; Kitchen-sink, flat rim with linoleum

(Continued on the next page)



counter top. Note the space saved by recessing the toilet into the bathroom partition. Heater type is dependent upon the kind of fuel most economical in the locality. It should be a convector type with a plenum chamber above and short ducts to the bedrooms. The expense of erecting a masonry chimney may be avoided by the use of a transite flue starting at the top of the smoke pipe.

FINISH: The exterior to be painted. Interior ceilings painted. Interior walls natural or stained wood with varnished or waxed finish.

HARDWARE: Bore-in type locks for all doors will save labor time.

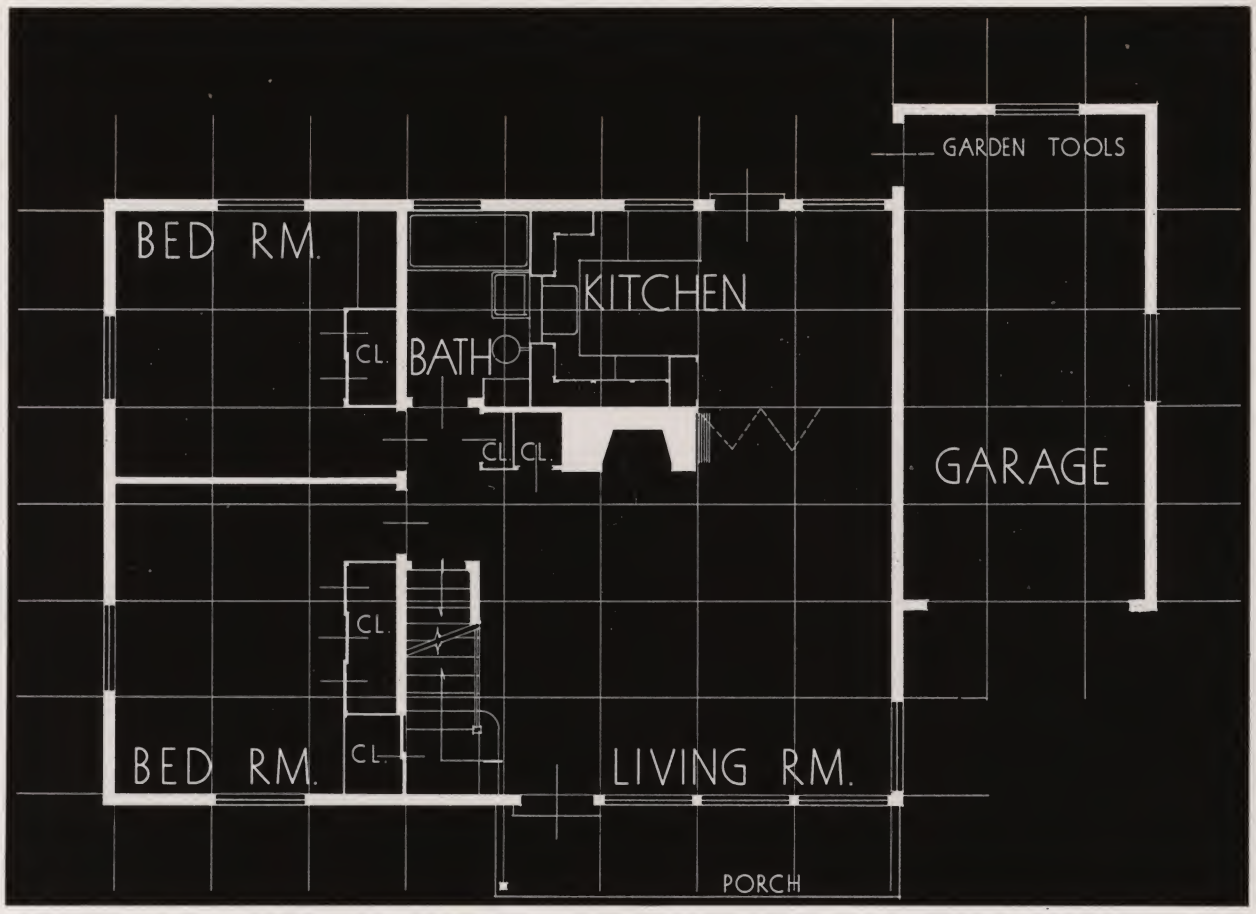
ELECTRICAL: Standard BX cable except where knob and tube type is required.

BUDGET OF COST

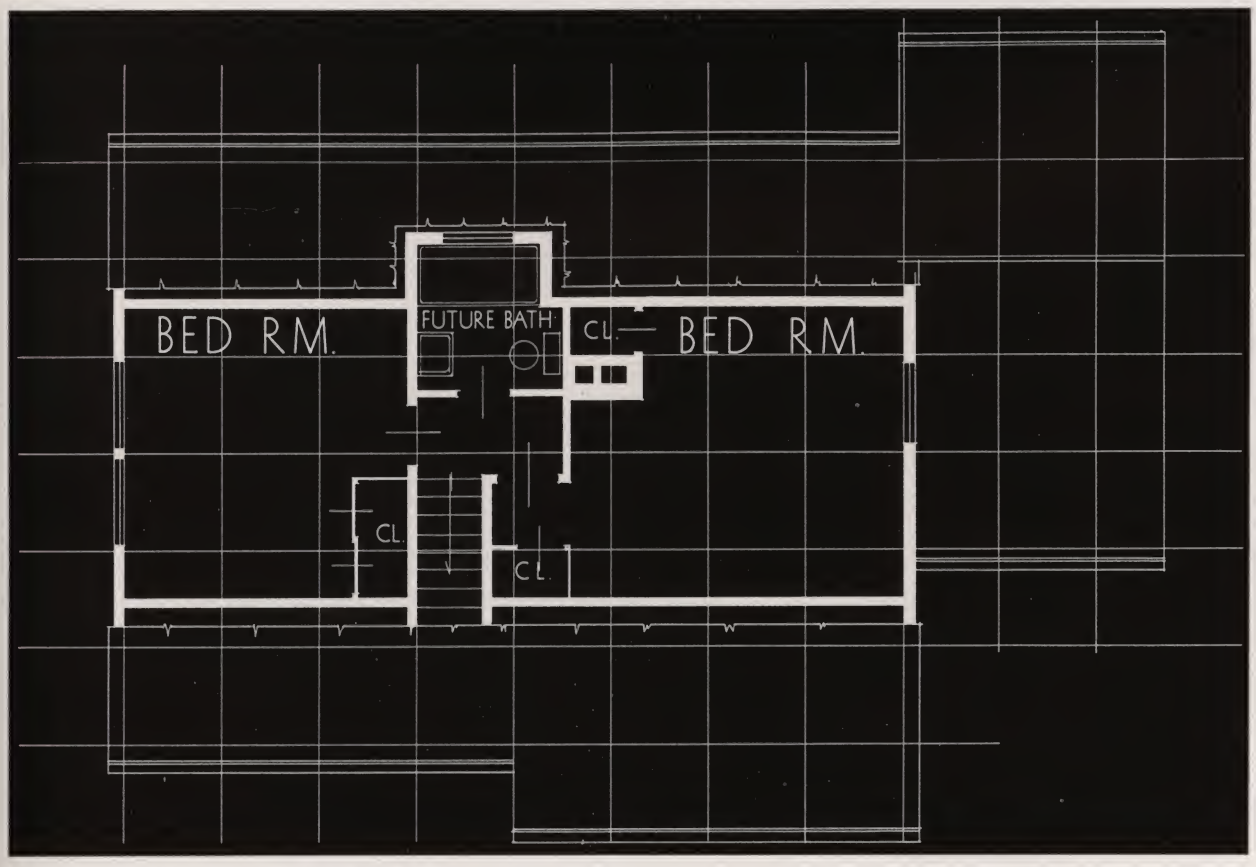
$2,000 Residence

Excavating and Masonry	$140.00
Lumber	300.00
Plywood	350.00
Millwork	150.00
Sewer	40.00
Plumbing and Heating	400.00
Electrical	50.00
Insulation	40.00
Labor	350.00
Hardware	40.00
Painting	140.00
	$2,000.00

A $3,500 Residence



FIRST FLOOR PLAN



SECOND FLOOR PLAN

Oak, Walnut or Mahogany De Luxe WELDBORD *Panels for This Living Room Add Less Than $26.50 to the Cost of This Home.*

Renderings on pages 12 *and* 13

A $3,500 Residence

This house has been planned for the average growing family. Heater and storage space are provided for in the partial basement. Room for expansion is provided for in the second floor future bath. The two bedrooms on the second floor may be included in the original budget as may also the garage. The room sizes and appointments rarely if ever found in a house of this price are only made possible thru the use of the cost saving features of an all-plywood house. The great majority of Americans can afford and will buy this type of house as fast as they are offered. According to U. S. Department of Commerce figures, we could build for many years in this price class without saturating the market. Both exterior and interior may be varied to a greater extent in this house than in the lower priced one.

OUTLINE SPECIFICATION

FOUNDATION: Poured concrete or concrete block. Chimney brick.

STRUCTURE: No. 1 Common Douglas Fir framing lumber. Sub-floors, ½″ Plyscord sheathing; Roof sheathing, 5/16″ Plyscord sheathing; Exterior siding, ½″ WELDWOOD waterproof plywood; Roofing, asphalt strip shingles; Insulation, 2″ over second floor ceiling and under rafters. Interior, ¼″ Blue Label WELDBORD. DeLuxe WELDBORD may be used in the living room and owner's bedroom (Walnut, Oak or Mahogany). Doors, Flush type Unilite. Floors, Oak or edge-grain Pine; Linoleum in kitchen and bathrooms over ¼″ plywood; Cabinets, built-in.

PLUMBING AND HEATING: Concentration of all plumbing lines make it possible to do a quality job within the budget of cost. The rough plumbing for the second floor bathroom is installed when the house is built and the fixtures are added later. The fixtures are similar to those in the $2,000 residence. The heating system may be steam, hot water or humidified hot air as desired.

FINISH: The exterior to be painted. Interior ceilings painted. Interior walls may be natural, stained or painted wood. The natural or stained wood finishes may be varnished or waxed. Walls may also be papered.

HARDWARE: Bore-in type locks for all doors will save labor, time and harmonize with the flush doors.

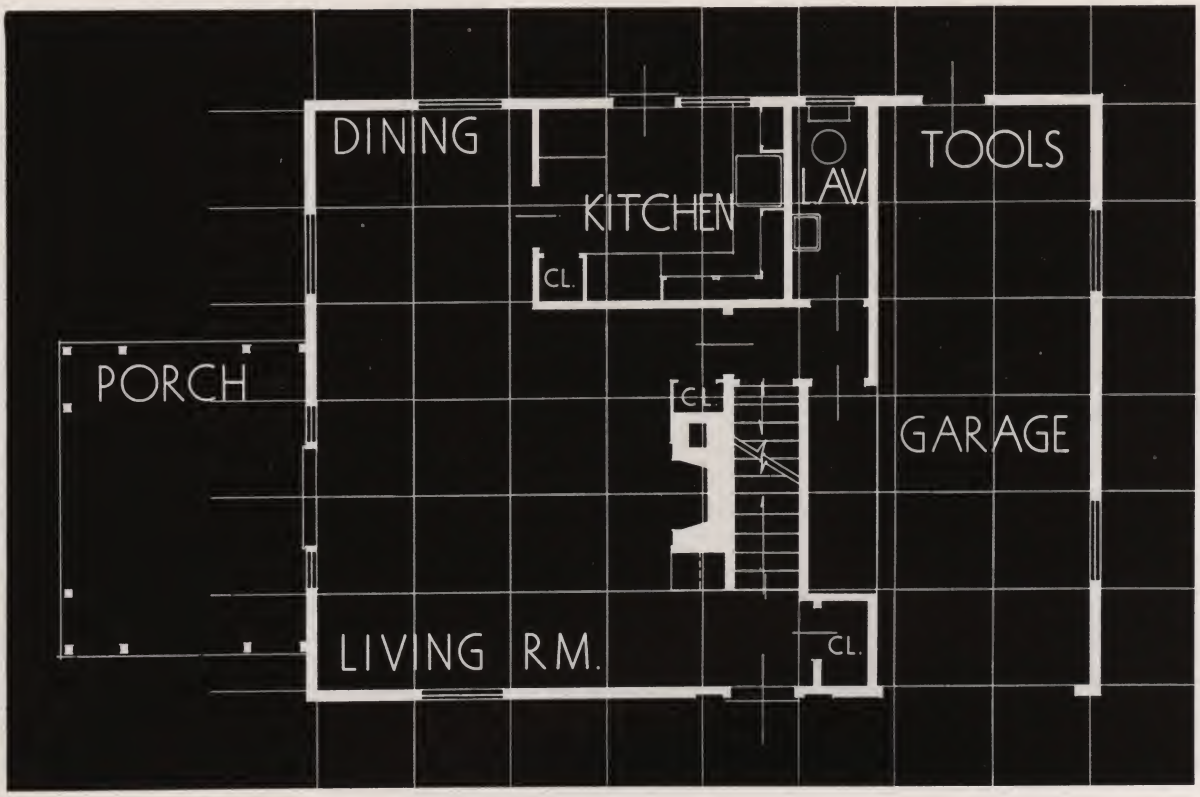
ELECTRICAL: Standard BX cable except where knob and tube is required.

BUDGET OF COST

$3,500 Residence

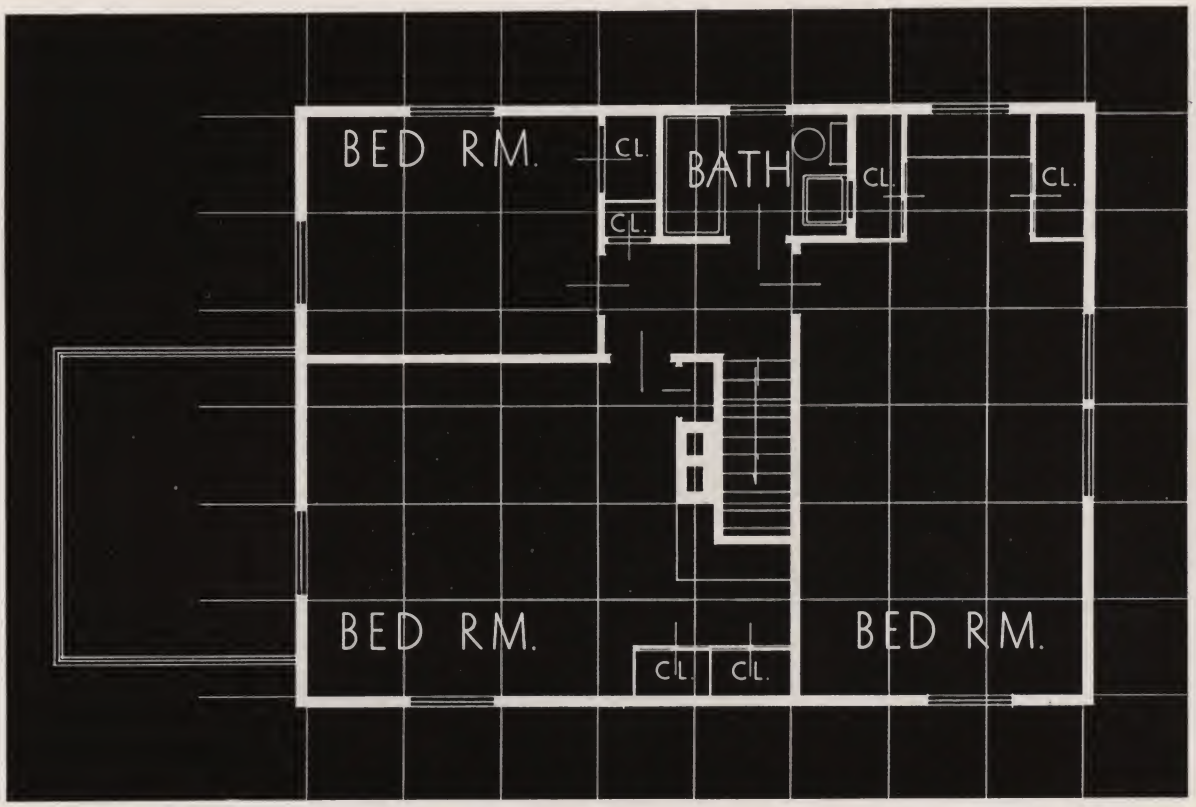
Excavating and Masonry	$325.00
Lumber	400.00
Plywood	650.00
Millwork	200.00
Sewer	60.00
Plumbing and Heating	750.00
Electrical	80.00
Insulation	50.00
Labor	600.00
Hardware	60.00
Painting	325.00
	$3,500.00

A $5,000 Residence . . .



FIRST FLOOR PLAN

De Luxe WELDBORD *Panels in Oak, Walnut or Mahogany for this Living Room and Dinette will Add Less than $42.50 to the Cost of this House*



SECOND FLOOR PLAN

A $5,000 Residence (continued)

This compact house will fit on an ordinary size lot and yet provide for a spacious kind of living otherwise unobtainable within the budgeted price. No house is too expensive to benefit from the labor saving and waste-eliminating features of efficient planning with plywood. Both the exterior and interior may be varied to suit individual preferences.

