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Michigan State University Cooperative Extension Service
4-H Club Bulletin
P.G. Lundin, Assistant State Club Leader
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FIRST YEAR

HANDICRAFT CLUB WORK

By
P. G. LUNDIN

MICHIGAN STATE COLLEGE
EXTENSION SERVICE
EAST LANSING

Michigan State College and U. S. Dept. of Agriculture cooperating. R. J. BALDWIN,
DIRECTOR EXTENSION SERVICE, Michigan State College, East Lansing. Printed and
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REQUIREMENTS FOR HANDICRAFT CLUB WORK

1. Handicraft club members must be between the ages of 10 and 20 years inclusive. First-year members must be 10 years old by January 1.
2. Handicraft club members enrolling for the first year's work must make five articles. The sanding block is the only required article. The other four articles may be selected from the list of first-year exercises.
3. Each handicraft club member must make an exhibit of his work and his report at a club, community, district or county exhibit.

Basis of Award

The work of handicraft club members will be judged on the following basis:

Wood work.

Wood finishing.

Interest and attitude as a club member.

Completeness and correctness of report.

(Revised July 1942)

(Reprinted June 1944)

HANDICRAFT CLUB WORK

P. G. LUNDIN
ASSISTANT STATE CLUB LEADER

Purposes of 4-H Handicraft Club Work

Handicraft work offers boys excellent opportunities to learn the fundamentals of manual training. This includes not only construction work but also the study of native trees, wood identification, selection and care of tools, reading and drawing plans, preparing and applying simple finishes, and many other phases of the work. Practice and knowledge gained from completing satisfactorily the handicraft project will not necessarily make carpenters of the boys, but it should equip those boys with the ability to plan and make many of their own articles.

The handicraft club purposes to do more than just teach the fundamentals of successful manual training or carpentry. The social club meetings offer chances for association with other members. Members should learn to conduct club meetings, and to follow some definite plan and an outlined program for each of the 4-H handicraft club meetings. Handicraft club work develops rural leadership, emphasizes the importance of organization and cooperation and promotes a four-fold development of head, heart, hands, and health.

In the subject matter presented in this bulletin it is intended to give only a general working knowledge of the different topics discussed. For a more detailed study of any one subject, the club member should obtain some of the bulletins, pamphlets and reference articles listed in the back of this bulletin.

Organize the club during October or November. As soon as the club is organized mail the enrollment blank to the county extension agent. Clubs should plan their work so that all project requirements may be completed by the middle of March or the first part of April.

TOOLS AND EQUIPMENT

While it is desirable to have a complete set of tools it is not absolutely necessary. These tools will more than meet the requirements for a first year club:

Back Saw
Cut-off Saw
Chisels, $\frac{1}{4}$ ", $\frac{1}{2}$ ", and 1"
Hammer (not too heavy)
Screw Driver
Brace and Bits, $\frac{1}{4}$ ", $\frac{1}{2}$ ",
 $\frac{3}{8}$ " and $\frac{3}{4}$ "

Smoother Plane
Coping Saw
Tri-square
Marking Gauge
Two-foot Rule
Knife
Oilstone

Note: The club members need not necessarily make articles listed in this bulletin. Design, dimensions and lumber requirements can be changed to fit the conditions. With the permission of the extension agent or local leader, the club member may make articles from plans obtained elsewhere, but the articles selected must compare in difficulty of construction to those articles listed in first year work. Power machinery should not be used in making first year exercises.

Selection and Care of Tools

Tools should be selected very carefully. It is never true economy to buy cheap tools, for they usually will be found wanting in quality and temper. These defects will only be noticed after use, and if the tools are of standard grade the defects will be made good upon complaint to the dealer. Having once purchased a set of good tools it is extravagant not to take the best possible care of them.

In the first place, it is important to have a clean, dry place for tools and, after using, to return them to their proper place. The tools may be kept in a cabinet over the bench or in the drawers of the bench itself. In either case it will be found easier to put the tools back in their places if a picture of each tool is placed on the rack behind it so that at a glance one can see where it belongs. (See Fig. 1.)

