

AT MICROFICHE
REFERENCE
LIBRARY

A project of Volunteers in Asia

The Yurt

by: William S. Copertnwaite

Published by:

Yurt Foundation

Bucks Harbor, ME 04618 USA

One large sheet of plans; paper copies are \$10.00 for a 12- or 17-foot yurt, \$20 for a 32- or 56-ft. yurt.

Available from:

Yurt Foundation

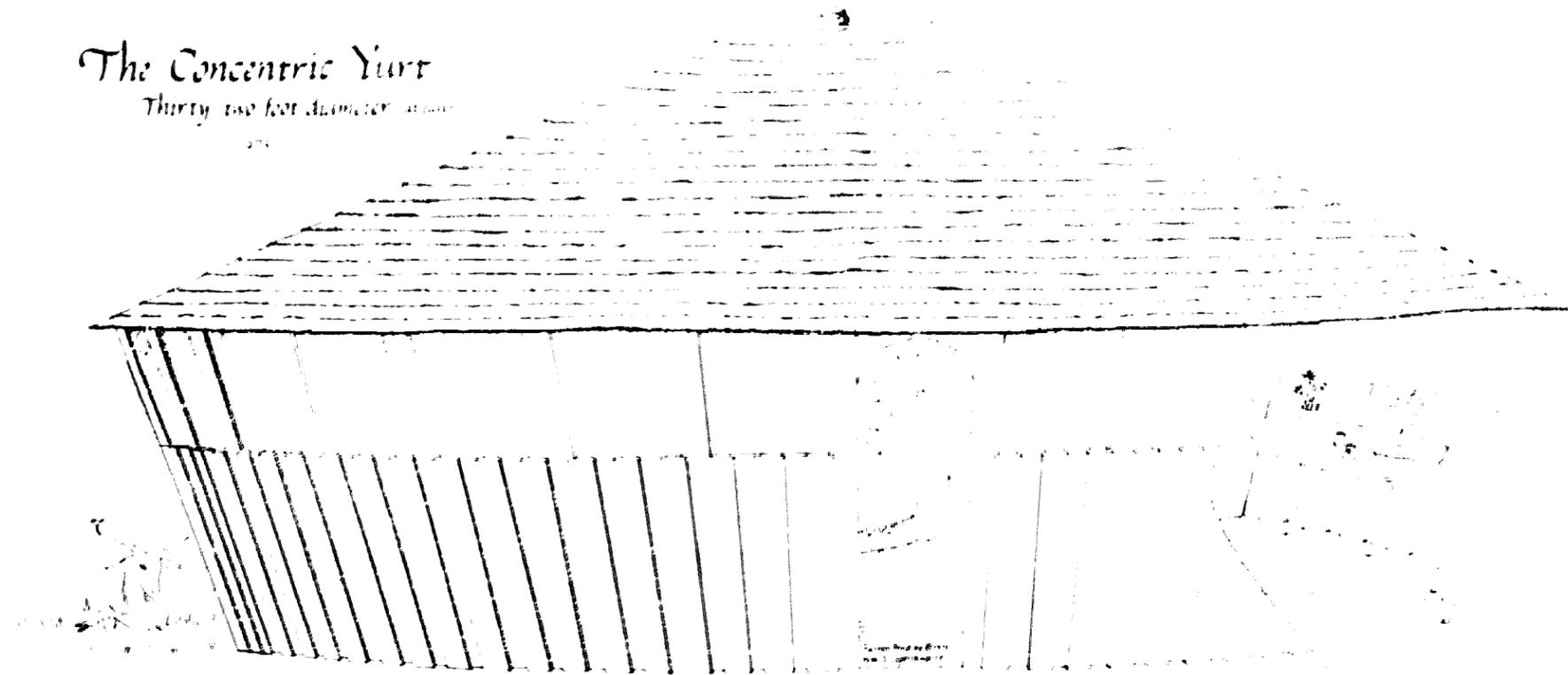
Bucks Harbor, ME 04618 USA

Reproduced by permission of the Yurt Foundation.

Reproduction of this microfiche document in any form is subject to the same restrictions as those of the original document.

The Concentric Yurt

Thirty two foot diameter



This Yurt design has its origins in the old Wisdom of Ancient Mongolia where the prototype has for thousands of years been found to withstand the severe cold and violent winds of the steppes. This structure has been designed to provide an opportunity for people to play a larger role in creating their

own shelter especially for those desiring to live in simplicity with the belief that a more personal intimate relationship with our environment is desirable. The low profile and the curved walls of the yurt help it to blend with the natural

environment. This is an attempt to design a dwelling that will not challenge, not dominate, not contend with nature but seek to be in harmony with it. The purpose of this design is to reduce the skills needed in building to a minimum and still have beautiful, inexpensive, permanent shelter.

I want a lodge that is round like the day and the sun and the path of the stars
I want a lodge that is like the good things that have no end
Then she chanted the song of the lodge that is round like the day and the year
and the seasons
Mal Bosland When the Legends Die / Littleton 1968

This poster plan is not meant to be a complete set of instructions but a GUIDE to the most difficult parts for those who want the adventure of building their own Yurt. If you perchance get hung up, have a swim & try again with a clearer head. The purchaser of this plan is entitled to build one Yurt for his own use. He may not manufacture or build for profit without permission. Additional copies of this plan can be ordered from the designer.
Wm S Coperthwaite
BUCKS HARBOR, MAINE 04616

This is a plan for people skilled in building. It is a supplement to the standard 17 Yurt plan and is to be used in conjunction with it. Please read both several times before building.

A. FOUNDATION

For a simple Yurt foundation, dig 22 holes to solid footing below frost line at the locations shown in dia. B or fig 1. Knowledge of the angles is not necessary. Simply lay out the two circles with a tape and divide the outer one into 14 equal parts and the inner one into 7. Place 10" cardboard tubes in them vertically and pack dirt tightly around them. Cut the tubes off level with each other, about 4" above the highest ground surface and fill exactly full with concrete. When completely dry, paint the top of the posts heavily with tar.

B. PLATFORM

Lay out the 7 radial timbers in dia B and cut them to fit at the center (Fig 2). Then spike them together with 20d gal. nails. Cut the ends 13'5" from the center at the angle in Fig 3. Add the inner ring members (Joint detail Fig 4). Now add the 7 rimbers, N as in Figs 4 & 5. Next add the 14 outer ring timbers, making them double in thickness (Fig 5 & dia B). To finish the frame add the 7 timbers, O, as in Figs 4 & 5.