The owner's room is provided with a dressing alcove and ample closet space. The first floor lavatory is convenient for inside use as well as to those on the way in from gardening or puttering with the family car. The space provided for gardening tools is especially convenient. A full basement is provided.

OUTLINE SPECIFICATION

FOUNDATION: Poured concrete or concrete block. Chimney brick.

STRUCTURE: No. 1 Common Douglas Fir framing lumber. Sub-floors, ½" Plyscord sheathing. Roof sheathing, 5/16" Plyscord sheathing; Exterior siding, ½" WELDWOOD waterproof plywood; Roofing, Asphalt strip shingles, slate or wood shingles; Insulation over second floor ceiling, 4"; Interior, ¼" Blue Label WELDBORD for ceilings and walls, to be papered or painted. DeLuxe WELDBORD (Oak, Mahogany or Walnut) where walls are to be left natural color; Doors, Flush type Unilite. Floors, Oak, edge grain Pine or Maple, Linoleum in kitchen and baths, cement in garage. Cabinets, built-in.

PLUMBING AND HEATING: The economical plumbing and heating layout should permit a better type of job and fixtures than would otherwise be possible within the budget. Any type of automatic heating system may be utilized.

FINISH: The exterior walls to be painted. Interior ceilings to be painted. Interior walls may be natural, stained or painted wood or papered. The natural or stained woods should be varnished and waxed.

HARDWARE: Any type hardware may be employed but the bore-in type lock saves labor, time and harmonizes with the flush type doors.

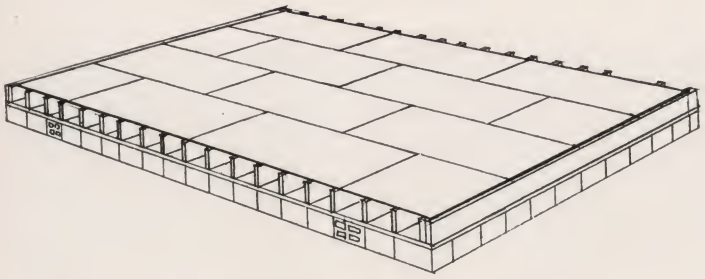
ELECTRICAL: Standard BX cable except where knob and tube is required by law.

BUDGET OF COST

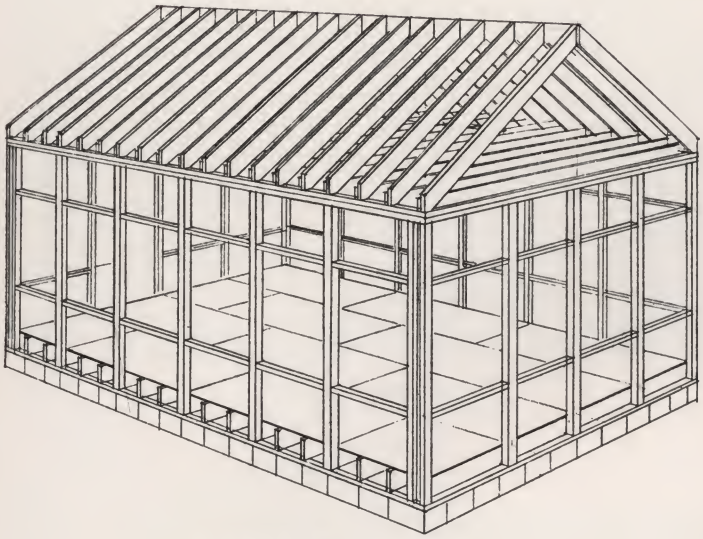
$5,000 Residence

Excavating and Masonry	$575.00
Lumber	475.00
Plywood	850.00
Millwork	275.00
Sewer	80.00
Plumbing and Heating	1,150.00
Electrical	110.00
Insulation	60.00
Labor	850.00
Hardware	100.00
Painting	475.00
	$5,000.00

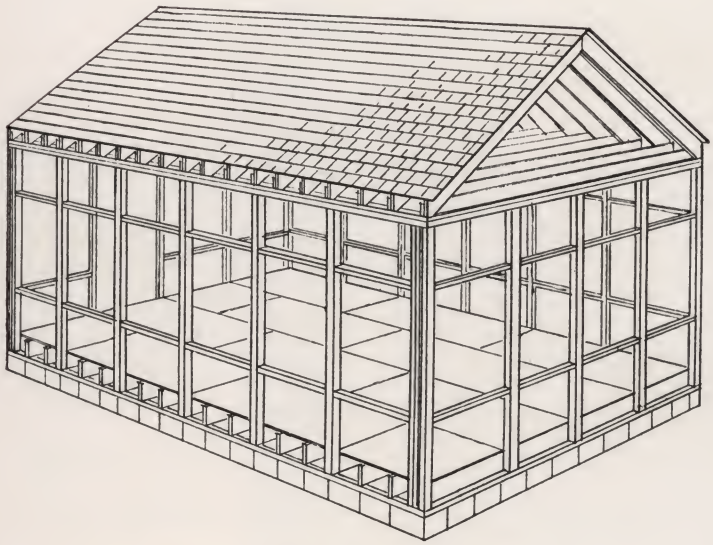
Sequence of Dri-Wall Construction



STAGE 1 — *Under-flooring in place*



STAGE 2—*Framing Set up*



STAGE 3 — *Roofing Sheathing applied*

The old system of construction whereby thousands of gallons of water were put into a house during plastering operations with long, useless waits for the drying of successive coats was wasteful, inefficient and uncertain.* When erecting a dry wall house with plywood, those time-worn customs that have handicapped the builder since the introduction of plaster may be discarded. A new sequence of construction which takes full advantage of the superiority of dry building may now be utilized. A typical construction is outlined below. It will vary, to a certain extent, according to the plan and size of each house but the basic method can be applied to all houses. It will produce a better, more economical and faster built house.

To produce the best results, plywood should be used from the foundation to the finish. A poured concrete foundation may be economically secured by using the large labor-saving concrete-form panels. After the foundation is poured and the first floor beams are in place, the plywood forms are stripped and used again for the sub-flooring. This method produces a smooth working platform for the assembly and erection of the outside stud walls. The hazard of carpenters walking on open floor beams is eliminated and, at the same time, an inexpensive and excellent sub-floor is produced. *In comparing the cost of plywood with ordinary construction, it is important to figure the cost of the unit in place rather than the bare cost of the materials.* Add one-third to the unit price of ordinary sub-flooring for waste and one-half of that total for labor. Compare that total with the unit price of plywood sub-flooring plus one-eighth for labor. It will be found that in any locality plywood will be less expensive and at the same time, produce a sub-floor which is considerably stronger and more rigid and will prevent open joints in the finish floor.

With the sub-floor acting as an ideal working platform, the side-wall framing may be completely assembled, wall by wall, and then boosted into place, quickly plumbed and braced. The

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* *During the plastering operation in a moderate-sized six room house approximately 1,000 gallons of water are used, all of which must be vaporized before the house is ready for the interior finish.*

Pg. 208, WOOD HANDBOOK, prepared by U. S. FOREST PRODUCTS LABORATORY.

". . . plaster . . . for interior walls has many disadvantages: it is a very wet, messy job and it introduces moisture into the building at just the wrong time; it delays the work because it stops all other work and no wood trim or finish can be put in until the plaster is thoroughly dry."
"HOUSE PLANNING" *Vol.* 11, *Page* 824, ENCYCLOPAEDIA BRITANNICA, *Fourteenth Edition* (1929).

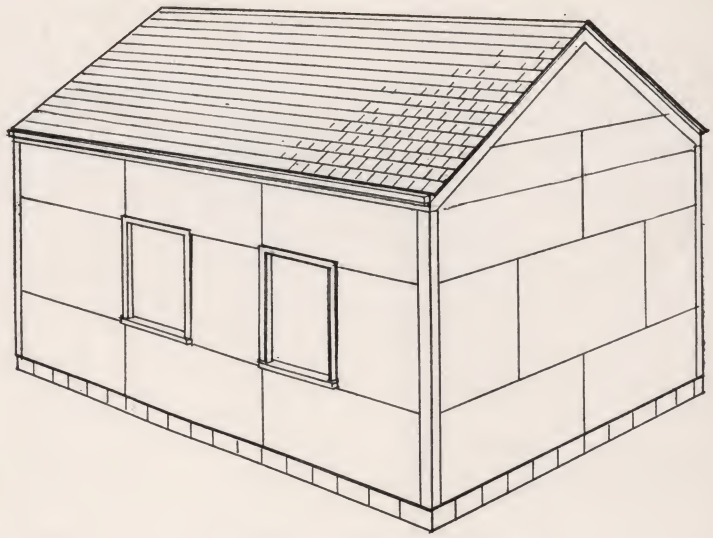
Sequence of Dri-Wall Construction (continued)

same method may be employed in one or two-story houses and in Western or Balloon framing systems. After the studs are in place, it is usually best to place the ceiling beams and spread the plywood (which will be used for the roof sheathing) on them for a working deck to erect the rafters.

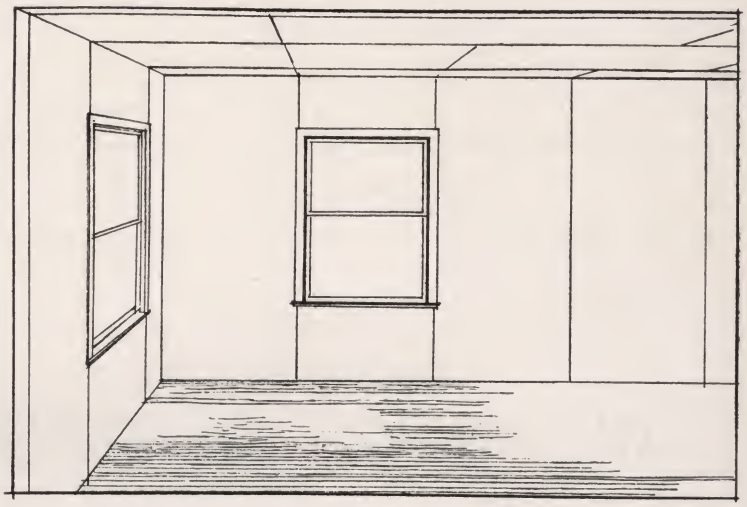
Due to plywood's great bracing strength (six times more rigid than ordinary sheathing) the roof or sidewalls may next be sheathed. Proceeding immediately with the roof will give the builder a weather-tight house sooner and eliminate delays due to weather. However, since plywood sheathing is erected so rapidly, it is merely a matter of individual preference whether to sheath the sidewalls or roof first. One of the most important advantages of using plywood will be gained in either case, i.e. the rapid closing-in of the building which eliminates time lost due to the vagaries of the weather. In addition, the plywood sheathing, applied, will cost one-half as much as ordinary sheathing. If WELDWOOD siding is used without sheathing, it is applied at this time. (See Plywood Wall Sections page 18). After the house is sheathed, the roof may go on and the window frames and sash installed. The house is then completely enclosed in one-half the time ordinarily taken for this part of the job.

The first step in finishing the interior should be the application of the ceiling plywood. The studding of all except bearing partitions is left for later erection. The advantage of this is obvious and cannot be achieved with any other material. The labor time of cutting around a great many corners is eliminated thus cutting the cost of one of the more expensive operations in interior finishing. An important advantage of this method of construction results from the rigidity which the interior finish will lend to the entire structure since it is tied together instead of being broken into room units.

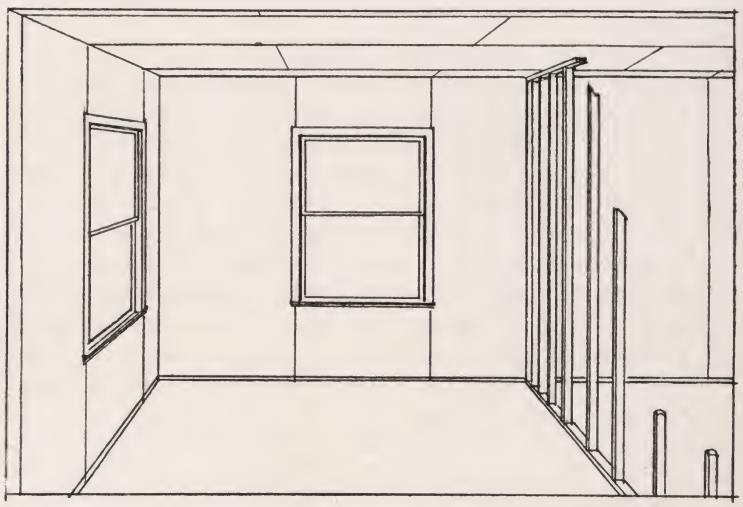
The same sequence should be followed in applying the plywood for the finished interior walls and partitions. First, the inside face of the exterior walls are finished. This makes it possible to run the plywood continuously across the house without breaks, reducing labor time and eliminating waste. It is obvious that following this sequence of construction means a better house at a lower cost. With fewer parts and motions coupled with continuous structural finishes the house of the future develops naturally in line with today's cost requirements.



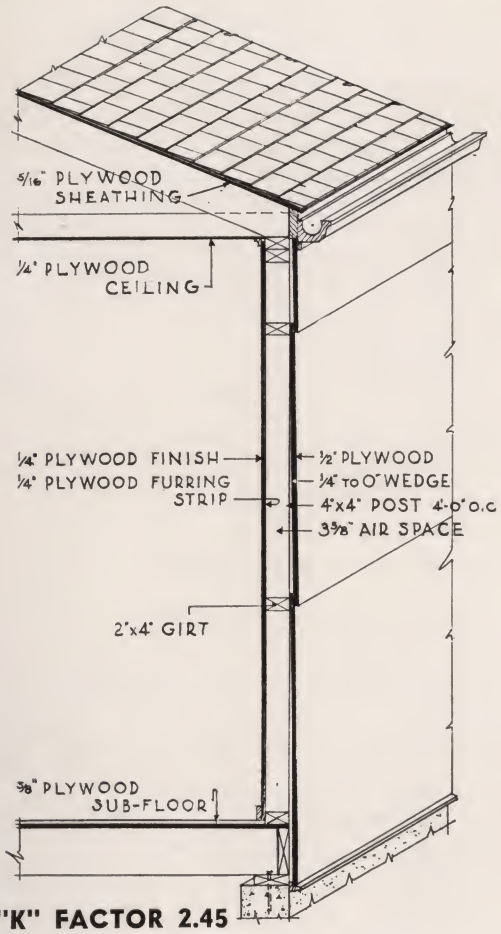
STAGE 4 — *Side Wall Sheathing applied*



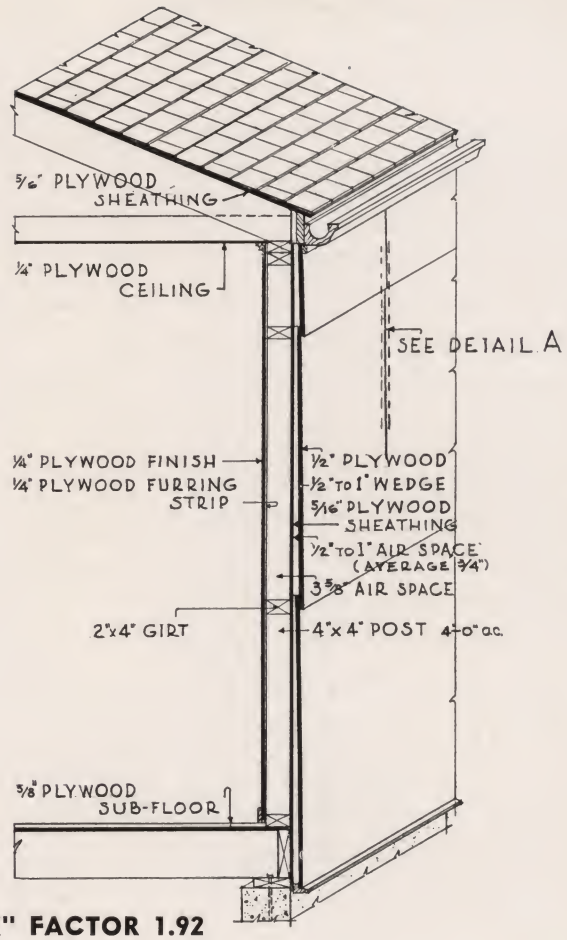
STAGE 5 — *Wall and Ceiling Panels Installed*