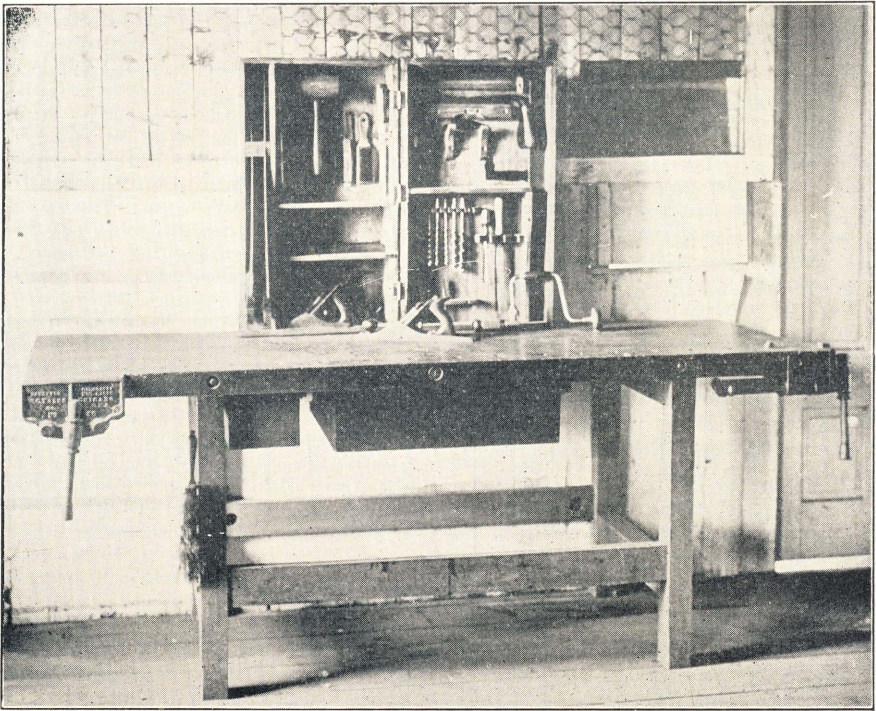


Fig. 1. Work bench and tool chest.

Oil should be used on tools to keep them from rusting but should be used sparingly. If tools become rusty the rust should be removed by rubbing with pulverized pumice stone, such as is sold at all hardware stores for rubbing down fine finishes. They should then be thoroughly oiled.

All tools bearing an edge should be kept well-sharpened, for it will be found that much time and energy is wasted in using a dull tool, and the quality of the work is also impaired.

Care should be taken that the edges of plane bits and chisels are not needlessly dulled by contact with metal or dirty surfaces. In using old lumber, care should always be taken to remove all the grit and dirt possible by brushing sharply. Never use the plane after sandpaper has been applied, because the fine particles will dull the plane bit.

TOOLS AND THEIR USES

HAND SAWS*

Hand saws are of two kinds, cross-cut and rip. The first is for sawing across the grain, the other for sawing in the direction in which the wood splits easily.

Cut-off Saw

The cut-off or cross-cut saw, as the name implies, is a saw used for cutting across the grain. There are usually 8 to 12 teeth per inch and the teeth are set alternately from right to left. The purpose of setting the cross-cut saw teeth or bending the teeth out is to make the saw cut a wider kerf than the width of the blade, so that the saw will not bind between the two cut surfaces.

Take a knife and cut two deep lines in the surface of the wood, and then cut between these lines with a chisel, and a smooth clean cut only at right angles to the grain results. In the latter cut the two tools, the knife and the chisel, work together. An examination of the teeth of a cross-cut saw will show how the knife or chisel may be combined to cut wood at right angles to the fiber. The saw teeth of the cross-cut saw are set so that the point of the first tooth is on one side of the blade and the adjacent point is on the opposite side. These adjacent points alternate from one side to the other the entire length of the saw. Cross-cut saws are filed on a bevel and rip saws are filed straight across, or at right angles to the blade.

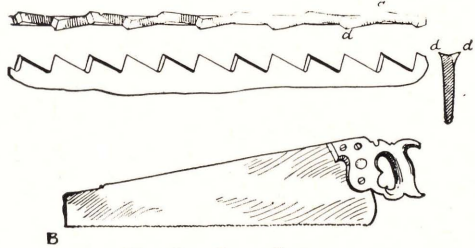


Fig. 2. Cut-off saw.

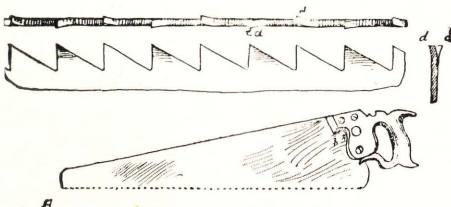


Fig. 3. A rip saw. View and section of setting teeth.

Ripsaw

The rip saw is a saw used for ripping lumber—that is, sawing with the grain. It has 3 to 7 points per inch, so sharpened as to be like so many small chisels. The edges of these points are filed at right angles to the blade.

*Figures shown in this section are from "Elements of Woodwork and Construction". Copyright, 1911, by Charles A. King. American Book Company, Publishers.