Insulating the platform requires a bottom to hold the insulation. Run a strip of 1" x 1" around the lower part of the triangles as an edge to hold the pycscore bottom in place (Fig 6). Cut 1/4" pycscore to fit and nail in. Fill evenly with 4"-6" of vermiculite. Plank the top of the platform with 2" tongue and grooved stock laid at right angles to the main timber. Remember to mark the center carefully. Nail a long stick to the center as a compass (a string is too elastic) and draw the circle for the outside edge at 13'6" radius and another at a 13' radius for the inside wall. Divide the outer circle in 28 equal parts, starting on a radial timber. In a straight line from these points to the center mark the 13' circle. Draw the 28 faces on both circles by connecting the neighboring points. Now cut the outside edge of the platform at the angle of the ends of the radial timbers.

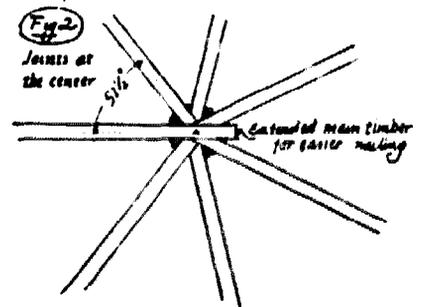
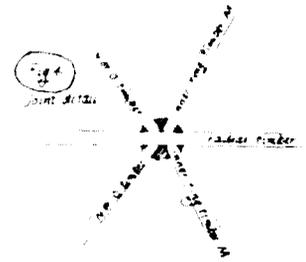
Use the same center and lightly draw a 6'6" radius circle (to use to position the upper platform) and also draw a 2'2" radius circle for the central leg.

The upper platform is made flat on top of the lower one. One of the 2x4 timbers should run the whole width of the platform, or 13'. Choose very good 2x4s for the floor frame (see dia C). Fit the remaining 8 radial timbers carefully (Fig 7), mark to length 6'6" from the center and cut. When these timbers are spaced evenly as possible, measure the lengths for the 10 rim timbers, average them and cut 9. When these are nailed in place (Fig 8) cut the 10th one to fit. One side of each rim timber will be needed another 2x4 spiked to it to help carry the overhang of the curved floor edge. The upper floor is reached through a hatch. Fit the hatch timbers as shown in dia C (for a view of the hatch and ladder leading to it see photo section Fig 12). Floor this platform with 3/4" plywood (Fig 9). See section Floor of the standard plan.

For the legs of the platform, select 11 attractive pieces of 4x4 and cut 10 at exactly 4'7 3/4" and one at 4'6 1/4". All of the legs need three diagonal braces (Fig 10), one to each rim timber and one to its radial timber... the center leg needs 4. These should be made of 2x4 - 20" long, cut with the proper angles at the ends. Cut 2 pieces of 3/4" plywood 8" square to nail on top of the central leg as a bearing block (run the grain of the two pieces in opposite directions).

Raising the platform is the heaviest job in building the Yurt. If you are short of muscle, you can lift it before putting on the plywood. Otherwise get 12 husky people to lift it while 2 scurry around putting legs under so the lifters can rest... rest but remain alert... for until all of the braces are in place, it can easily fall over and is dangerous. Two people can now go around with a hammer and level to tap the legs vertical and nail the legs and braces solidly in place. (Do first one leg and then the opposite... then the two on the quarters... then the center one - be sure to nail the bearing blocks solidly to the frame). Now it will stand alone. Continue nailing until all of the legs and braces are in place. With all available hands, tap, nudge and shove the platform until all the legs are located just inside the 13' circle on the main floor. When all legs are again vertical, nail the legs to the floor with three 10d nails each.

Detail showing angle to cut timbers at joint edge



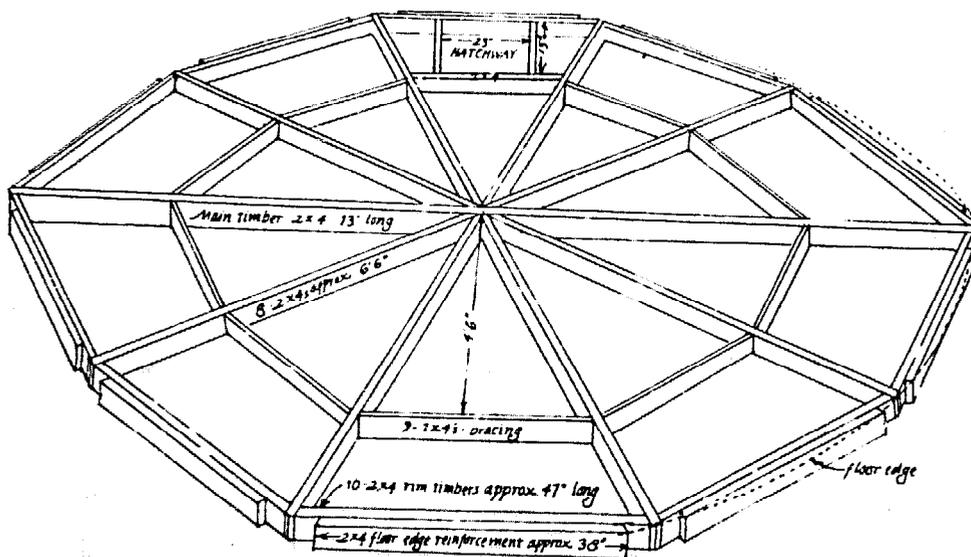
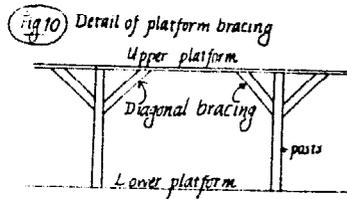
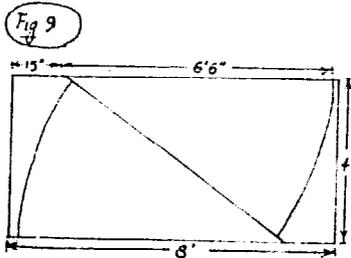
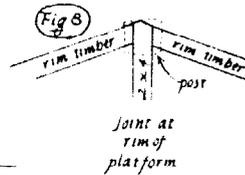
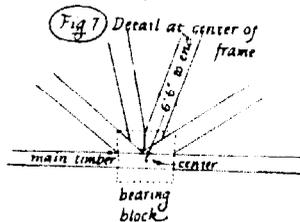
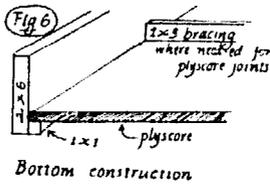
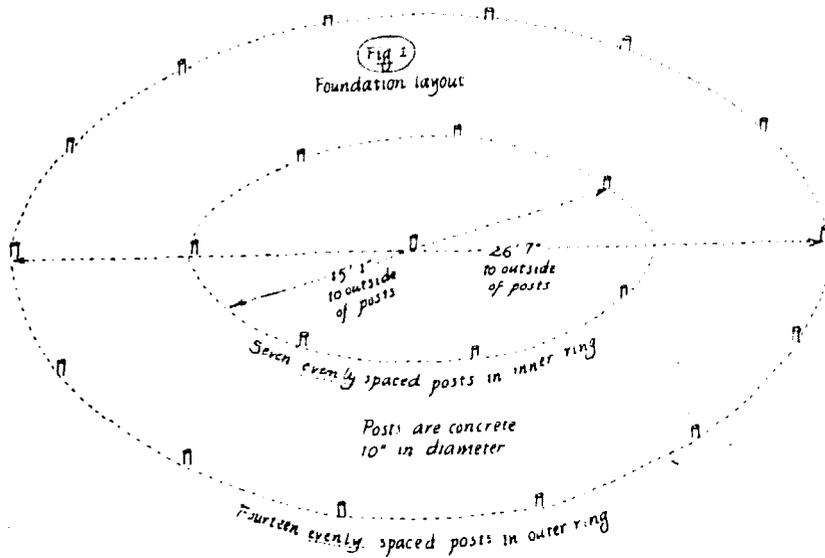