STAGE 6 — *Erect Interior Partitions*



"K" FACTOR 2.45



"K" FACTOR 1.92

★

WELDWOOD

in

ALL HARDWOODS

and

DOUGLAS FIR

★

WATERPROOF

★

Conforms with F.H.A. standards for exterior plywood

★

Guaranteed for the life of the building in which it is installed

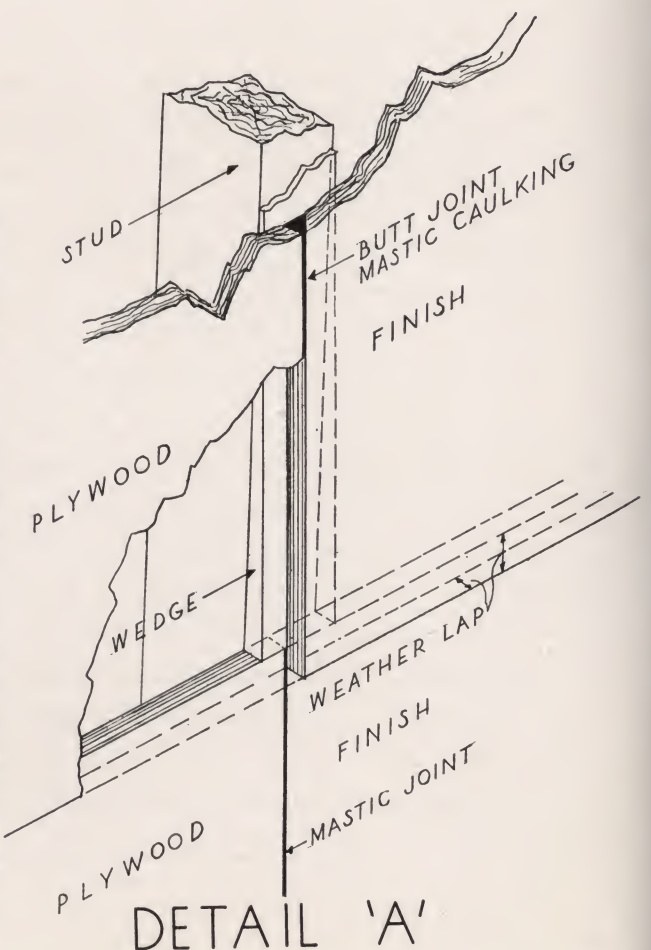
★

WELDWOOD for SIDING

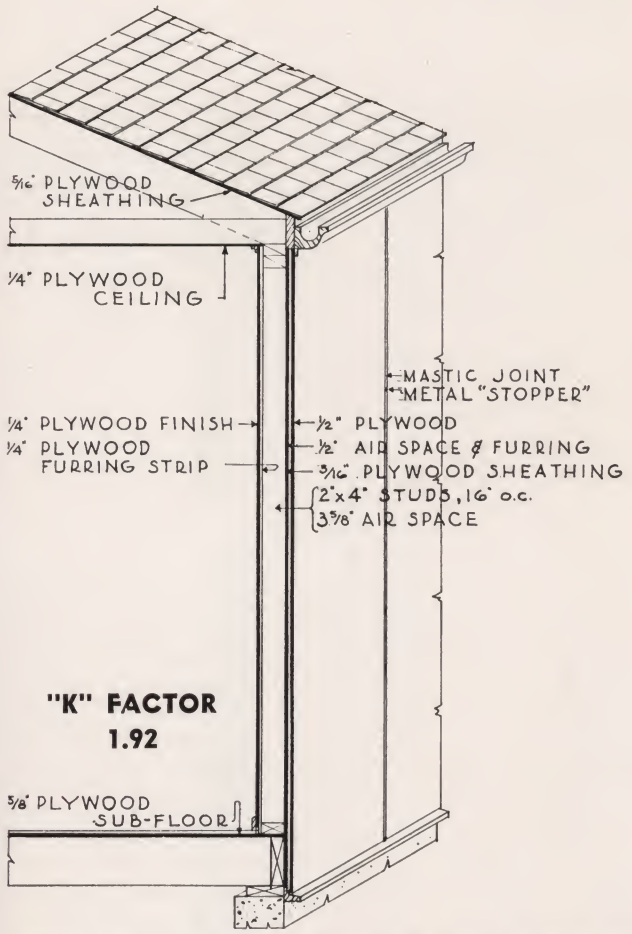
The savings due to the use of WELDWOOD (phenol formaldehyde hot-press resin-bonded plywood) for siding are truly phenomenal. This application of plywood probably represents the greatest *single* economy to be effected in the whole building program. The saving in labor is enormous, the job is sounder and the decorative possibilities of large unbroken exterior surfaces almost limitless.

On page 20 we show various effects to be attained with this material. Other equally striking renderings can be developed by individual designers but the fundamentals remain the same. When WELDWOOD is applied in sheets, there is such a saving in labor that two men can close in a 25′ x 25′ one-story house in three hours, i.e., six man-hours for the job. This is not a theoretical figure but is taken from the cost sheets of a contractor who has done this job repeatedly.

It is always best to build with as few different materials as possible. When a variety of materials are used in one structure, there are as many different risks and reactions as there are materials. Each material has a differing coefficient of strength, reaction to climatic conditions and durability, i.e.; Wood will swell and shrink depending upon the amount of moisture in the atmosphere;—steel will not. Steel will rust;—wood will not. Steel will expand and contract with temperature changes far more than wood; Stone and glass will react differently and plaster will not shrink or go with the frame and therefore, it will crack. All this points to the obvious conclusion that if houses are to be framed with wood, it is best to build as much as possible of the remainder of the house of the same material.



DETAIL 'A'



Plywood is an ideal finish for a wood frame. The superiority of plywood over any other kind of wood enclosures is manifest. With ordinary wood frame construction, the frame itself must be considered the sole source of strength for vertical loads. The only structural function performed by ordinary sheathing or interior finish is to provide a small amount of lateral bracing. The frame must take care of a good percentage of the required bracing strength. Ordinary siding, i.e., clapboards, shingles, etc., practically act only as decorative finishes.

In plywood construction the inside and outside skins of the building may be said to provide muscle as well as decoration. If the outside plywood were only ¼" thick, it would make the house six times as rigid as ordinary sheathing. With the interior plywood ¼" thick and the outside plywood ⅜" or thicker, the result is far stronger and far more rigid than any other method of building with a wood frame. At the same time, the plywood offers a beautiful surface for finish, whereas, with other materials, the decorating problem has only begun after the wall is complete.

Three wall sections are illustrated out of the many plywood possibilities. The first two demonstrate a system of construction which has been utilized on many houses. All have stood the tests of the great outdoors in the laboratory of practical experience. They have been subjected to summer rains and burning sun, to winter freezing and thawing, and some of them went through the New England hurricane of 1938 unaffected.

The exterior plywood in the first two systems illustrated is applied like a mammoth shingle, four feet by eight feet. The ½" WELDWOOD is lapped at the horizontal joint and the vertical joint is caulked. (See exterior joints, page 20)

The third wall section shows a system which produces a simple unbroken wall surface which has been the aim of designers since the ancient Greeks patiently ground their stones to eliminate the appearance of a joint.

INSULATING VALUES

Both types of wall may be constructed with single or double air space. The wall with the single air space will produce an insulating factor ("K" factor .245) which is twice as good as a 12" concrete wall and is better than the ordinary frame wall consisting of sheathing, siding and plaster. This insulating factor is created by the tightness of the air space developed when plywood is used. While the ordinary lath and plaster wall is subject to about 2½ air changes per hour, the semi-sealed plywood wall reduces intra-wall air changes to considerably less than one per hour. The double air space wall which is sheathed compares favorably with an ordinary frame wall which has had four inches of mineral wool installed between the studs ("K" factor .192). This is due largely to the creation of the outer air chamber which, averaging only ¾" in depth, does not support the development of convection air currents and thereby sets up an insulating blanket of static air in the weather side of the wall. The excellent insulating qualities of these walls is achieved without risking the devastating effects which sometimes result from moisture deposited in insulating materials inserted inside the walls. Since there is no known method which will prevent the introduction of moisture to the inside of walls, it seems reasonable to assume that it is far safer to depend upon the dead air spaces which these plywood walls provide than to install a costly material to produce the same effect.

MOISTURE BARRIERS

Condensation inside the wall is greatly reduced by the application of two coats of asphalt paint to the inner face of the interior paneling. U. S. Forest Products Laboratory tests show that a wall so treated has a vapor transmission factor of 0.308 as against the standard wood-lath and plaster wall figure of 7.900, the figure in each case representing the loss in grains of moisture per sq. ft. per hour. A good grade of asphalt-impregnated building paper between interior paneling and studs will yield equally satisfactory results.

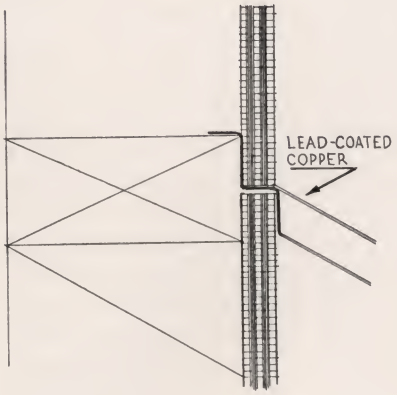
CAULKED BUTT JOINTS

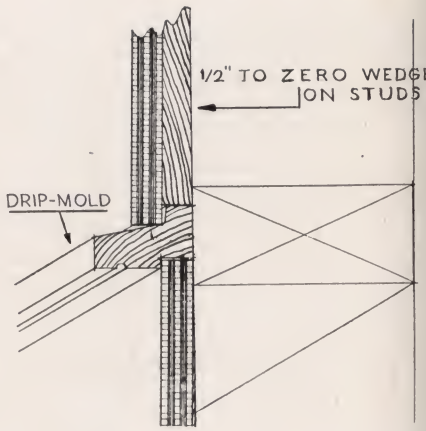
Wherever butt joints in WELDWOOD siding occur between panels in exterior construction, it is advisable to leave a gap of ⅜" between the panels and caulk these with any good exterior caulking compound. U. S. Forest Products Laboratory advises a gap of this size owing to the fact that caulking compound knifed into a smaller gap has an opportunity to dry and harden completely with a consequent tendency to fall out. Where a ⅜" gap is left, oxidization causes a hard shell to form over the face of the compound and act as a seal to keep the balance of the compound permanently alive and active. Some gap must be left between panels because a perfect seal for each panel is not practical and, while the expansion and contraction of WELDWOOD due to moisture and temperature changes is very small, allowance must be made if future trouble on the job is to be avoided.

Note that the double air space wall will accommodate standard mill work.

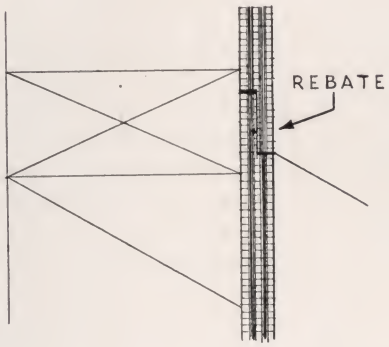
EXTERIOR JOINTS

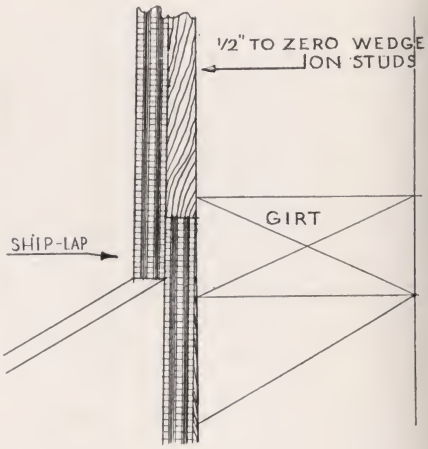
HORIZONTAL



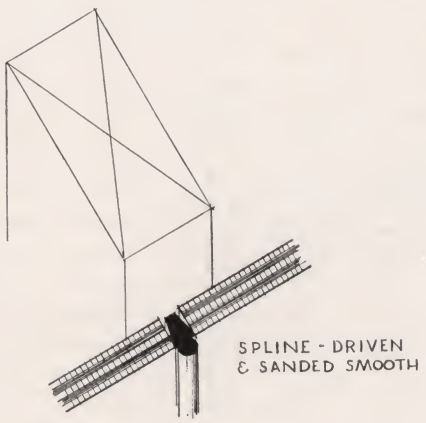


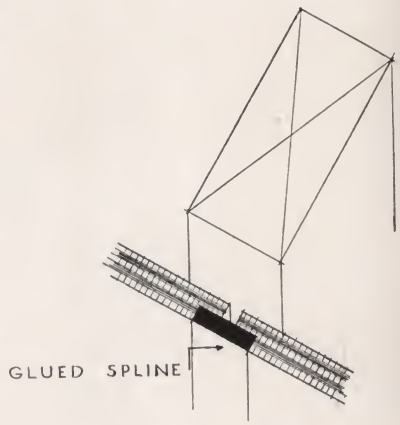
These Illustrations Are Examples of Practical Joints—Architects and Designers Have Broad Latitude in Creating Other Joint Treatments to Meet Varying Architectural Styles and Individual Taste Requirements

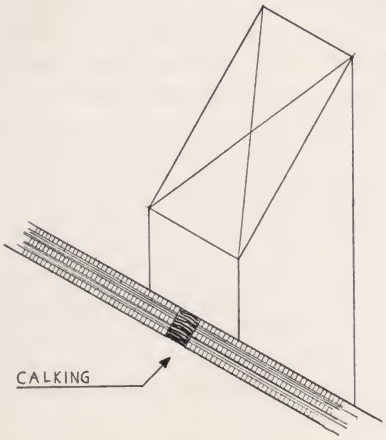


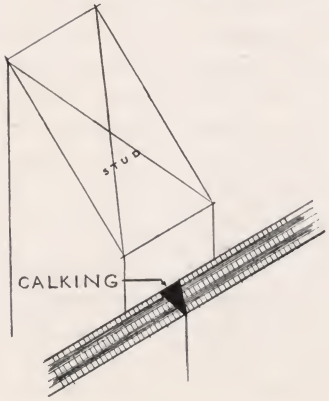


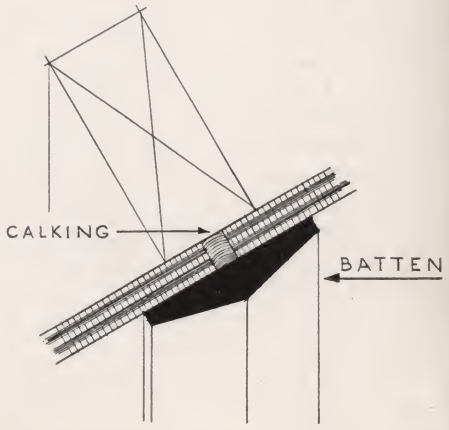
VERTICAL



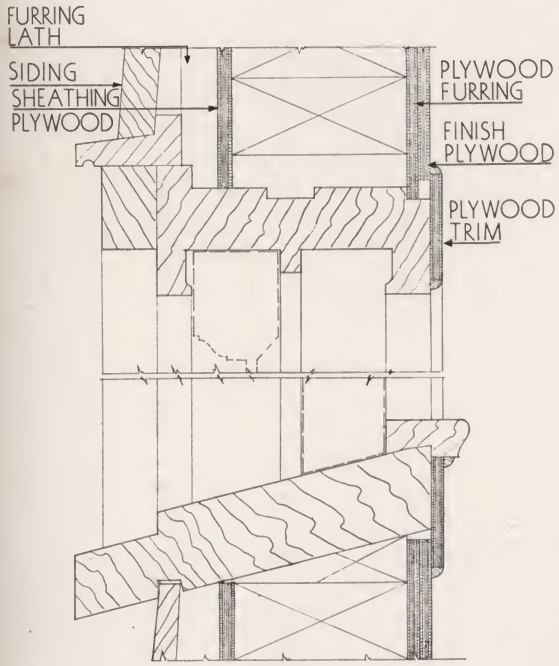




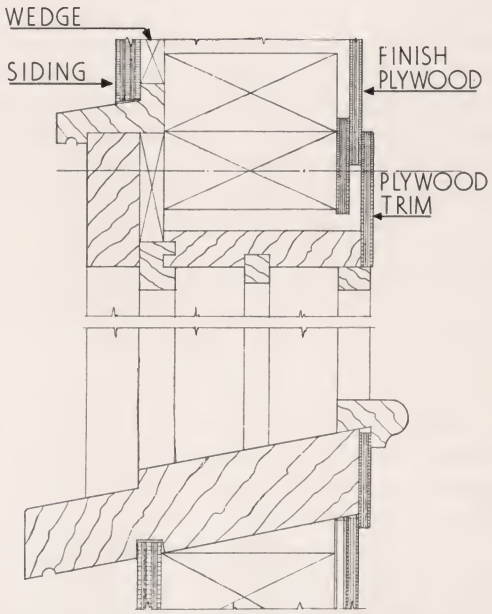




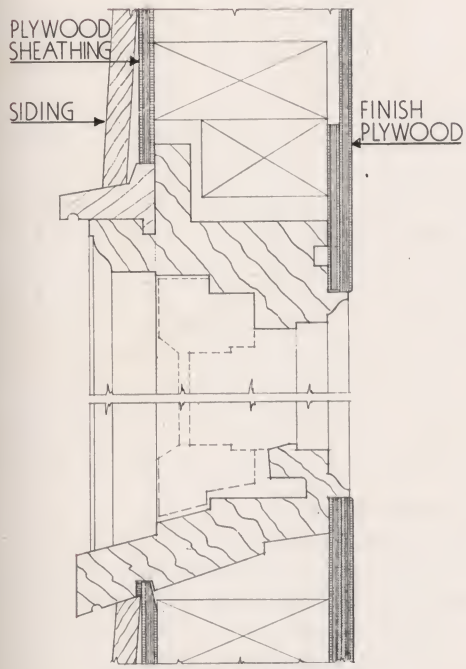
WINDOWS IN PLYWOOD WALLS



STOCK DOUBLE-HUNG



DOUBLE-HUNG RIPPED DOWN

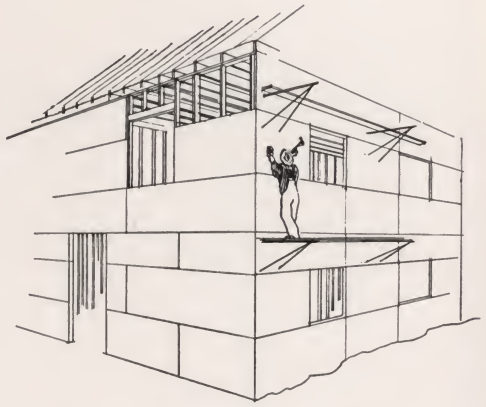


STOCK CASEMENT

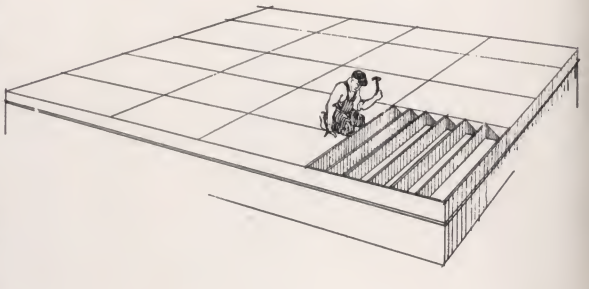
Window manufacturers are at present working on details of window frames and sash which will fit the thinner wall produced by plywood construction. Until these new sections are commonly carried in stock, however, a number of methods for utilizing present sections may be used, a few of which are illustrated. The first double-hung window detail shows a typical stock window frame in a double airspace plywood wall with furring lath applied outside the sheathing and the siding nailed over the furring lath. On the inside, the plywood furring strips are used under the finish plywood (see pp. 28 and 29, Plywood Joints and Trim). The second detail shows a stock double-hung window ripped down to fit a plywood wall with a single airspace when the exterior siding is applied directly to the studs. The detail directly to the left shows a typical casement frame in a plywood wall. The detail shows the frame installed before sheathing. This produces a tight joint around the frame at a point where most installations depend upon building paper to prevent infiltration. If this method is not preferred, the frame may be moved outward 5/16″ and the difference made up by a mold on the inside.