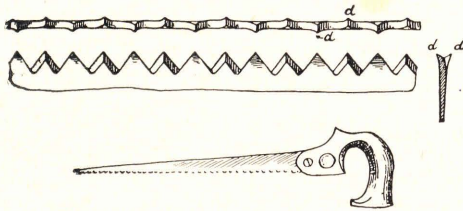


Fig. 4. Compass or keyhole saw.

The Compass Saw

The compass or keyhole saw is used where a large saw is impracticable, or for cutting curves. It is started by boring a hole and inserting the point of the saw in this hole.

Back Saw

The back saw is used upon fine work. It is filed like a cut-off saw, but generally has about 12 teeth per inch.

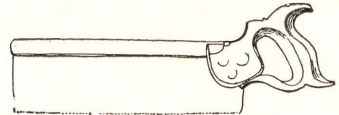


Fig. 5. Back saw.

Use of Hand Saws

In using hand saws, the most advantageous position is obtained by placing the board upon a pair of "horses". Whether ripping or cross-cutting, the manner of starting the cut and guiding the saw throughout the operation is the same.

The index finger of the right hand extends along the side of the handle to assist in guiding the saw. The thumb of the left hand rests upon the board at the place where the cut is to be made. With the right hand the saw blade is pressed lightly against this thumb, and this assists in setting the saw at the desired point.

Begin with short, light, easy strokes, holding up on the saw so that it will take small "bites" at first. Gradually increase the length of the stroke until the full arm stroke is obtained. Avoid short, jerky strokes and undue pressure. The cutting edge of the saw should travel in a straight line and not rocked or forced.

The saw will cut best when held at an angle of about 45° with the board. Stand so as to permit the arm free and easy movement, keeping the eye, hand and saw in the same plane. When nearing the finish of a cut lessen the length of the stroke and hold up the saw so that little weight rests upon the wood. If cross-cutting, reach over the saw and grasp the overhanging piece to prevent splitting.

Planes

We have two types of planes, one for cutting in the direction of the grain, and one for cutting at right angles to it. Even a hasty glance at these two planes will reveal a marked difference. The cutting part of one stands much more nearly perpendicular to the base of the plane than does that in a block plane. The size and general shape of the two are so different that the worker will readily learn which one to use for the work at hand.

Adjustment of the Plane

The adjustment of the modern plane may be understood by a careful study of Fig. 6 and by comparing it with the plane itself. The cutter iron or bit (1) and the cap iron (2) are the essentials of the tool and it is upon their condition and adjustment that the efficiency of the plane depends. If the cap iron is set too far from the edge of the iron and

if the cut is made against the grain, the shaving will not break before it leads the iron into the wood. If the cap iron is set somewhat less than $1/16''$ from the edge of the cutter according to the wood being planed, it will break the shaving nearly as soon as it is cut and will result in a smooth, clean surface.

It will be seen that the closer the bottom of the cap iron (2) is set to the edge of the cutter (1) the shorter the shavings will be and the more smoothly the plane will cut. The plane iron screw (3) holds the edge of the cutter (1) and the bottom of the cap iron (2) into their desired relation. The cap lever (4) being pressed against the under side of the head of the cap screw (5) by the cam (4a) holds the iron in its place and presses the cap iron (2) firmly against the top of the cutter (1). Unless the cap iron fits the face of the cutter perfectly, the plane will not work satisfactorily. The frog (6) carries all the adjusting mechanism of the plane and may be moved backward or forward to reduce or enlarge the mouth (6a), which should be no larger than is necessary to allow the shavings to pass freely. The frog rarely will require readjusting after it has been properly located.

The Y lever (7) forces the plane iron (1 and 2) in or out simultaneously which governs the projection or set of the edge of the cutter (1), beyond the face or sole (b) of the plane stock and thus the thickness of the shavings which the plane will cut. The adjusting nut (8) moves freely upon the screw (8a) and operates the Y lever (7). The side adjustment (9) is for the purpose of forcing the iron to cut in the exact center of the width of the face (b) of the plane. The two frog