DIAGRAM C Framing Plan of the Upper Floor

C. WALLS

LOWER WALL

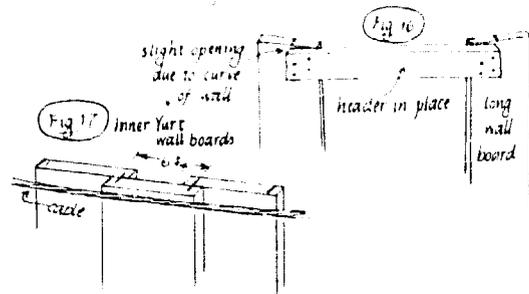
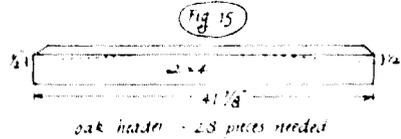
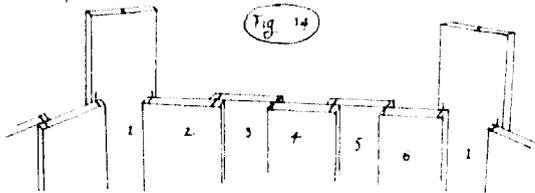
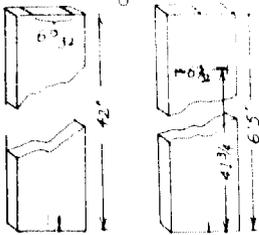
For the inner wall of the lower Yurt, cut 28 pieces of 1×8 6'5" long and 130 pieces 4'2" long (if you wish 2 doors). Divide the faces of the 26" dia circle at the edge of the platform into 6 equal parts. Pick the best side and the best end of the wall boards... the best end goes up and the best side in (if you are using rough lumber you will probably want to have the inside surface planed since it is next to impossible to keep a rough inside wall clean). Mark all of these boards with a center line on both sides of the bottom (fig 11). Mark the 4'2" boards at the top with a space $6 \frac{1}{32}$ " wide (fig 11). The long boards should be marked with the same spacing but at a point $4 \frac{1}{4}$ " from the bottom (fig 12). Nail the long boards to the floor from the outside using a helper to hold the boards in position (see wall section of the standard plan). Nail them with their centers on the 28 corners using two 10d box nails each. Nail a 4'2" board on every other one of the remaining marks on the floor (fig 13). Skip the door ways. Nail in place the three alternating 4'2" boards centered on the floor marks as the others. Move the tops of the boards inward and outward until the lines on the tops line up (fig 14). The long and short boards should meet as in fig 14. Be sure the boards line up... it assures a constant diameter. Nail with 7d galv box nails. Nail carefully with a weight behind to take up the shock... and clinch well. Use about 7 nails spaced evenly down the board. These inner boards can now be nailed solidly to the floor on the inside with two 10d nails each. Prepare the 2×4 headers for the windows and doors. Use hardwood for strength and make 28 of them $41 \frac{1}{8}$ " long with a $\frac{1}{2}$ " curve in the top side (fig 15). Nail these solidly in place with four 10d galv box nails at each end at the top of the long wall boards (but not so solidly as to crack the wall boards). Nail from the inside and clinch. Be sure each header comes just to the center of the long boards (fig 16).

To hold the cable, drive 6d galv nails into the headers on the outside, $\frac{1}{2}$ " from the top and spaced 6" apart. Directions for tightening the cable are found under "Tension Band or Cable" in the standard plan. Make sure the cable clamps are very tightly fastened. The window sills also serve as wall stiffeners. Cut 26 of these from good clear 2×4 s $33 \frac{1}{16}$ " long and nail them in place just at the top of the lower wall boards, with the broad edge upper most... nail solidly with 8d nails.

UPPER WALL

The wall of the upper Yurt goes up as described in the standard plan under Walls. The major difference is that the outer 46 wall boards are now $58 \frac{7}{8}$ " long and the inside 46 are $59 \frac{1}{4}$ " long (keep them separate as they easily become confused... strange as it may seem, the outer boards are the shorter ones). Use 8" boards and mark them as in fig 17. After the boards are up, fasten the cable as in the Wall section mentioned.