Sheathing and Subflooring

With all the economy so often emphasized in this book, it must always be borne in mind that plywood produces *better* construction. Authority for this statement is the U. S. Forest Products Laboratory at Madison, Wis., whose tests have proven that where plywood is used for sheathing, the wall is seven times stronger and six times more rigid than where ordinary horizontal sheathing is used and twice as strong and 50% more rigid than the wall constructed with let-in braces. Furthermore, walls sheathed with plywood do not have cracks built into the structure. Every joint between panels is on a stud or a girt. That is why the plywood wall is practically wind-proof in itself and why it requires little or no insulation.

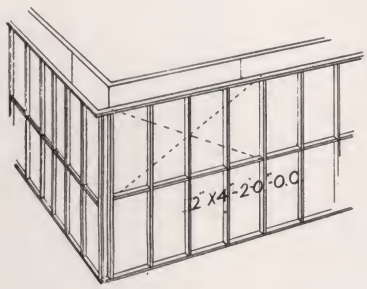


In the use of plywood for roof sheathing, this remarkable material reveals another important factor, i.e., its ability to hold hails. Tests made by Prof. Bror L. Grondal, the leading shingle authority in the United States, have proven that 5/16″ Fir plywood sheathing is practically on a par with 1″ lumber as a nailing base for shingles. His tests show that shingles nailed to 5/16″ sheathing will withstand a pressure ten times greater than that exerted by a sixty mile gale—a pressure that will topple any structure in the world. It should be noted that nail heads will not pull through plywood owing to the rick-rack nature of plywood construction. The same construction accounts for the ability of plywood to resist cracking when nails are driven close to the edge.



GONE—6,000 SWINGS OF THE HAMMER

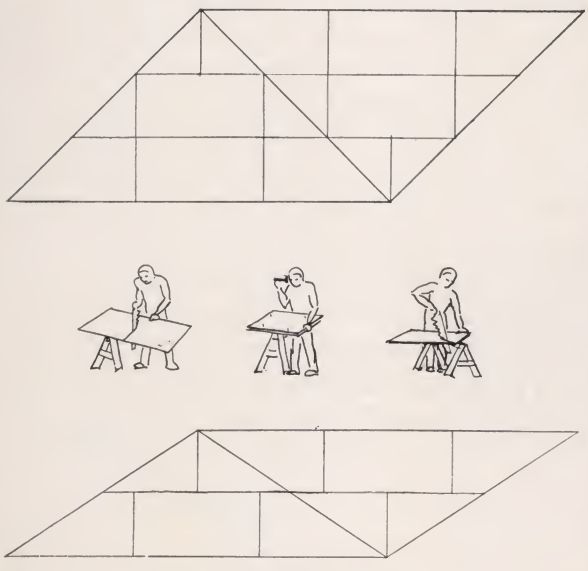
This also explains why fewer nails may be used per unit of plywood area than with lumber. Typical nailing of a plywood panel is 6″ on centers around the edge of each panel and 12″ on centers at intervening studs. Thus 56 nails will hold a 4′ x 8′ panel covering 32 sq. ft. of area. Figure it out for yourself—a saving of fully 50% in the number of nails on a job. In sheathing the ordinary six-room house, this amounts to about 1600 8d. nails weighing 29 pounds—a saving of more than 6,000 hammer blows to drive them home.



Plywood used for under-flooring has the same advantages as far as material saving and economy of labor are concerned but, from the owner's standpoint, has the additional advantage that it insures warmer, creak-proof floors. There are no weak or loose spots to permit slipping or rubbing between members. As a base for linoleum or other resilient floors, plywood does away with crack or joint marks and the wavy appearance which so often follows warping or cupping of under-floors.

The use of Plyform (concrete form Fir) is practically universal on large jobs because project engineers quickly realized the tremendous economies in labor and material which this panel affords. Owing to the fact that no material is wasted when Plyform is used and a great deal of labor saved, it is entirely practical to use poured concrete foundation in cellar walls in even the lowest cost homes. The usual waste allowance on concrete form lumber is one-third of the material. As every square foot of plywood is utilized, this waste is eliminated. Due to the relatively large size of the panels and the elimination of cutting, the labor cost of form construction figures at approximately one-eighth the cost of the plywood.

As all of the material used for forms is re-used for sub-flooring and framing after the concrete has set, the saving in material is really more than 100%. It is, therefore, actually cheaper to start the job with Plyform.

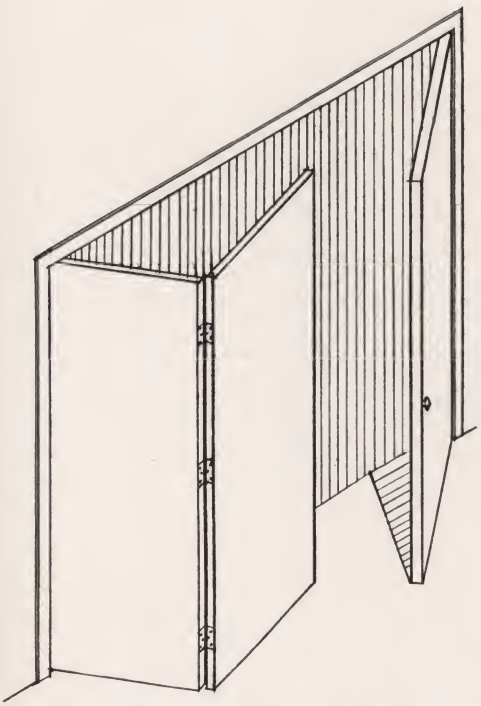


Gable Ends Without Waste

GABLE ENDS WITHOUT WASTE

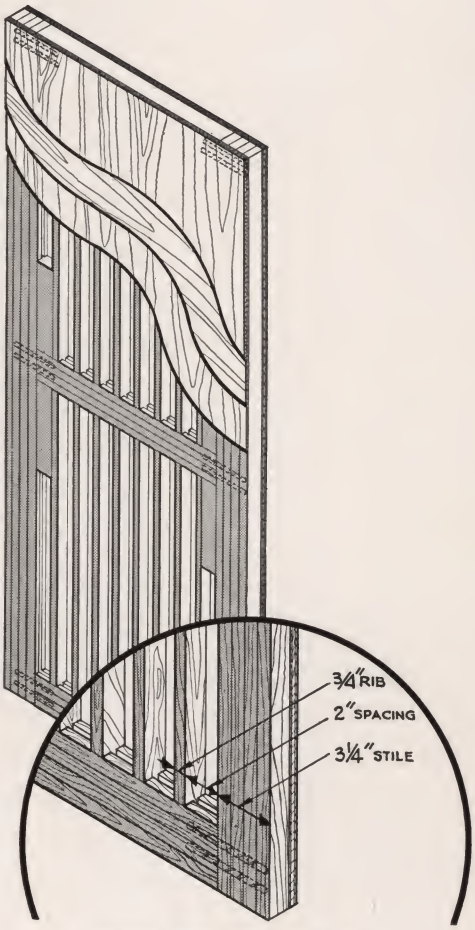
One of the most wasteful operations in the construction of a house is the cutting of gable ends both in sheathing and siding. The diagrams illustrate the cutting of WELDWOOD for gable ends with different roof pitches. It is perfectly obvious from a glance at them that this may be efficiently done with absolutely no waste by means of simple calculations for the roof pitch required. The triangular faces are cut accurately in one operation by sawing the panels in half, nailing together, and cutting as a unit. The flush gable end which so many attempt to achieve by ship-lap boarding or tongue and groove boarding only to find their joints opening in a very short time, may now be done simply by using plywood for the sheathing and the exterior finish.

PLYWOOD FLUSH DOORS



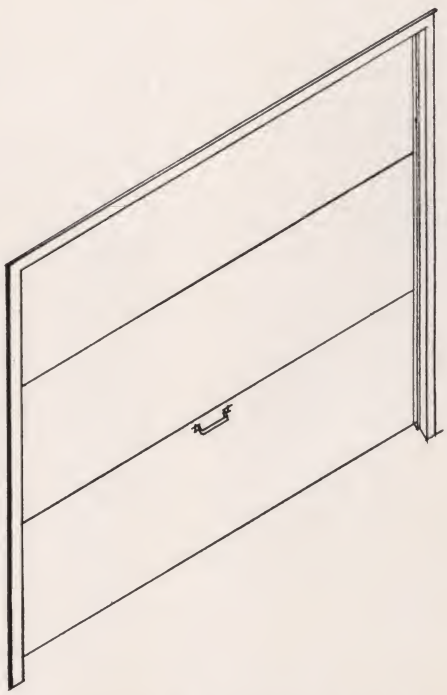
DOUBLE OPENING GARAGE DOOR
Made by Hinging Three Flush Exterior Doors Vertically

The beauty of simple slab doors has until recently been available only in the highest priced types of interiors. The hollow core "Unilite" door illustrated is one which will compliment any interior in which it is installed. The cost is no higher than for other doors of more common types. In remodeling an existing house, it is possible to change the old multi-paneled doors to flush type by gluing plywood to *both* faces as illustrated. Protruding moldings should be planed flush with the surfaces and a good grade of casein glue used. Use enough brads to keep even pressure on the assembly until the glue has set. Use the same type and thickness of panel on both faces to keep the door in balance.



THE UNILITE DOOR
For Interior Use Only

REMODELING AN OLD DOOR

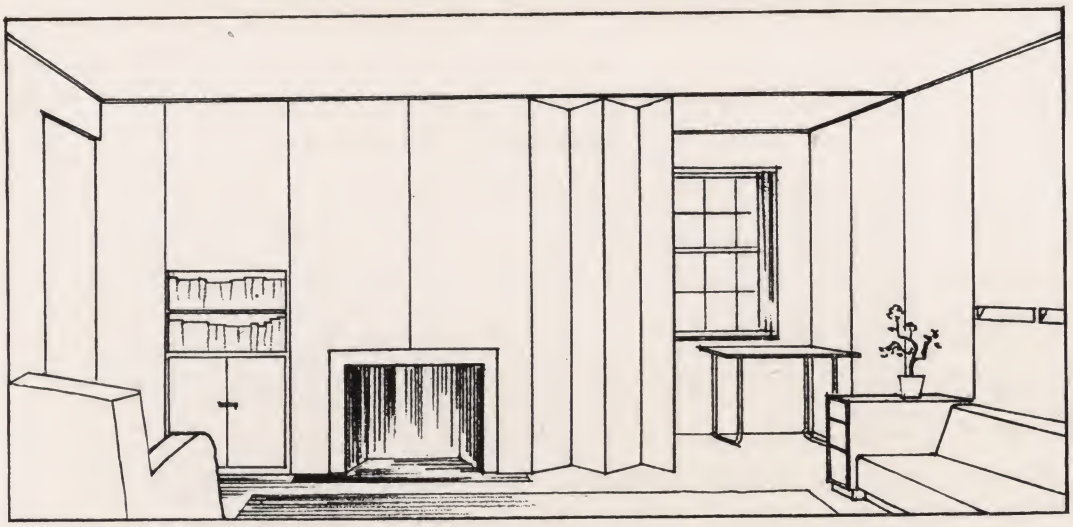


OVERHEAD GARAGE DOOR
Made by Hinging Three Flush Exterior Doors Horizontally

INTERIORS of PLYWOOD

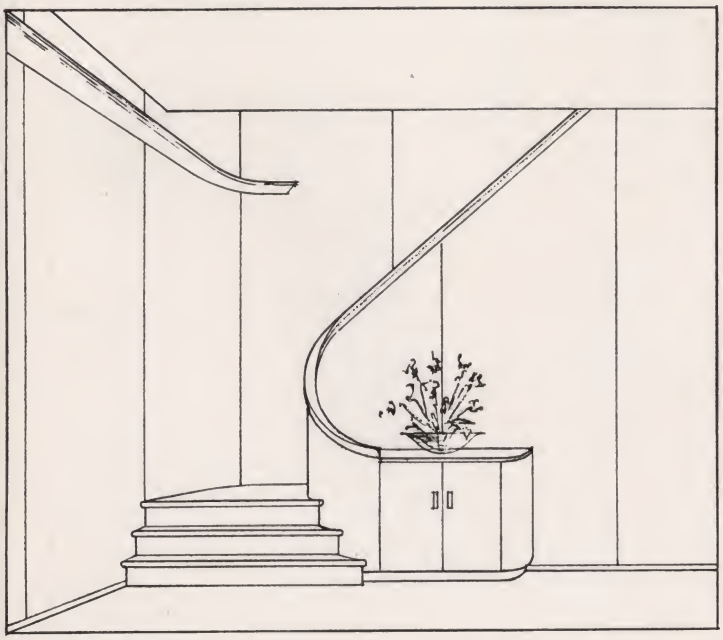
STOP EVERYTHING!—*Here Come the Plasterers!*

It is in the application of WELDBORD to Dry-Wall construction that plywood makes its *broadest* contribution to the solution of low-cost housing problems. At one stroke, it widens the field of interior decoration to include fine hardwood panel finishes which may be installed along either traditional or modern lines, at the option of the designer and owner. According to U. S. Forest Products Laboratory, (the leading American authority on the use of lumber) plastering introduces approximately 1,000 gallons (8,000 pounds) of water into the average moderate-size six room house. Before building operations can proceed and finish be applied, all or a great percentage of this water must dry out. Where does it go? Some of it vanishes into thin air but much of it is absorbed by the framing,—the studding, sills, plates, etc. That is why it takes a house so long to dry out and why cracks frequently appear in plaster walls and ceilings. Furthermore, plaster is only a finish. It hangs a weight on

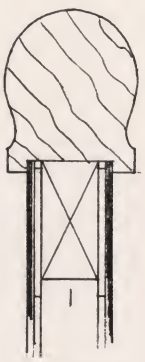


Simple but Effective Paneled Living Room and Dinette (*see plan on page 11*)

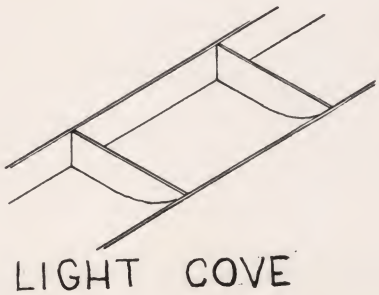
the framing instead of adding to the structural strength of the building as plywood does. It is expensive and easily marred. It is the "bottle neck" of frame construction, for the whole building schedule stops when the plasterer comes on the job, and either halts or limps along until he is through, his mess cleaned up and his work dry. The substitution of plywood panels for interior walls is cheaper and the results are better. There is no delay. The entire job progresses on schedule and whenever the contractor is ready for painters or paper-hangers, they can proceed with their work.