Fig 11 wall board marking



D. ROOF

Take 168-8" boards 16' long and start nailing 7'6" from one end taper them to 1 5/8" wide (fig 18). This tapering can be easily done with a draw knife if the board is clamped edge up on a bench. Lay half of these boards in place on the roof, one to each long wall board and two spaced evenly in between. At 6 1/2" from the big end of the 28 main roof boards, drive a 7d nail part way in on the underside to keep them from slipping off the wall. This temporary positioning nail is used for adjustment (fig 19). Be sure all of the boards are aiming exactly at the center of the roof. A pole set up with a bright plumb line hanging precisely at the center helps in the lining up (fig 19). The boards between the main boards must have their positioning nails adjusted to the header. Adjust these boards with the nails until all are snug at the skylight and none are overlapping.

Nail all of the main boards first. Drive one nail at each wall contact first for stability using 8d nails and then drive in 2 more. Nail carefully. (By nailing the main boards in first all the way around, you have distributed the error so that it does not pile up at one spot). When these boards are in place, nail the 2 between each pair (marking the upper wall to show the position of the boards helps to prevent error due to slippage while nailing). Tap the last few boards in to place to insure a tight fit. Over these, nail the second half of the roof boards, shifted enough to fit and tapped tightly into place (fig 20). Nail from the inside using 8d galv. nails, one every 6". Start at the top on the inside and nail as far down the roof from the skylight as anyone can reach using a 5 lb hammer to nail against. After completing this all the way around, clinch them well with a heavy hammer held on the inside (nail heads inside & clinched ends out looks better).

Next nail the lower half of the roof completely. With the completed lower half as a support, you can now nail the lower half of the upper section. Work around the roof first starting at the inner wall... and then work upward. (This allows the person with the backup hammer to be on the roof supported by the heavily nailed part... It's a good job for a youngster).

Next cut 42-8" boards 9' long to fit the hollows in the outside of the roof. The size of the hollows has been affected by variations in local lumber sizes... these pieces will take up that variation. Two boards are gotten from each diagonal cut (fig 21). These will be a little oversize (actual dimensions approx. 6 15/16" x 8' 5 1/2") because it helps to leave these boards a little long to be trimmed to fit after they have been tapped solidly into place and nailed from the inside. Around the skylight opening is needed a stiffening band. First trim the ends of the roof members with a coping saw so that a vertical surface remains to take the stiffening band. 1/4" by 2 1/4" of good quality. Soak them 24 hrs. and then bend them into place and nail them with 7d galv. box nails. There should be 4 bands totaling 1" in thickness. Stagger the joints. Make the band flush on the inside and project slightly on the outside. (Drill holes for the nails).

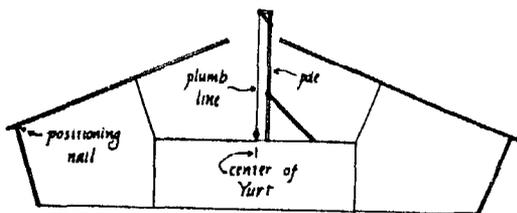


Fig 19 Plumbline setup & positioning nail

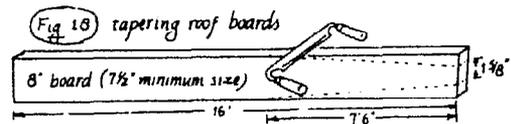


Fig 18 tapering roof boards

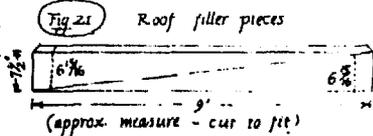


Fig 21 Roof filler pieces

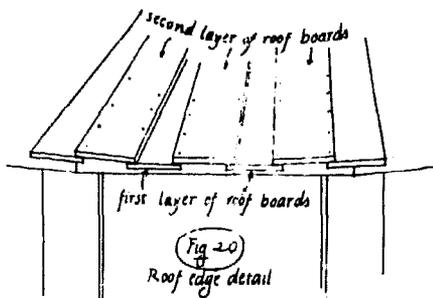
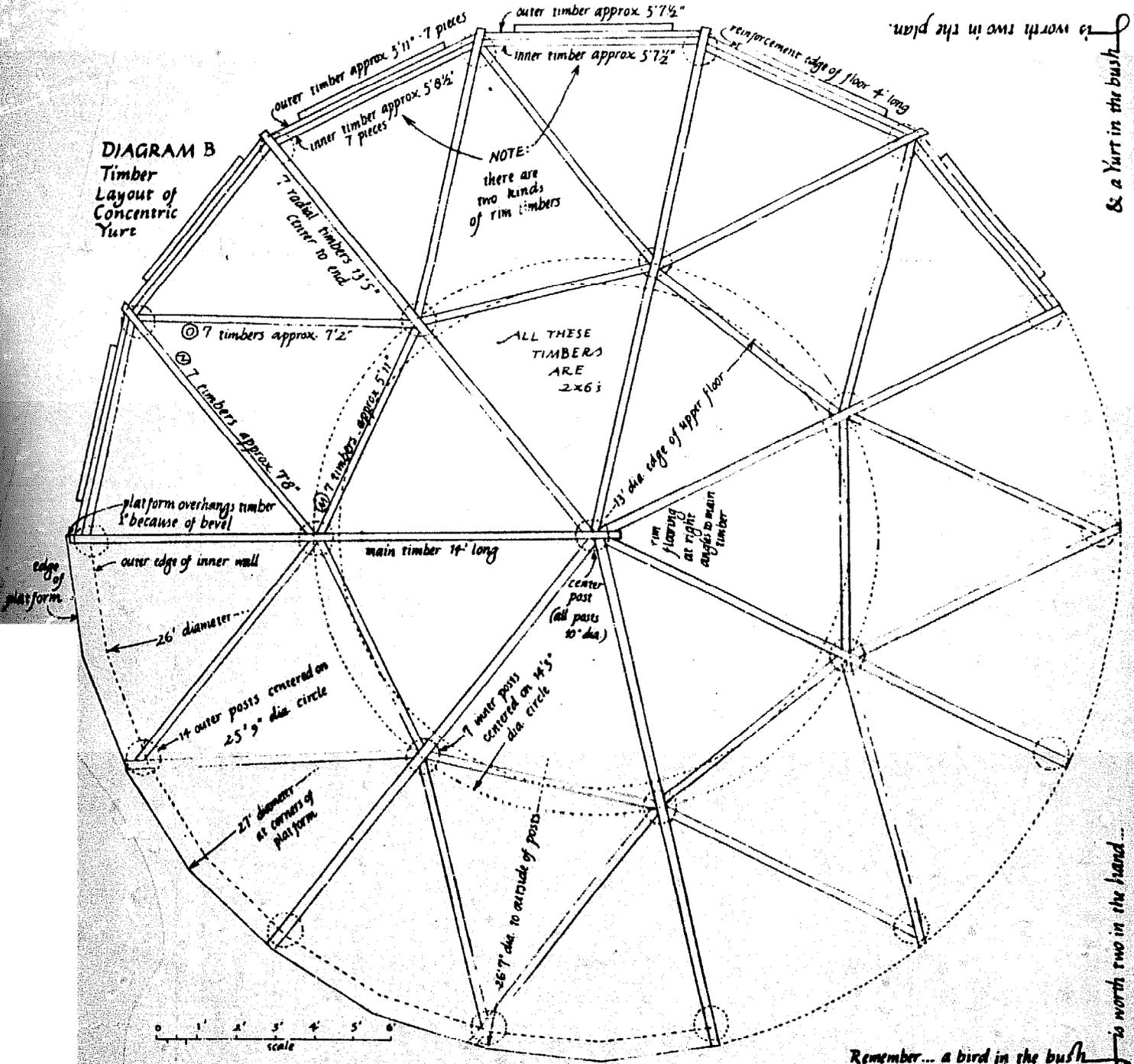


Fig 20 Roof edge detail

DIAGRAM B
Timber
Layout of
Concentric
Yurt

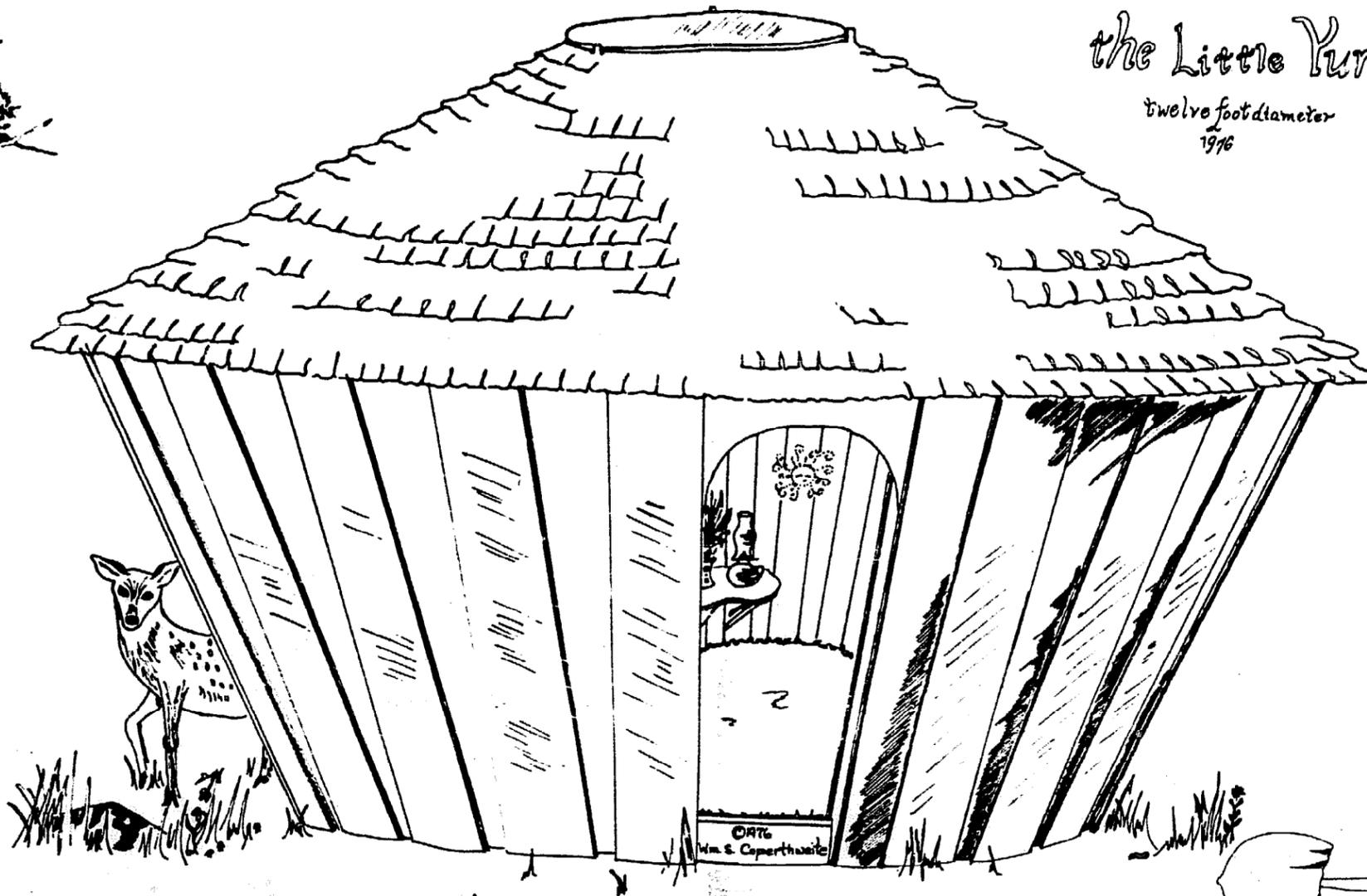


is north two in the plan

is a Yurt in the bush

Remember... a bird in the bush

is north two in the hand...