Panelled Entrance Hall—Note the Light Cove Made of ⅛" Fir WELDWOOD



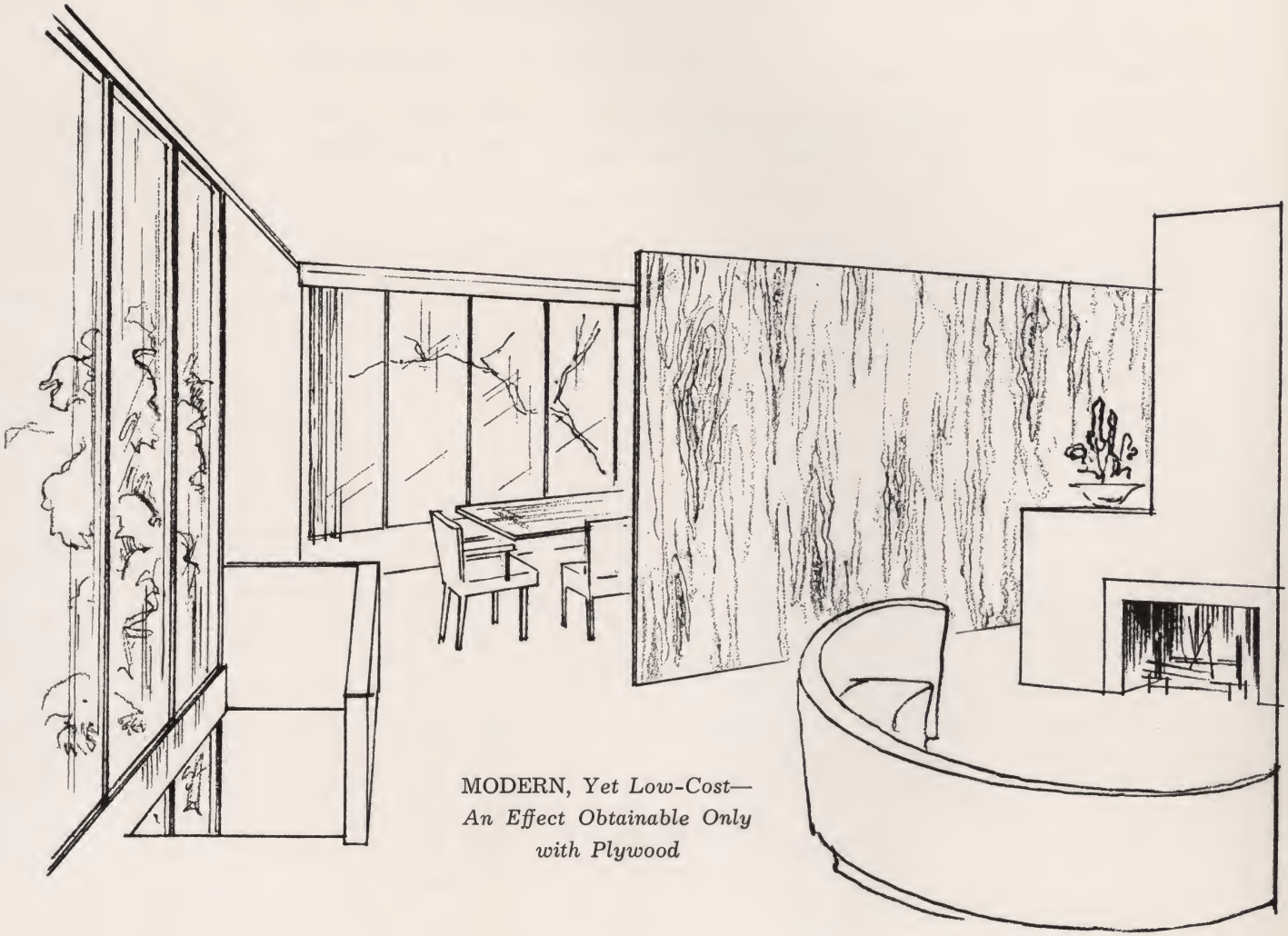
Detail of Handrail



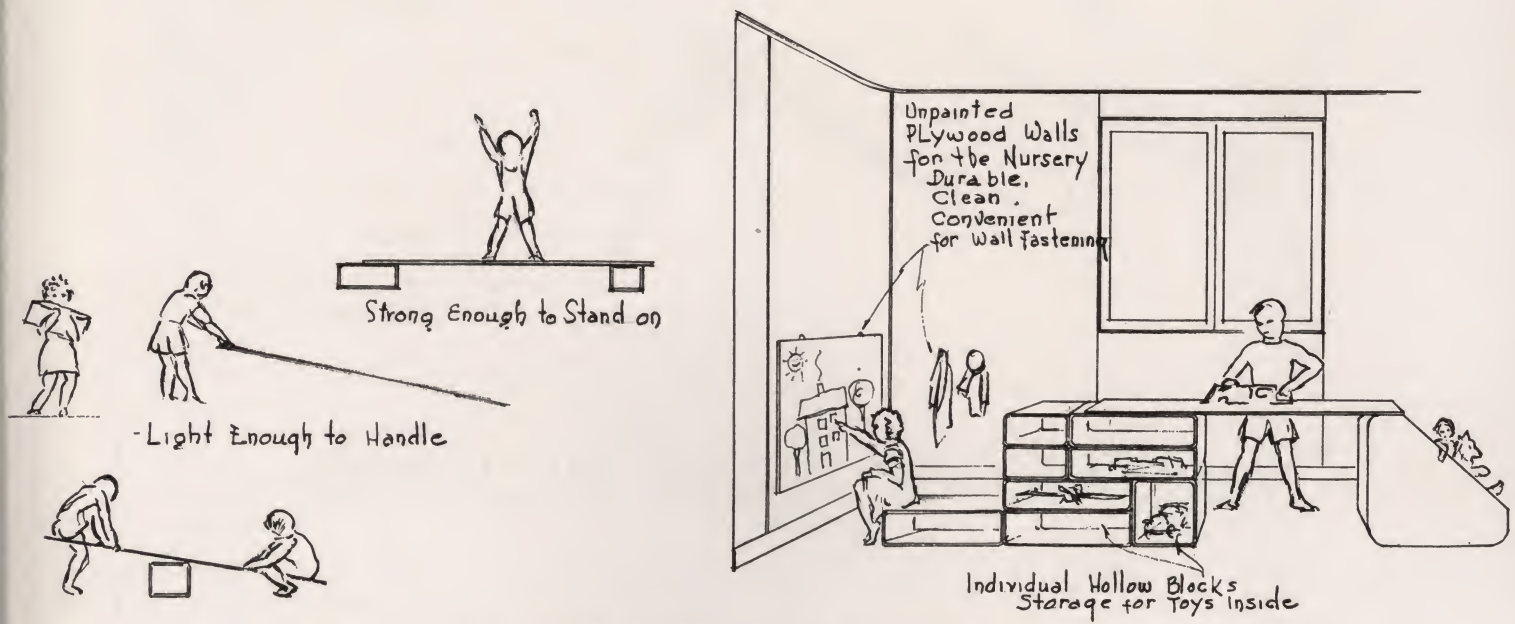
GRAINLESS BLUE LABEL WELDBORD

The use of Blue Label WELDBORD for interior walls insures a satisfactory job regardless of what finish may be applied over it as these panels have grainless faces and take paint, stain or enamel perfectly. Where wallpaper is to be applied, one coat of the regular glue size is all that is necessary for a perfect paper-hanging result.

Two types of joints can be used under either paint or wallpaper. See illustrations and text on page 29. Where furring sticks are used over the studs and

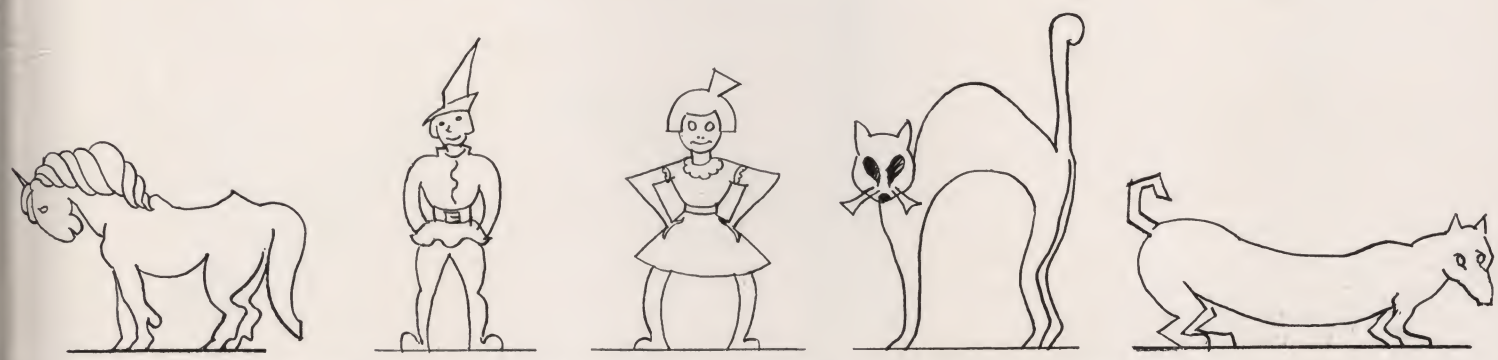


MODERN, *Yet Low-Cost—*
An Effect Obtainable Only
with Plywood

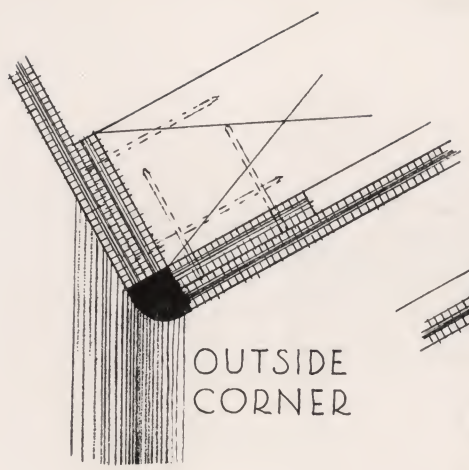


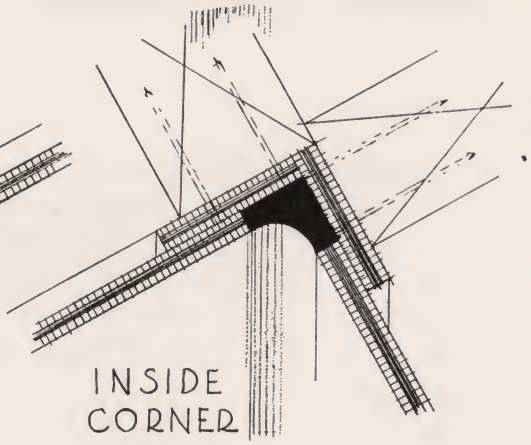
FOR THE NURSERY—*Cleanly, Effective, Practical*

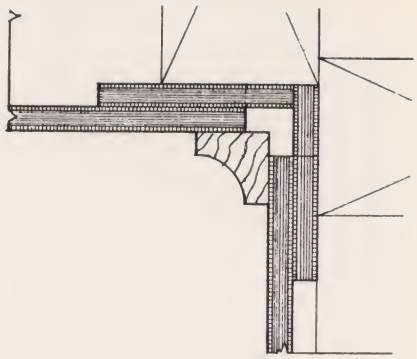
casein glue used to fasten the panels to furring sticks, a tight butt joint gives excellent results. As soon as the glue has set solid, the joint is block-sanded and no later trouble with the finish need be anticipated. Otherwise the open joint should be caulked with Swedish putty or a mixture of white building plaster and shellac. Where the tight butt joint is used, expansion gaps must be left at all openings to take up possible frame movement.



A Jig Saw Plus a Little Paint—and the Odds and Ends of Plywood Left Over from the Building Operation are Converted into Durable Toys or Attractive Designs to Be Nailed to the Plywood Walls







Inside corner with compensating expansion gap back of cove

INSTALLING DeLuxe WELDBORD

Before proceeding with a DeLuxe WELDBORD installation, it is advisable to arrange the panels around the walls of the room viewing them from the standpoint of harmonious coloring and grain effect. This is a very simple procedure but the results of proper placement of panels will more than make up in beauty for the small amount of time consumed in arranging them.

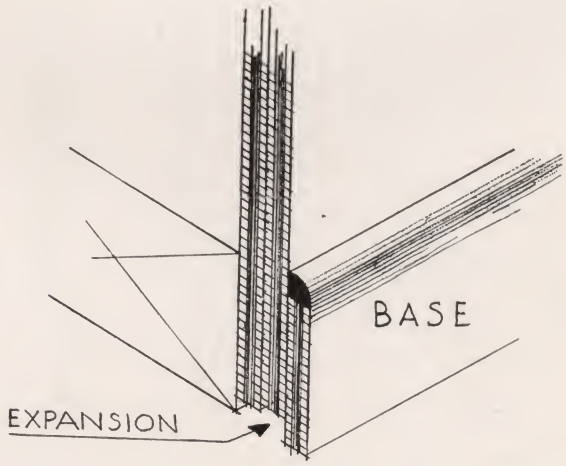
There are two basic methods in applying DeLuxe WELDBORD interior paneling.

No. 1—Direct to Studs.

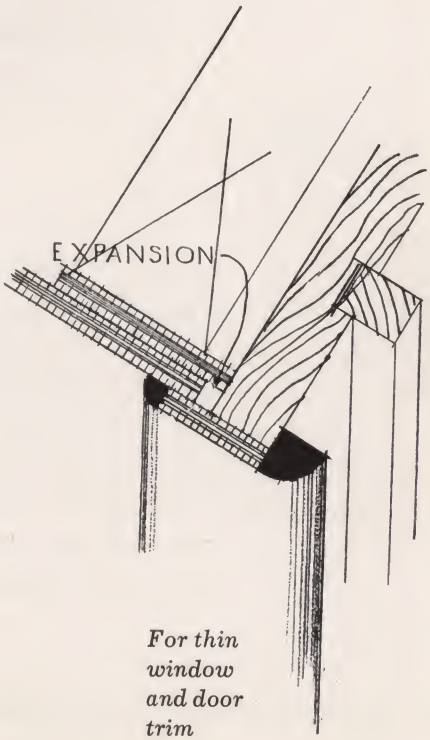
No. 2—Over Furring Sticks.

No. 1.—Direct to studs: This is the cheapest installation possible. It is practical but it is not as good as when furring sticks are used as all movement of the framing is distributed to the panels putting an extra burden on nails which, in extreme cases, may pull. Joints directly over studs never should be tight butted but should be spaced from ⅛" to ¼", a caulking compound knifed into the joint and sanded smooth. For this purpose, several types of Swedish putty are on the market but the carpenter can make a highly satisfactory putty of his own by mixing white building plaster with shellac to the consistency of putty, allowing it to dry (which requires about three hours) and then sanding it. Tight butt joints directly over studs are never satisfactory and should be avoided.

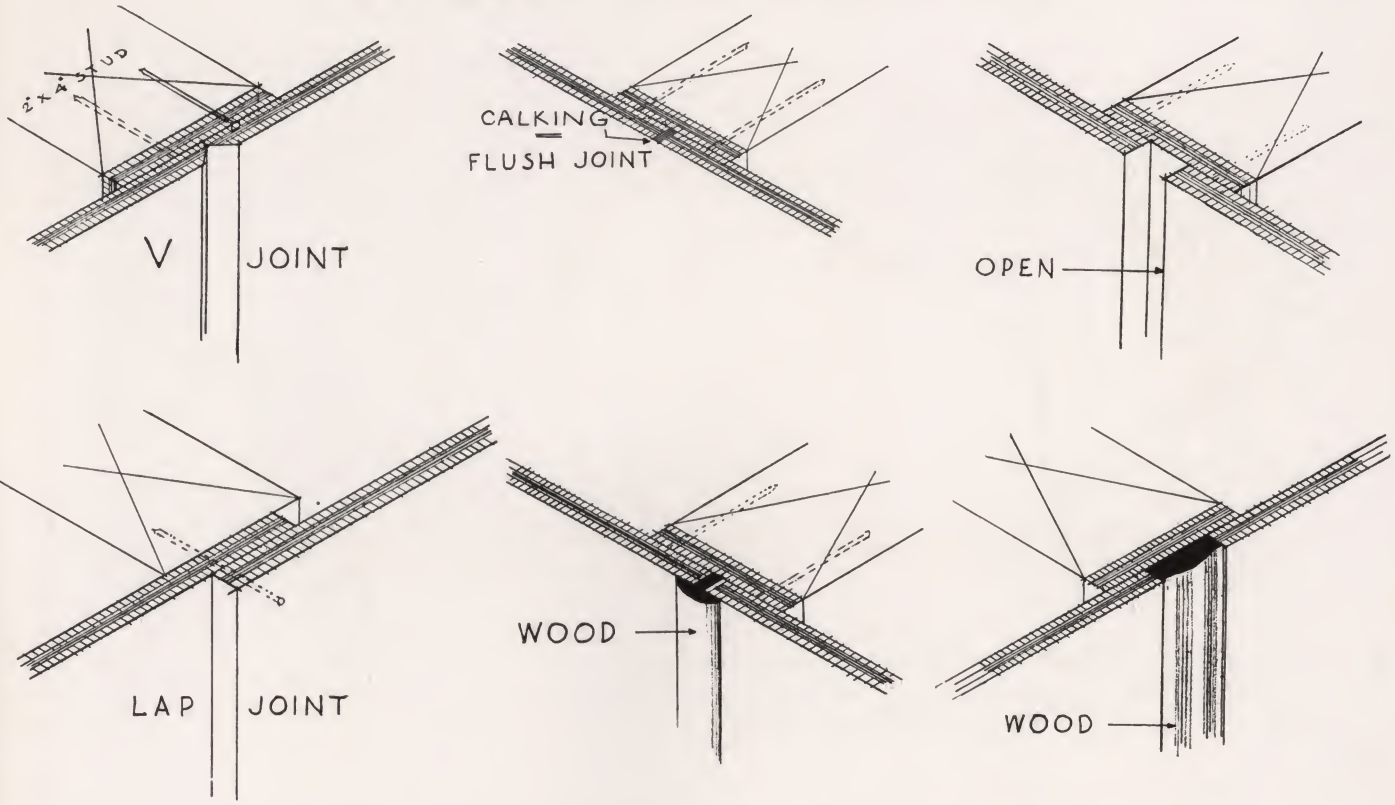
No. 2.—Joints over furring sticks: This is the most satisfactory method of jointing to use regardless of what finish is desired. Where panels are to be bright-finished or stained, this type of joint gives the designer a wide range of treatments to suit his taste or the requirements of the job.