the Little Yurt

twelve foot diameter
1976

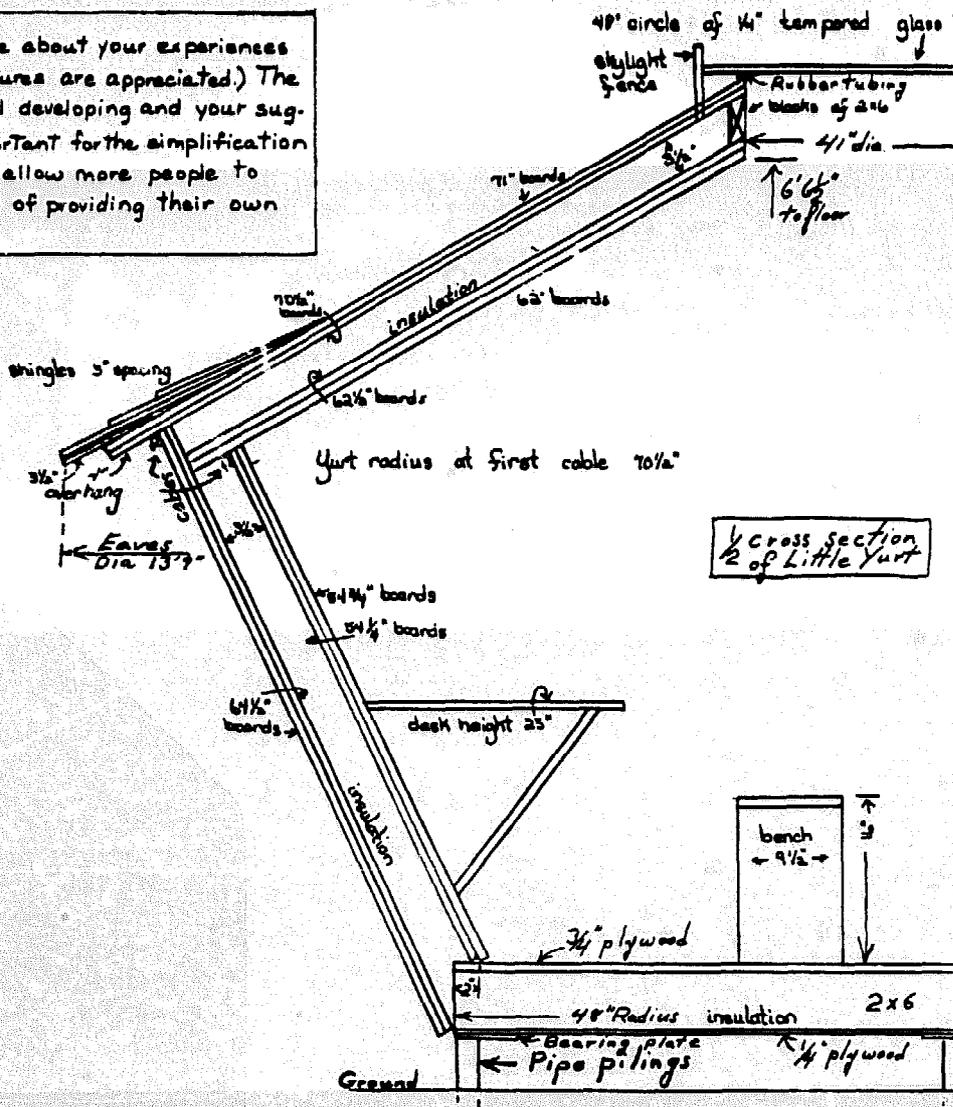
The Skin Horse said to the Rabbit:
"Generally, by the time you are Real, most of your hair has been loved off,
and your eyes drop out and your joints get loose and you get very shabby.
But these things don't matter at all, because, once you are Real, you can't be
ugly, except to people who don't understand."
Margery Williams. The Velveteen Rabbit



This Yurt design has its origins in the Folk Wisdom of Ancient Mongolia where the prototype has, for thousands of years, been found to withstand the severe cold and violent winds of the steppes. This structure has been designed to provide an opportunity for people to play a larger role in creating their own shelter... especially for those desiring to live in simplicity...with the belief that a

more personal, intimate relationship with our environment is desirable. The low profile and the curved walls of the Yurt help it to blend with the natural environment. This is an attempt to design a dwelling that will not challenge, not dominate, not contend with nature but seek to be in harmony with it. The purpose of this design is to reduce the skills needed in building to a minimum and still have beautiful, inexpensive, permanent shelter.

Please write to me about your experiences in building. (Pictures are appreciated.) The Yurt design is still developing and your suggestions are important for the simplification of the design to allow more people to experience the joy of providing their own shelter.



1/2 cross section
2 of Little Yurt

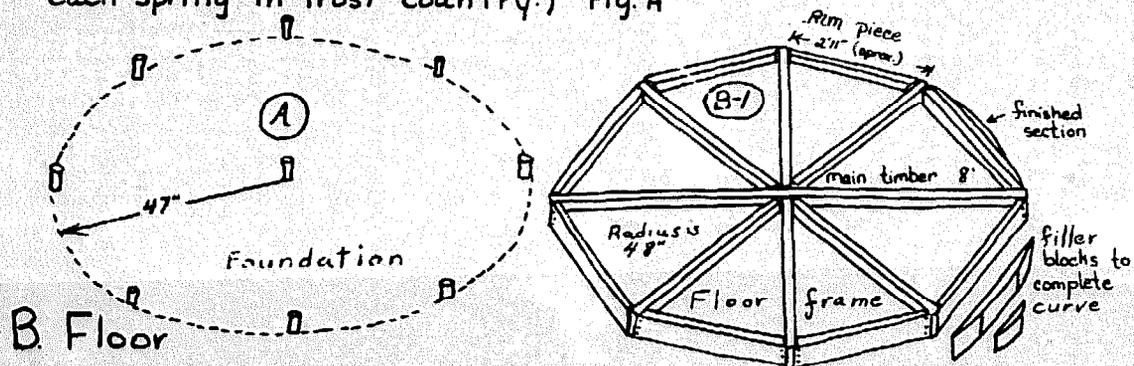
⊙ means extra care.

This plan is not meant to be a complete set of instructions but a GUIDE to the most difficult parts for those who want the adventure of building their own Yurt. If you, perchance get hung up, have a swim & try again with a clearer head. The purchaser of this plan is entitled to build one Yurt for personal use and may not manufacture or build for profit without permission.

Additional copies of this Plan can be ordered from the designer—
Wm. S. Coperthwaite
Bucks Harbor, Maine 04618

A. Foundation

Draw a circle of 47" radius on the ground and divide it into 8 equal parts. At the 8 points and at the center drive the 2" pipes for pilings, (the 47" radius is to the outside of the posts) until level at the desired height. Allow at least 4" of air space under the Yurt for dryness. The lower the Yurt, the better it will blend with the landscape. (Other foundations can be used. Wooden posts can be dug in below frost line. Large rocks set level on the ground will work — but need to be leveled each spring in frost country.) Fig. A

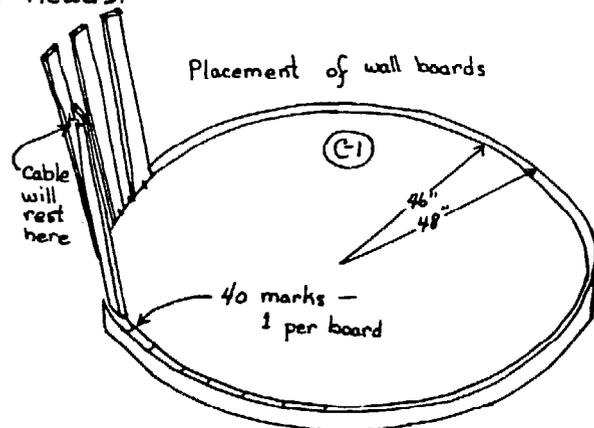
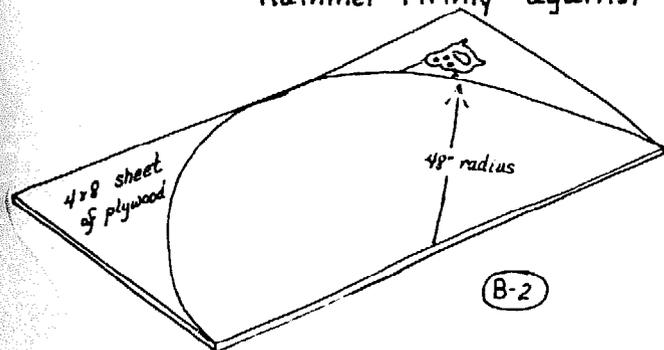


Make a framework of 2x6 timbers as in sketch B-1. Nail carefully together using the 16 penny nails. On each half of the frame, nail in three of the rim pieces first and then cut the fourth one to fit. Cut the four plywood sheets as in sketch B-2 using a fine sharp handsaw with hand held low as in the sketch. Around the outside of the rim of the frame, filler blocks are needed to round out the curve. These can be cut with a handsaw, power saw, draw knife, band saw, or hewn with an axe from 2x6 pieces. Careful work with an axe does it nicely -- be sure to toe nail the pieces on first to protect your axe while hewing and then nail heavily afterwards. (Fig. B-1)

Next nail the $\frac{1}{4}$ " plywood to the frame using the ring nails spaced 4" apart, and coat it with old motor oil to protect it from dampness. Now turn the platform over and place it on top of the posts with the steel bearing plates on the top of the posts to protect the wood. Now you can fill the frame level with pouring insulation and nail on the top layer of heavier plywood with ring nails spaced 4" apart. (Boards can be used in place of the plywood. If so, the floor should be made of two layers nailed at right angles to each other.)

C. Wall

Find the center of the platform and draw a circle of 46" radius. Next divide the platform edge into 40 equal parts and with a 48" stick pivoting on the center extend the 40 marks to touch the 46" radius circle. Now put a center mark on the inside of the bottom of all of the 54" wall boards. Mark the top of each of these boards as in Fig. C-2. Next nail the 54 1/4" boards in place with their inner surfaces on the circle, centered on alternate marks see Fig C-1. Use 10 penny nails. Now nail the 20 54 3/4" boards in place on the remaining marks on the floor inside of the others. With their outer surfaces on the circle move the tops of these boards inward and outward until the lines on the tops of neighboring boards line up as in Fig. C-2 — this is a place for accuracy. Nail these boards together with 7 penny nails spaced every 6". Have someone hold a hammer outside while nailing to dampen the vibrations. Then clinch the nails firmly (bend the points over) with a second person holding the hammer firmly against the heads.



D. Tension Band or Cable

The secret of the strength of the Yurt is in the tension band. It holds the building together by going around it at the eaves. Great care and respect should be used at this point. Place a ring nail about 1/2" from the top of each board juncture in the wall. Leave about 3/8" of the head out to take the cable (C-2) remembering to have a hammer held on the inside while nailing. Lay the cable over the nails with the exception of the last 8 or 10 nails. The shortest way around the Yurt is not horizontal, so let the cable sag here to its shortest distance. Put the clamps on and gently force it up into place. It wants to be snug but not "fiddle tight." If it is too loose, repeat

The Yurt Foundation

The Yurt Foundation is essentially an information pool and has been set up expressly for the purpose of providing the technical knowledge needed by those who wish to explore simpler forms of living in closer contact with nature — ones that are less costly in human and ecological terms. It is focused on the collection of traditional knowledge from the world at large. When possible this knowledge will be blended with the knowledge of modern science to design new solutions to old problems that will match man's needs more closely. The results will be published with the hope of stimulating more people to expand the search for simpler ways of living.

Tools

skilsaw
handsaws - rip & crosscut
hammers
sledgehammer 5 lb.
level
measuring tapes
squares
adjustable wrench
paper & pencils
saw horses
ladder - 6 ft.
stapler
hack saw
strong knife

Hardware

Pipe 2" gal. 54" long 9 pc.
1/8" steel plate 6" sq. 9 pc.
(round if you like)
Cable 3/8" gal. 45 ft. 2 pc steel
(1/4" will serve)
Cable clamps 3/8" 4 pc.
Hinges double strap 5"
2 pc. with screws
Wooden wagon wheel
40-46" inside diameter

Materials — Use Dry Wood

White Pine 1 x 12 planed one side (if poss.)
54 1/4" 20 pc (inner wall)
54 3/4" 20 pc " "
64 1/2" 46 pc (outer wall)
12 ft. 18 pc (inner roof)
12 ft. 18 pc (rough if poss.) (outer roof)
1 x 8 75" 18 pc " " " " " "

Spruce or fir - Floor timbers and skylight blocks - 2x6 12 ft. 10 pc (one extra)

Plywood - 3/4" two 4x8 sheets CDX
1/4" two sheets construction grade ex.

1/2" 30x54" ACX (door)

Desk (optional) see drawing

Glass

Skylight 47 1/2" - 48" circle of 1/4" or 3/32" clear safety plate or tempered

Door 19" x 16" oval 3/32" thick

Windows 11 1/2" x 16" double strength (as many as needed)

Insulation

Floor 20 cu. ft. pouring insulation

Walls and roof 260 sq. ft. fiberglass 4" foil backed (as long and wide as poss.)

Nails - 16 penny gal. box 3 lbs.