For base mold



For thin window and door trim



Furring sticks should be cut of ¼" plywood two inches wide with the grain running the short way of the stick. Nail sticks to studs and girts. For best results, panels should be glued and nailed to the furring. Nails can be used alone if necessary.

Where the finish is to be paint, enamel or wallpaper, this joint may be either tight-butt or caulked.

For a tight butt joint, brush casein glue over the furring strip, nail the panel in place with just enough nails to hold it until the glue sets. Be sure to mix glue according to directions—too thin glue is worthless. Enough glue should be used so that there is a squeeze between the panels. Let this squeeze dry hard. Then block sand.

Where a caulked joint is preferred, a gap of from ⅛" to ¼" should be left between the panels and the caulking compound (see p. 28) knifed in and block-sanded smooth. Where bright finishes (natural wood) are desired, care must be taken that the glue does not stain the faces of the panel.

It will be well to remember that on bright-finished jobs, panels laid horizontally make a room look longer and wider but make the ceiling appear rather lower than it is. Where joints run vertically, an effect of higher ceilings is given. Owing to the fact that DeLuxe WELDBORD panels are 48" wide, this optical illusion is reduced to a minimum. Panels can be random-grooved at 4", 6", 8", 10" or 12" intervals with a grooving plane to give the effect of random boards. When this is done, the blade of the plane should be set to cut to a maximum depth of 3/32".

INTERIOR JOINTS AND TRIM

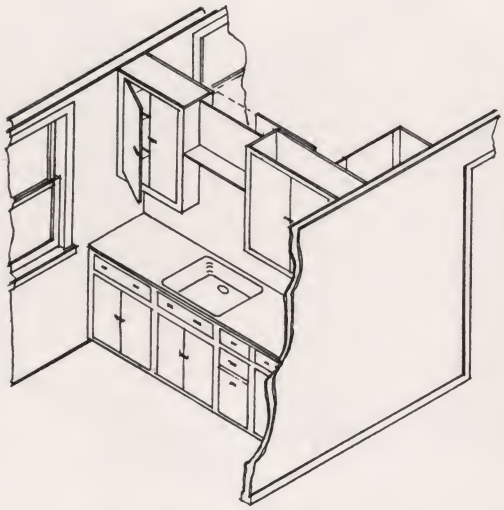
Treatment of joints is one of the most interesting points in the use of plywood. Most of the joints illustrated are shown with a plywood furring strip behind the joint. This furring strip is nailed to the studs and the finish plywood is glued to the furring strip. Thus, the individual plywood panels are united into one unit and each wall is essentially a single piece of plywood. This is done to eliminate joint movement due to swelling and shrinkage of the building frame. Since the nails will give more easily than the glue, the frame is permitted to move behind the finish without affecting the surface or the joints. Allowance for movement should be provided at the corners, window and door casings and ceilings and base molds.

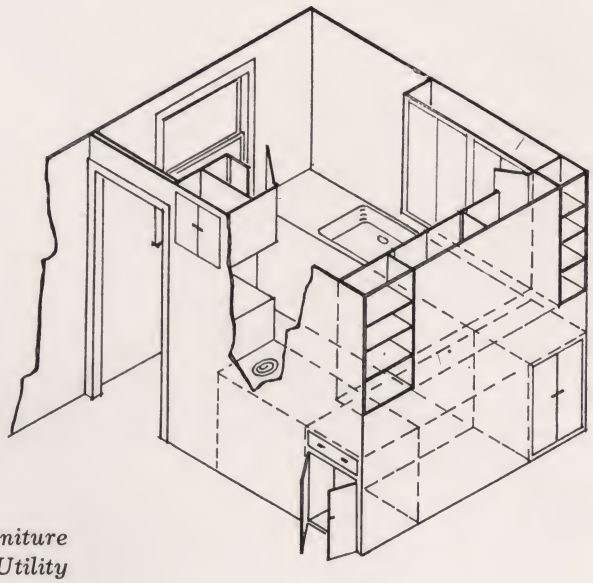
All the joints illustrated fit a stock size two by four stud with adequate allowance for nailing of the plywood. If the technique of erection outlined above is followed, the selection of joint treatment is merely a matter of the designer's preference, since all of them will be permanently trouble free.

The window and door trim illustrated show a method for securing modern small-projection trim at a low cost. The plywood required for trimming an ordinary small house in this manner would not cost more than five dollars.

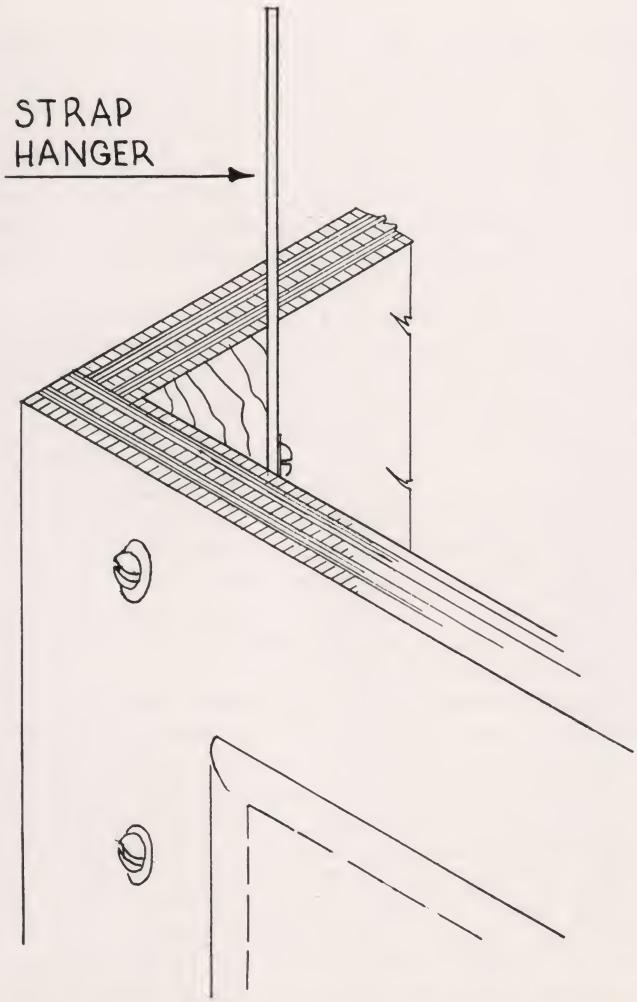
To the imaginative designer, moldings open up a broad field of decorative possibilities with DeLuxe WELDBORD. While great emphasis is being laid on modern designs calling for flush or semi-flush wall surfaces, varying types of traditional paneled effects can be obtained through the application of moldings. Wall surfaces can be broken up into square or rectangular designs at the decorator's option or, at slightly additional cost of labor, panels themselves may be cut apart for checker-board treatments or slotted with a grooving plane to simulate random widths. Picture molds, chair rails, etc., are readily and securely held in place by nailing into the studding. Cornices or lighting coves are applied with equal facility. Vertical battens can be nailed over open joints or applied as splines. Matching moldings in Oak, Walnut or Mahogany are stocked at all warehouses.

Cabinets and Closets





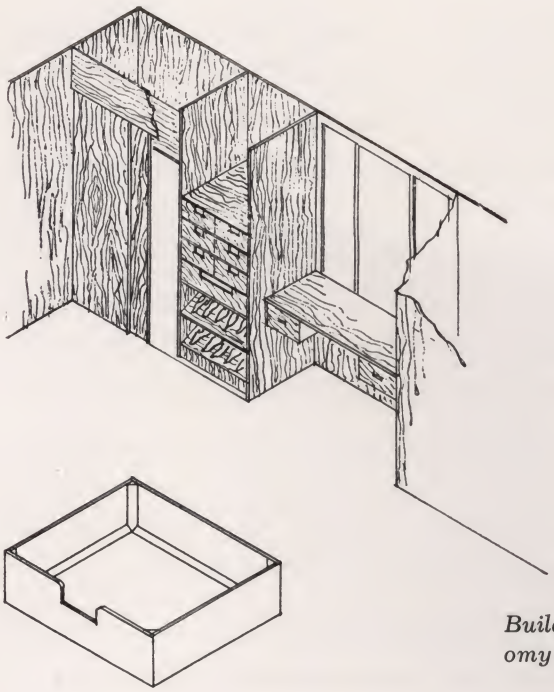
The Kitchen Unit Becomes a Piece of Furniture Built in—Note the Use of "Dead" Space as Utility Cabinets in Adjoining Rooms

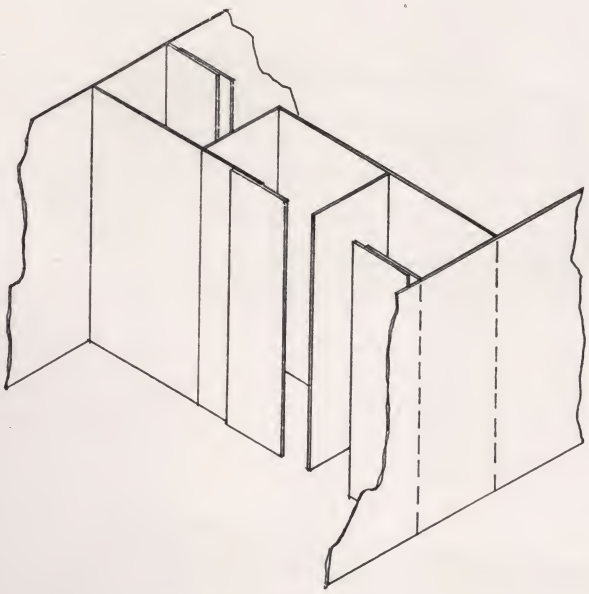


Hanging Cabinets from Ceiling Beams Eliminates Cracks at Ceiling

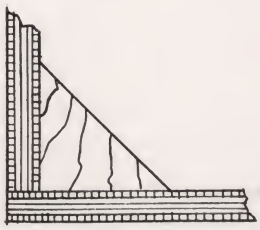
Until recently closets were not built into houses. They were added as separate units and designed like pieces of furniture. It is now becoming the custom to build in as much of the furniture as possible. Wardrobes, dressers, shoe shelves, linen cabinets, book shelves, and many other utility cabinets are becoming an integral part of the house. Plywood has become almost universally accepted as the ideal material for this purpose. We are returning to the conception of closets as furniture with the exception that this furniture is so designed that it forms complete partitions between rooms.

Building these modern cabinets with plywood makes it unnecessary to resort to the heavy space-consuming and clumsy

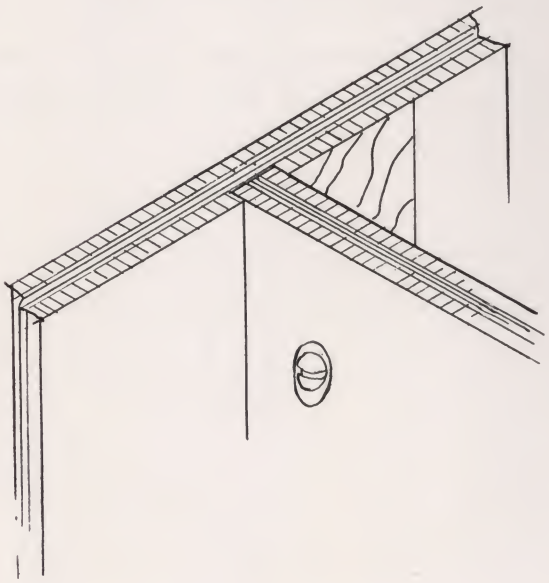




Build Clothes Closets as Wardrobes—An Economy as Far as Furniture is Concerned and a Great Saving of Bed Room Space



Simple Details of Built-in Furniture

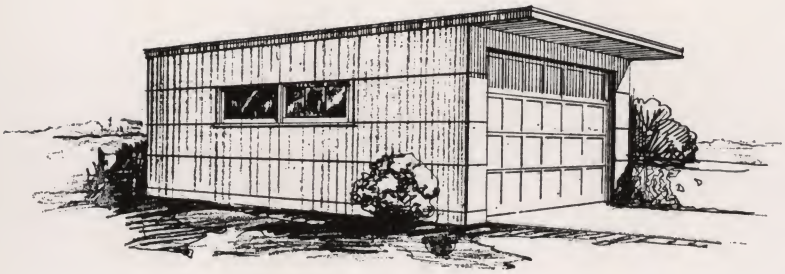


construction which is necessary when plaster or other materials with less strength than plywood are used. It is possible to build closets and storage units in the manner illustrated out of single thickness plywood without studs. An obvious advantage of this system is illustrated in the double faced kitchen cabinet units. The illustration demonstrates how the inaccessible corners in kitchens may be utilized for storage cabinets and shelves in adjoining rooms.

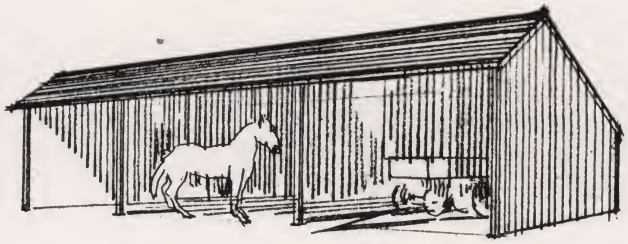
The method of hanging the cabinets and closets from the ceiling beams keeps them free of dirt gathering cracks which usually appear at the ceiling in ordinary construction.

Bear in mind that the closet made of plywood has no dust-catching cracks to gather dirt, germs or moth eggs.

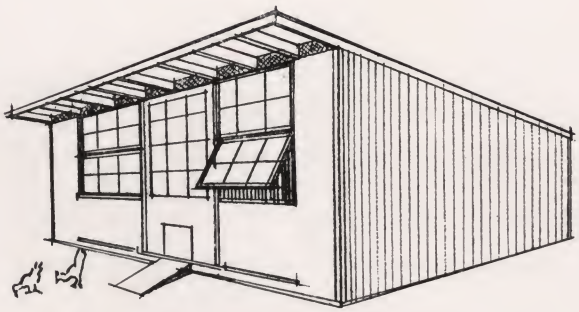
Farm Buildings



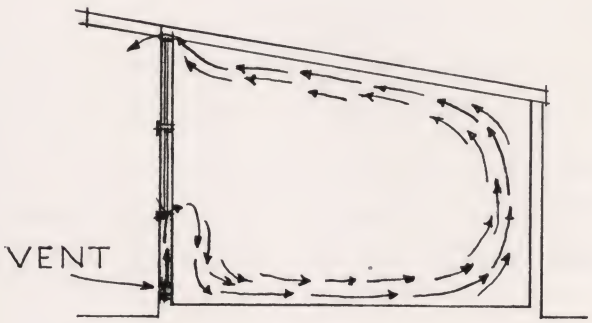
Garage

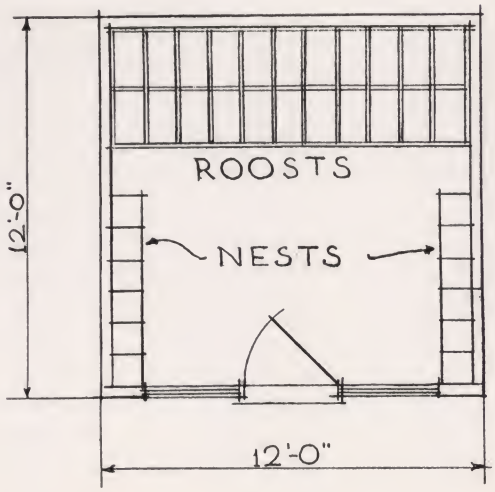


Shed



Scientifically Planned Chicken House





Illustrated are a number of easily constructed buildings for the farm. The chicken house illustrated is one which follows the recommendations of the better farm agencies. The recent New England experience with chicken houses constructed of synthetic wallboards, many of which were blown down by the hurricane of 1938, points out the necessity for construction with WELDWOOD because of its superior strength and waterproof qualities. Note the perfect ventilation achieved in the chicken house by means of the double plywood wall beneath the windows. By facing windows to the South, a much more even temperature can be maintained; hens are more comfortable and consequently lay better.