10 " " " " 7 "

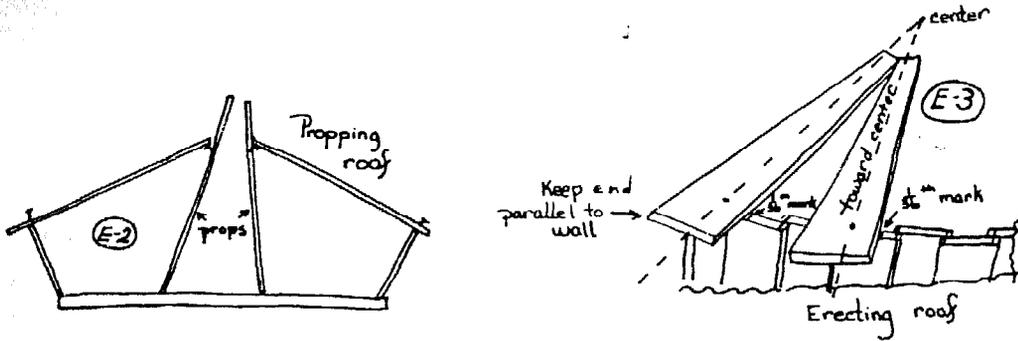
8 " " " " 15 "

7 " " " " 7 "

1 3/4" ring nails 2 "

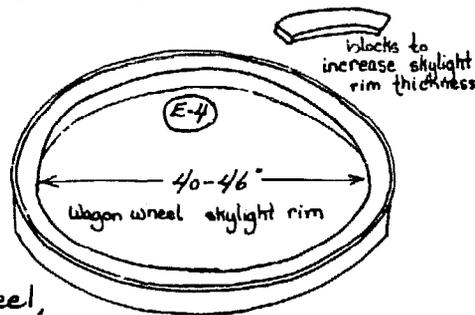
Shingle nails enough to do 2 sq. of shingles

Shingles - 2 squares cedar shingles

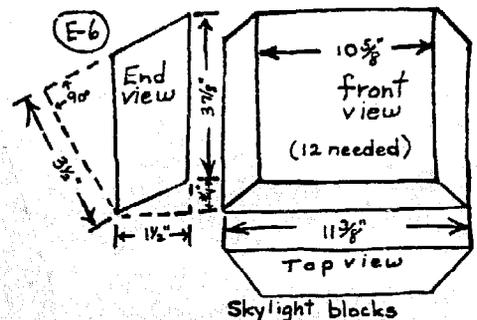
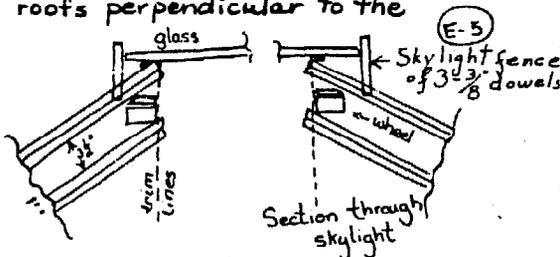


Next nail the 62 $\frac{1}{2}$ " boards in place over the gaps in the first layer using one 10 penny nail at the outer edge of each board first. When all are snugly fitted at the top (you may have to move that outer nail a little) nail fast at the end. Then use 7 penny nails and nail from the inside outward spacing them every 6". Have someone hold the sledge to back up your nailing. Then clinch the nails. Good clinching makes a stronger roof.

Compression band — if you can find an old wagon wheel to use for a compression band, it saves a good bit of work. The wheel should measure 40-46" inside diameter. (Fig. E-4) Cut out the spokes and hub and screw the rim in place from below centered on the skylight. Next add pieces of pine boards, cut to the curve of the wheel, on top of it until it will provide a distance of $3\frac{1}{2}$ " between the inner and outer roofs perpendicular to the surfaces. (Fig. E-5)

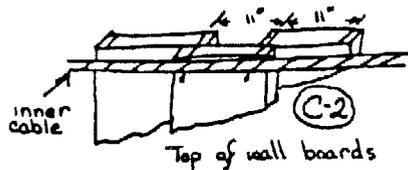


If you can't scare up an old wagon wheel, you can make a compression band by cutting pieces of 2x6. Cut 12 pieces $11\frac{3}{8}$ " long and nail or screw them carefully in place at the lower edge of the skylight. They must fit tightly together. (Fig. E-6) Now you can remove the props.



the process with the cable off a few more nails. If too tight, loosen it a little.

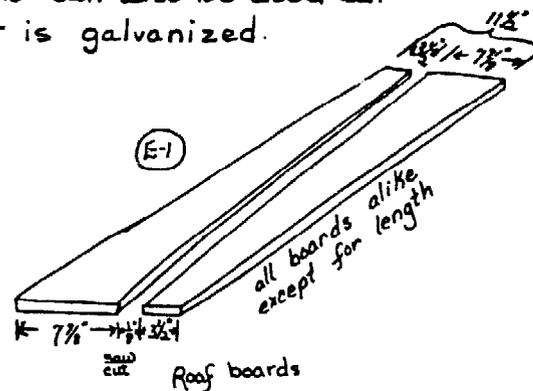
Next tighten the clamps very tightly and one by one remove those last few nails and replace them in the same holes with the cable now above them.



* Do not force the wall too tightly with the cable or the wall board nails will start to pull. At this stage the wall will feel flexible. The roof will make it rigid. A good cable to use is the $\frac{3}{8}$ " guy wire that utility companies use. Much of this is discarded each year, and local junk dealers often have it. $\frac{1}{4}$ " cable can also be used but is less common. * Be sure it is galvanized.

E. Roof

Cut the roof boards as in Fig. E-1. From the 1x12 boards cut 18 boards each of the pieces 62", 62½", 70½", and 71" long, (making 36 pieces of each size). Note: a 12" board is



normally 11½" wide. If your boards are slightly wider or slightly narrower than this, keep the 3½" dimension the same and vary the wide piece. If the boards are planed only on one side, it is important to make the diagonal cut the same direction each time — so mark and cut all boards with the planed side up — if you don't, the ceiling will be alternately rough and smooth.

Divide the top of the wall into 36 parts. Draw a line across each 62" board 3½" from the big end on the smooth side to allow for overhang and nail in place on top of the wall boards with one edge on the 1/36th mark and using 1-10 penny nail. Prop the roof boards up with poles with nails driven in 79" from the end. (2x2s work well for this but any light pole will do) See Fig. E-2. Extra hands help in holding the props. Be careful to see that each board is aimed at the center of the Yurt. (Fig. E-3) When all the roof boards are up, raise or lower the poles until all the roof pieces meet snugly. Now put 2 more 10 penny nails in the wide end.