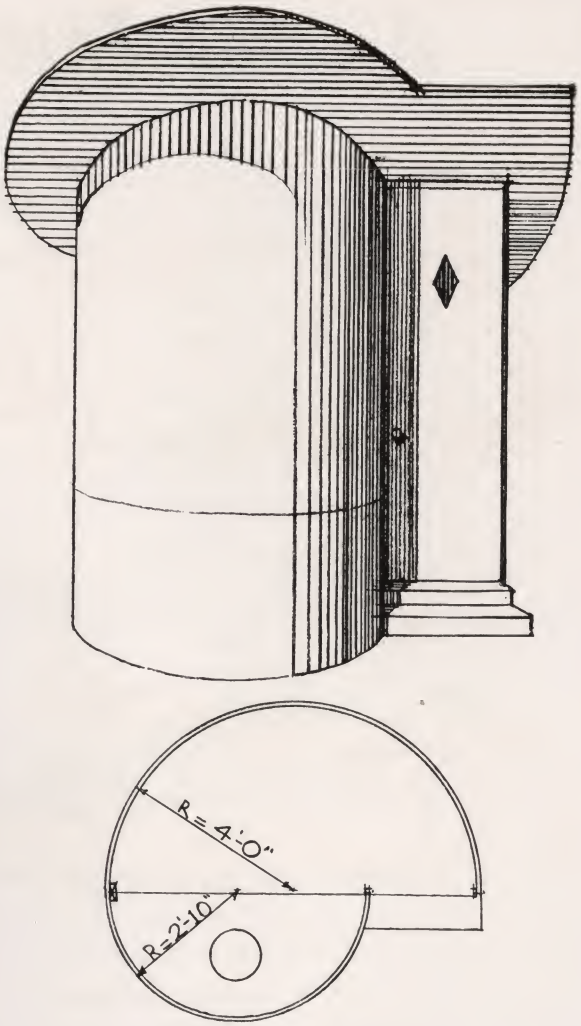
Farm buildings which are ordinarily left without any interior finish should unquestionably be built with siding material which not only closes in the building but adds permanence, strength and rigidity to the frame.

Farmers also appreciate the fact that pulp boards tend to retain moisture, and are easy for animals to peck or gnaw their way through. WELDWOOD is waterproof, is unappetizing to animals and resists insect pests.

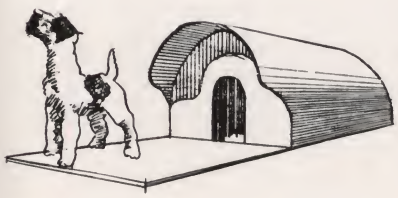
It is important to realize that these buildings can be constructed of WELDWOOD at no higher cost than with fabricated wallboards or other wood siding materials when the elimination of wasted material and the labor time saved is included in the calculations.

Plywood Novelties

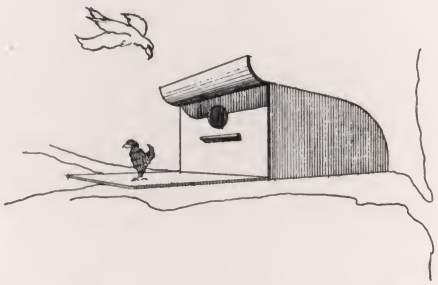
Plywood can easily and economically be adapted to a great many accessory articles needed around the average home. It gives free rein to the imaginative designer and builder in the construction of dog-houses, bird houses, out-houses, tool-houses, garden shelters, mail-boxes, etc. It is a simple matter to curve plywood in the manner shown in the articles illustrated. Limited curves may be made by fastening the panel at one end and gradually bending the plywood around a template. Sharper curves may be made by saw kerfing the back of the plywood at intervals spaced according to the sharpness of the curves desired. Where WELDWOOD is used, bends can be produced after soaking or steaming the panel. For steaming, allow double the time required for equal thickness of lumber.

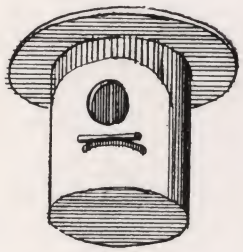


Tool Shed or Out House
Built of four pieces of WELDWOOD



Dog Kennel



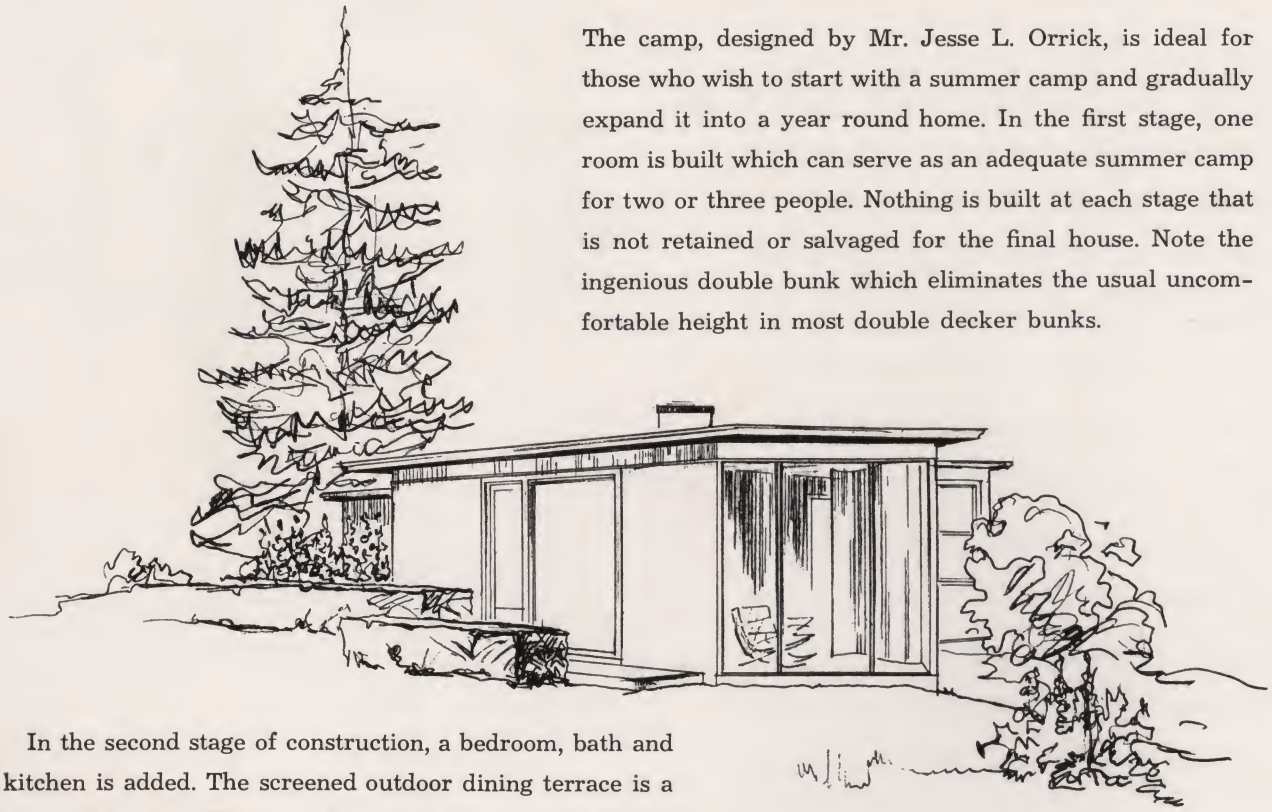


Bird Houses

THE FOLLOWING TABLE SHOWS MINIMUM RADII TO WHICH PLYWOOD PANELS OF VARIOUS THICKNESSES CAN BE BENT:

1/8"	lengthwise,	minimum radius 15 inches
	crosswise,	minimum radius 8 inches
1/4"	lengthwise,	minimum radius 24 inches
	crosswise,	minimum radius 15 inches
3/8"	lengthwise,	minimum radius 54 inches
	crosswise,	minimum radius 36 inches
1/2"	lengthwise,	minimum radius 8 feet
	crosswise,	minimum radius 6 feet
5/8"	lengthwise,	minimum radius 10 feet
	crosswise,	minimum radius 8 feet
3/4"	lengthwise,	minimum radius 12 feet
	crosswise,	minimum radius 10 feet

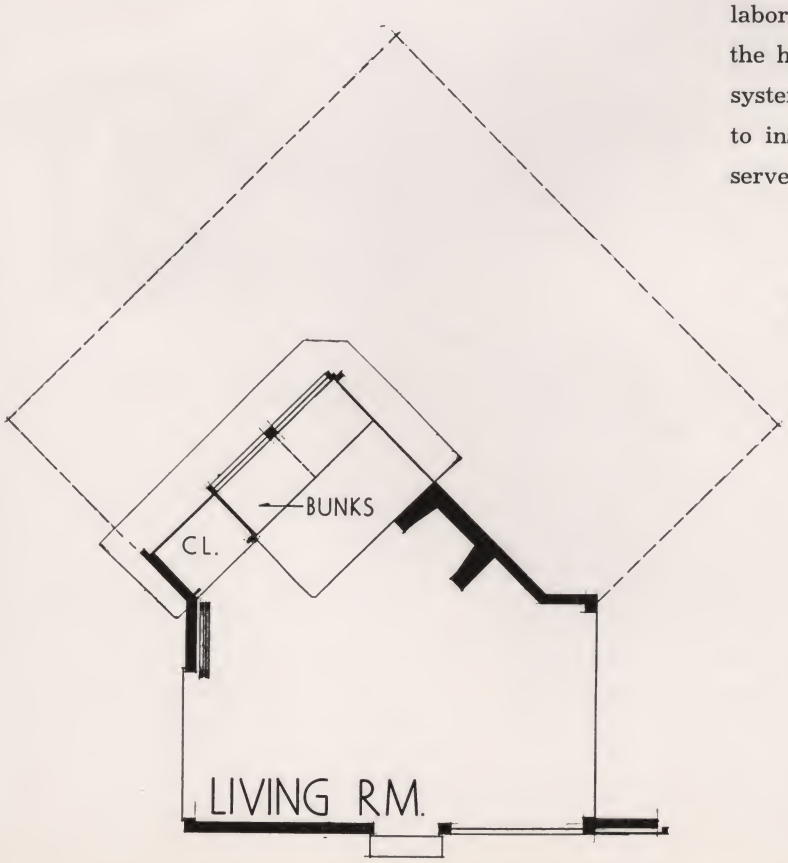
A Camp That Becomes a House



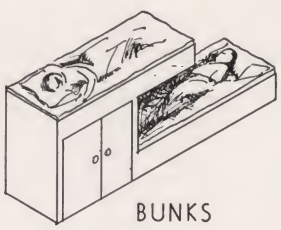
The camp, designed by Mr. Jesse L. Orrick, is ideal for those who wish to start with a summer camp and gradually expand it into a year round home. In the first stage, one room is built which can serve as an adequate summer camp for two or three people. Nothing is built at each stage that is not retained or salvaged for the final house. Note the ingenious double bunk which eliminates the usual uncomfortable height in most double decker bunks.

In the second stage of construction, a bedroom, bath and kitchen is added. The screened outdoor dining terrace is a pleasant feature. The accordion doors between the living room and terrace make it possible to expand the living room during the warm season of the year. At this stage a circulating heater in the fireplace will prove satisfactory for keeping this little house warm.

Without waste of any material or duplication of any labor the second bedroom is added in this stage to complete the house. The cost calculations do not include a heating system. The closet adjacent to the fireplace may be utilized to install a convector type heater which will adequately serve for heating the complete house.



FIRST STAGE



A Camp that becomes a House

(continued)

COSTS

First Stage

Excavating and Masonry	$200.00
Lumber	140.00
Plywood	175.00
Millwork	75.00
Sewer	....
Plumbing	....
Electrical	25.00
Insulation	20.00
Labor	150.00
Hardware	20.00
Painting	100.00
	$905.00

COSTS

Second Stage

Excavating and Masonry	$ 40.00
Lumber	160.00
Plywood	225.00
Millwork	60.00
Sewer	40.00
Plumbing	225.00
Electrical	15.00
Insulation	25.00
Labor	175.00
Hardware	15.00
Painting	80.00
	$1,060.00

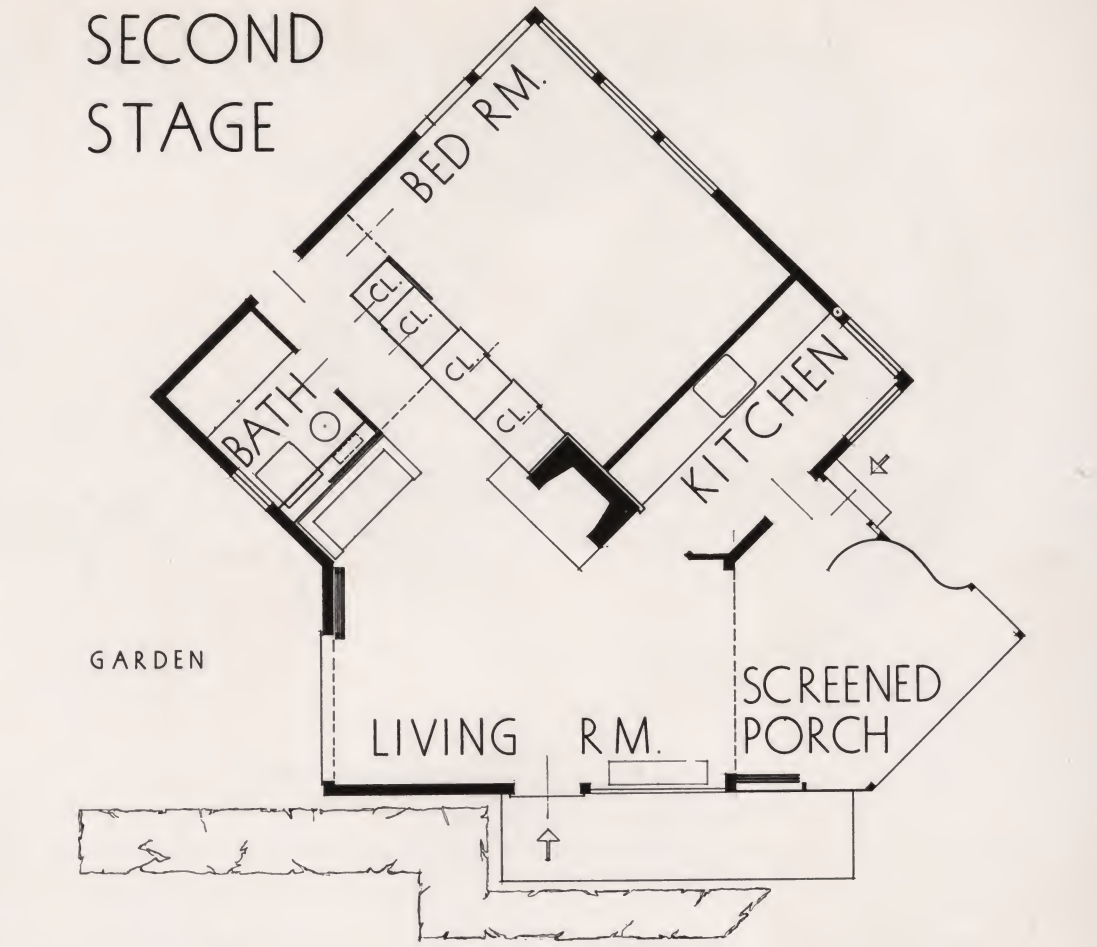
COSTS

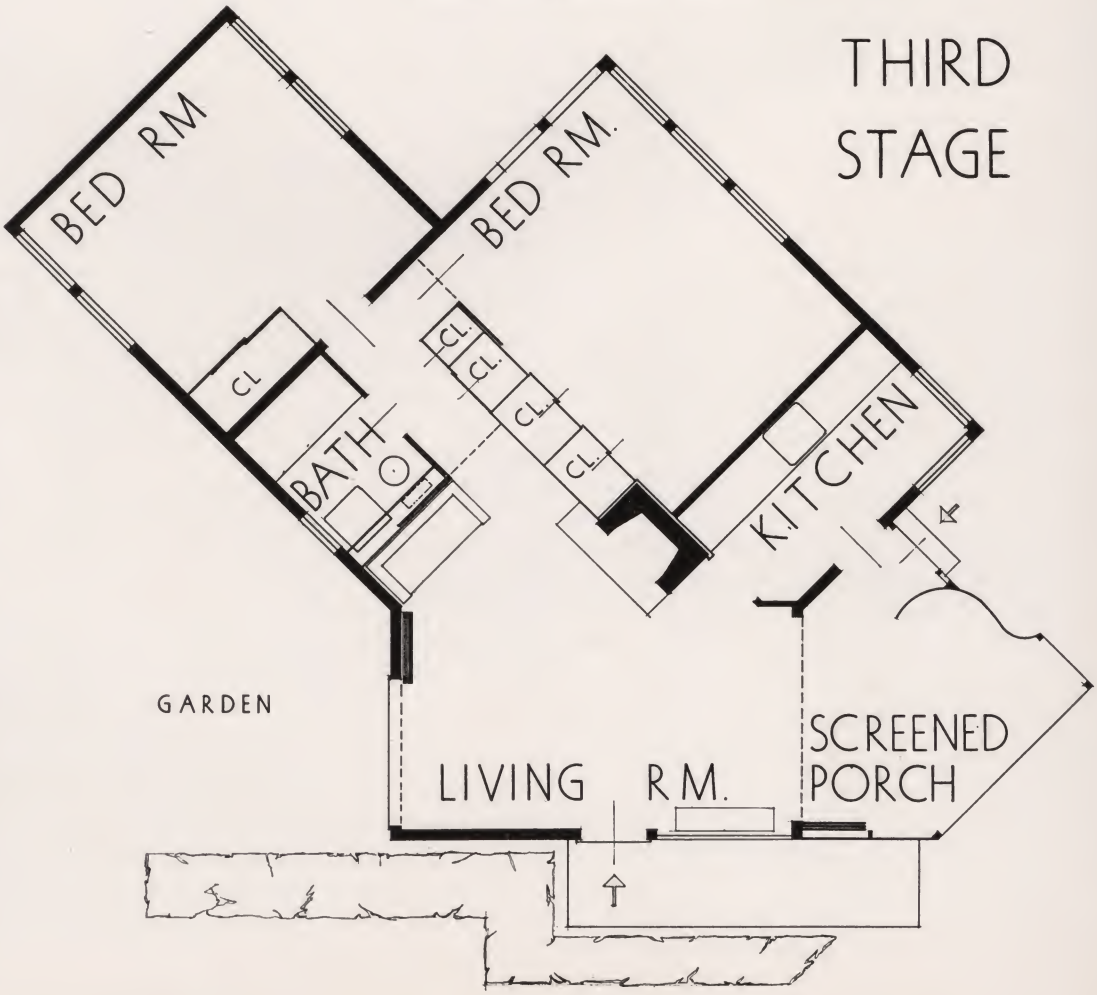
Third Stage

Excavating and Masonry	$ 30.00
Lumber	50.00
Plywood	100.00
Millwork	40.00
Sewer	....
Plumbing	....
Electrical	10.00
Insulation	10.00
Labor	75.00
Hardware	5.00
Painting	45.00
	$365.00

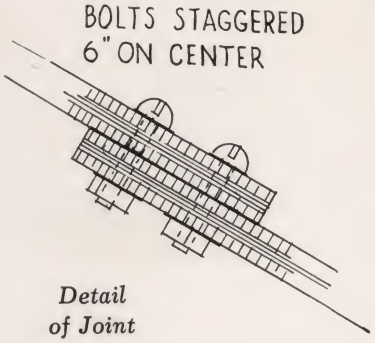
TOTAL COST

Excavating and Masonry	$270.00
Lumber	350.00
Plywood	500.00
Millwork	175.00
Sewer	40.00
Plumbing	225.00
Electrical	50.00
Insulation	55.00
Labor	400.00
Hardware	40.00
Painting	225.00
	$2,340.00



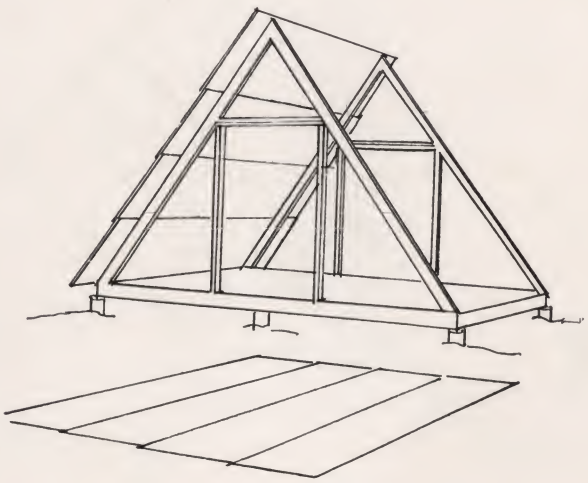


A Plywood Tent

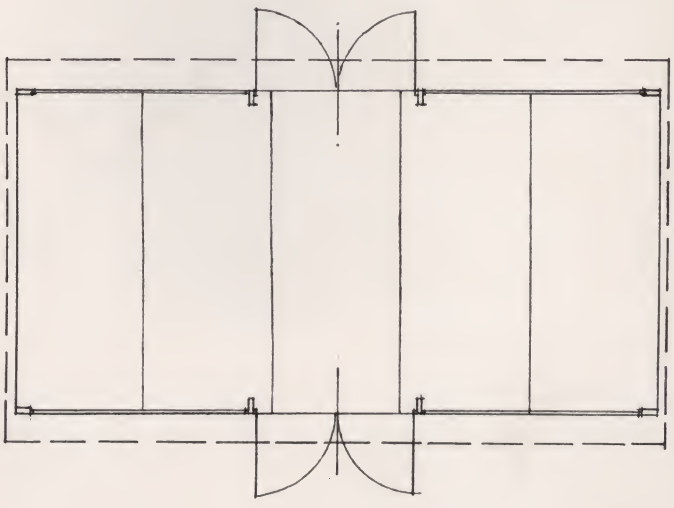


Detail of Joint

An excellent knock-down shelter which may be used repeatedly may be erected in the manner illustrated, with a simple frame, eight pieces of WELDWOOD for the roof, a little screening and four screen doors. A light weight demountable tent may thus be built which will not need replacing every year or two. The cost of this tent should not exceed the cost of any similar tent built of canvas and will prove far more satisfactory in its weather resisting qualities and its durability. A canvas flap or a discarded inner tube split down the middle make an excellent drip cap over the ridge pole.



Erection



Plan

Nailing and Finishing Schedule

NAILING

All plywood should be nailed 6″ o.c. around the edges and 12″ o.c. on intermediate studs

INTERIOR

WELDBORD (DeLuxe or Blue Label)

¼″ thick.....6d casing or finishing, when glue is not used; 4d casing or finishing, when glue is used

PLYWALL OR PLYPANEL (Douglas Fir)

¼″ thick.....4d casing or finishing
⅜″ thick.....6d casing or finishing
½″ thick or over.....8d casing or finishing

EXTERIOR

PLYSCORD (sheathing grade Douglas Fir)

5/16″ thick.....6d coated
½″ thick.....6d
⅝″ thick.....8d

WELDWOOD (Douglas Fir waterproof siding)

⅜″ thick.....6d
½″ thick or over.....8d

JOINT FILLERS

INTERIOR

An excellent joint filler can be made economically by mixing white building plaster and shellac about as heavy as workable putty. Knife into joint, leaving a slight bulge. Let dry. (Takes about 3 hours.) Block sand smooth and apply finish or wallpaper.

Various good joint fillers are sold under advertised brand names —Savogran, Spackle, etc.

EXTERIOR

Use any good grade of caulking compound of which there are many on the market. It is good practice to brush down the edges of the joint with slow-drying varnish before applying the caulking compound. On long vertical joints, the possibility of the compound flowing can be checked by driving two 8d nails side by side, into the stud at two foot intervals, leaving their heads slightly *below* the level of the face of the siding.

FINISHING

INTERIOR

Finishing plywood interiors depends entirely on the quality of the job and the amount of money available. A satisfactory bright finish can be applied to DeLuxe or Blue Label WELDBORD with a priming coat of shellac, lightly sanded and rubbed down with one or more coats of wax. More elaborate finishes can be applied with a priming coat of shellac and successive coats of rubbed varnish or lacquer.

Where walls of Blue Label WELDBORD are to be painted, it is important that a good lead and oil base paint be used so that movement of the wall section will not be transferred to the finish.

Where wallpaper is hung over Blue Label WELDBORD, the regulation glue size is applied to the WELDBORD and paper is hung in the usual manner.

Wherever Plywall or Plypanel is used for painting, factory-sealed panels should be specified or a priming coat of clear resin sealer used on both faces and all edges. This tends to eliminate the tiny surface checking and grain-raising to which Fir is normally subject. Where wallpaper is to be applied over Fir panels, a layer of unsaturated felt should be tight butt-jointed over the Fir before the wallpaper is applied. Do not let the felt joints come over the plywood joints.

In *every case,* sealing the panel is of primary importance.

EXTERIOR

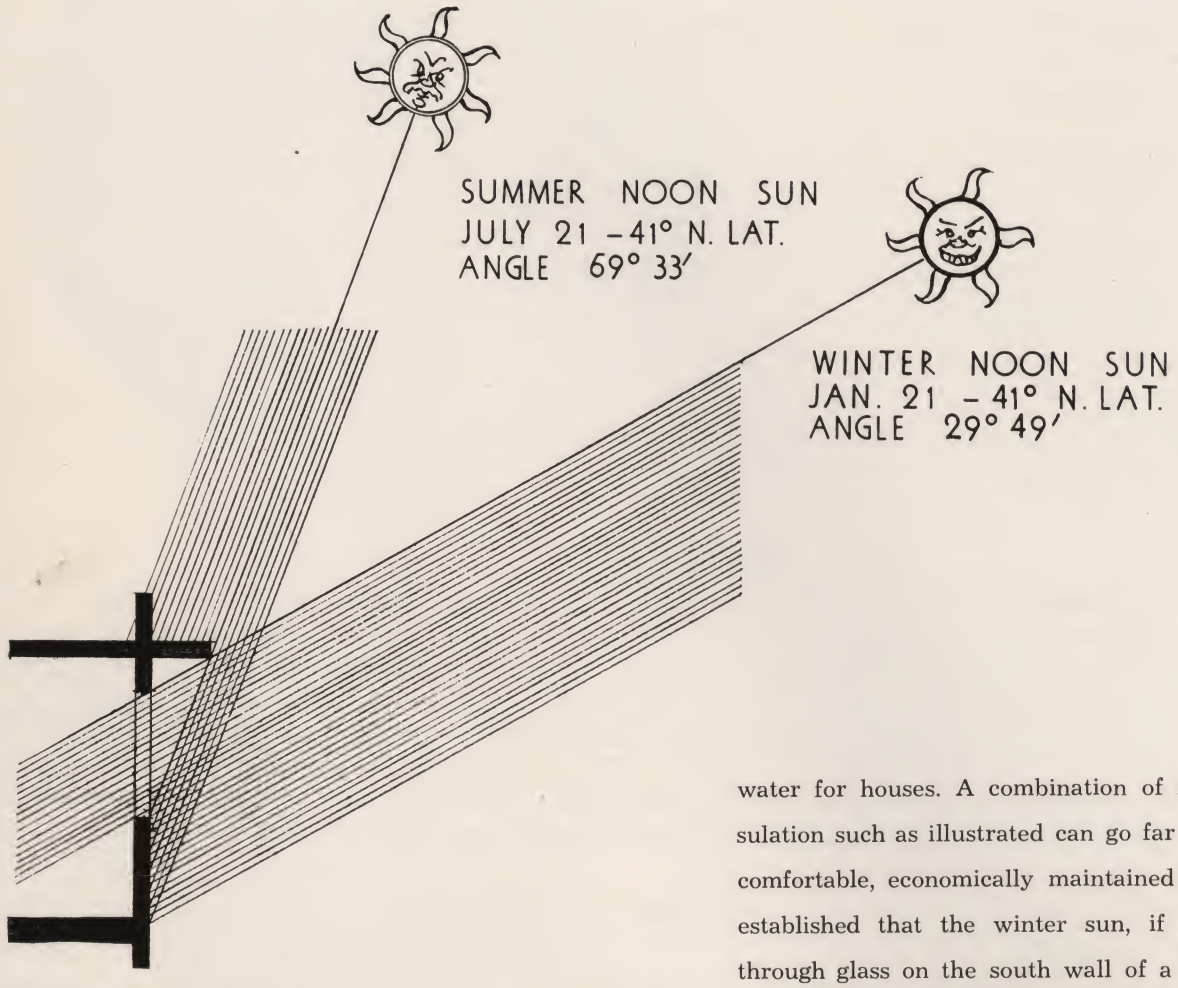
WELDWOOD for siding requires less paint than any ordinary siding, as there are few if any crevices to fill. As with other outdoor finishes, the job will be only as good as the paint used.

ALL WELDWOOD panels should be sealed on both sides and all edges with a clear resin sealer of which several are on the market.

This material replaces the usual priming coat and does not add to the cost of the job.

For bright finished exteriors of WELDWOOD consult your paint house. All paint manufacturers maintain departments which will be glad to furnish information on these special finishes without extra cost to you.

Sunsulation



It is becoming increasingly apparent to everyone that houses will have to be planned for greater year-round comfort. Much of the money people formerly threw away on ginger bread ornament is now being utilized to pay for automatic equipment which adds to comfort and effortless living. People would rather have their houses warm or cool when they so desire than impress their neighbors with a General Grant Gothic porch. By manipulation of the plan and proper orientation, houses may now be built so that the sun can enter each room at any desired time of day. The idea that a house would soon be built which would heat itself automatically according to outdoor temperature without the necessity of back-breaking attention by the owner was considered utopian only a short time ago. Today, the house which will heat, cool and keep itself clean is well on the way toward realization. Already, in Florida, the sun is being put to work to provide year-round hot water for houses. A combination of insulation and sunsulation such as illustrated can go far toward providing a comfortable, economically maintained house. It has been established that the winter sun, if permitted to enter through glass on the south wall of a house, will provide an average of heat through the winter season equal to a square foot of radiation per square foot of glass. Conversely, if it is permitted to enter during the summer, it will result in a similar amount of discomfort.

A simple hood such as the one illustrated may easily be provided on the south windows of a house. It will exclude the direct rays of the summer sun and permit the winter rays to enter and warm. If the hood is lightly constructed of Weldwood according to the critical angles shown on the drawing it will automatically provide for such control.

A house planned with a minimum of exposed glass on the side of the winter storms and permitting the winter sun to aid the heating system will be exceedingly economical to heat. At the same time, with the summer sun excluded and the openings planned to take advantage of the prevailing summer breezes, the same house will be comfortable in warm weather.

Stock Sizes and Woods

For Interior Finishing

WELDBORD, DeLuxe in Walnut, Oak and Mahogany—1/4" thick, **48" x 96"** only.

Blue Label, in Unselected Gum only. Grain runs across face of panel for extra stiffness. 1/4" thick, **48" x 96"** only.

BAYOTT, hard, close-grained imported hardwood with pencil-striped figure. Wood has a delicate rosy tint.
1/4" thick, 36" x 60", 72", 84", 96"
48" x 84", 96"
13/16" thick, 36" x 72", 84", 96"
48" x 84", 96"

DUALI, imported hardwood—the lowest-price hardwood on the market. Wood is delicately tinted with red and carries a large rotary figure, excellent for paint on an extra-fine job.
1/4" thick, 36" x 60", 72", 84", 96"
48" x 60", 72", 84", 96"
3/4" thick, 36" x 72", 84", 96"
48" x 72", 84" 96"

DEORO, unusually hard, tight-grain wood, honey-colored, sanded extra smooth. This is the lowest price, blonde hardwood obtainable.
1/4" thick, 36" x 72", 84", 96"
48" x 96"
13/16" thick, 36" x 72", 84", 96"
48" x 96"

PLYWALL—Douglas Fir
1/4", 3/8"—**48"** x 60", 72", 84", **96"**
1/2" thick—**48" x 96"**

PLYPANEL, Douglas Fir—1/4", 3/8", 1/2", 5/8" and 3/4" thick
24" x 48", 60", 72", 84", 96"
30" x 60", 72", 84", 96"
36" x 60", 72", 84", 96"
48" x 72", 84", 96"
longer lengths, from mill, in quantities of 1,000 sq. ft. or more.

For Exterior Use

WELDWOOD, Hardwood, Birch or Mahogany faces—1/4" thick, **48" x 96"**
Can also be had in any other hard woods, in any thickness or size panel in quantities of more than 300 sq. ft. from the mill.

WELDWOOD, Douglas Fir—1/8", 1/4", 3/8", 1/2", 5/8" and 3/4" thick
48" x 96", 48" x 144"
Also in widths up to 6'-0" and lengths up to 24'-0", on special mill order in quantities of more than 1,000 sq. ft.

The above list outlines stock sizes of "USP" products in general demand. For a complete list, write the nearest "USP" warehouse for a copy of the PLYWOOD CATALOG showing nearly 3,000 items in approximately fifty woods available for immediate delivery as required. "USP" mills are organized to fabricate special orders of all types of plywood in any woods or thicknesses.

The Back Cover

The cover has been designed with module lines four feet apart at one-quarter inch scale to the foot so that it may be utilized as a scale for estimating and listing plywood quantities directly from blueprints. In addition, the four foot units have been sub-divided into sixteen inch units. This scale may be used to list rough lumber directly from the plan with ease.

UNITED STATES PLYWOOD

CORPORATION

Executive Offices:

616 WEST 46th STREET, NEW YORK, N. Y.

Branch Offices and Warehouses:

BALTIMORE, MD.
Builders Exchange Building
12 West Madison Street

BOSTON, MASS.
61 McGrath Highway
(Northern Artery), Somerville

BROOKLYN, N. Y.
187 Gardner Avenue

CHICAGO, ILL.
900 West Division Street

CINCINNATI, OHIO
1187 Gilbert Avenue

CLEVELAND, OHIO
3131 St. Clair Avenue

DETROIT, MICH.
1815 Franklin Street

LOS ANGELES, CAL.
1920 East 15th Street

NEWARK, N. J.
Newark Tidewater Terminal

NEW YORK, N. Y.
616 West 46th Street

PHILADELPHIA, PA.
Cumberland Street near Richmond Street

ROCHESTER, N. Y.
404 Atlantic Avenue

SAN FRANCISCO, CAL.
119 Kansas Street

SEATTLE, WASH.
13th and W. Nickerson Streets