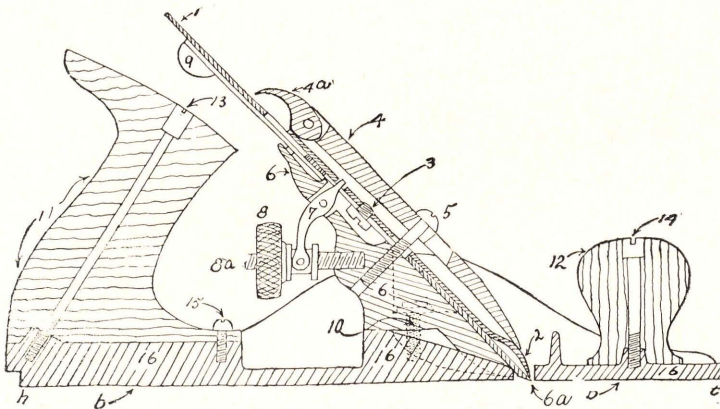


Fig. 6. Section of iron plane.*

- | | |
|----------------------------|-------------------------------|
| (1) cutter iron or bit | (8a) vertical adjusting screw |
| (2) cap iron | (9) lateral adjustment |
| (3) plane iron screw | (10) frog screw |
| (4) cap level | (11) handle |
| (4a) cam | (12) knob |
| (5) cap screw | (13) handle bolt and nut |
| (6) frog | (14) bolt knob, and nut |
| (6a) mouth | (15) handle and screw |
| (7) Y lever | (16) bottom or stock |
| (8) vertical adjusting nut | |

*From "Elements of Woodwork and Construction". Copyright, 1911, by Charles A. King. American Book Company, Publishers.

screws (10) hold the frog rigidly in the position which will make the throat (6a) of the desired size.

The face or sole of the plane (b) must be kept perfectly flat; else good work cannot be done. The ends of the plane h and t are called the heel and toe, respectively. The mouth of the plane between (6a) and (2) must be kept clear of shavings or it may become clogged. In setting a plane do not pass the fingers over the face or sole as cut fingers may result. Hold the plane face up in front of yourself with the left hand and look toward the light, when the exact projection of the cutter may be seen. This leaves the right hand free to make the adjustments. This is the workmanlike way of setting a plane.

Ruler

The most common measuring rule is the two-foot rule, which for convenience in carrying has been made to fold together. It is usually graduated, that is marked off into sixteenths, eighths, quarters, halves and inches. Better wooden rules are bound on the edges with brass to prevent wearing. A yardstick may serve as a rule on many occasions.

The Marking Gauge

The marking gauge is used in drawing a line parallel to the straight edge. The parts are called the bar, head, thumb screw and point. The bar has graduations in inches and fractions thereof. A marking point or spur should be sharpened to an obtuse wedge shape. A spur thus sharpened will make a shallow line, although one that is easily seen. In studying the gauge it should not be assumed that the scale of the beam is correct, for when the spur is sharpened it is not likely that the point will come at the zero mark on the scale. The head may be set to the required dimensions and the set screw turned lightly against the beam. Then with a separate scale the measurements may be set and the head brought to the proper dimensions by a light tap on the bench. The set screw is then made tight and the measurement

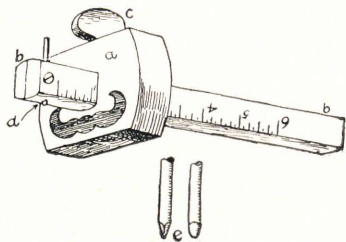


Fig. 7. Marking gauge.*
a. head b. stick c. thumb screw
d. point

checked by measuring again to make sure that the head has remained in position. The screws in the slot are for clamping the spur and holding it in position as well as to allow it to be removed for sharpening. In making a line with a gauge the head should always be held lightly against the marked edge or face. The face of the beam on which the spur projects is made oval and should always be placed in contact with the surface upon which the line is to be made. The hand should be placed on the gauge, the thumb being placed directly back of the spur. The oval face of the beam admits turning so that the spur may be made to cut a deep or shallow line. Shallow lines are preferred as the deep lines are generally crooked. When the line is made it should be exactly parallel to the straight edge.

*From "Elements of Woodwork and Construction". Copyright, 1911, by Charles A. King. American Book Company, Publishers.

Tri-square

The tri-square is used for laying out work and in testing faces, edges, and ends to make certain that they are "true". In testing a block of wood to see whether a face and an edge are true the handle of the tri-square should be placed firmly against the face and then slid down until the blade touches an adjoining edge. If the face and edge fits the tri-square perfectly, they are true, that is, they form a right angle. The parts of the tri-square are the blade and the handle. These parts are riveted firmly together so that they form a right angle. The blade is graduated in inches, halves, quarters and eighths. Tri-squares may also be obtained, graduated in the metric system. The blades differ in length from 2 inches to 12 inches. A six-inch blade is about the right size for all practical purposes.

Chisels

Chisels are catalogued according to their size and length. The size of a chisel is designated by the width of the cutting edge and ranges from $\frac{1}{8}$ inch to one inch by eighth inches; as, $\frac{1}{8}$ inch, $\frac{1}{4}$ inch, $\frac{3}{8}$ inch, $\frac{1}{2}$ inch and so on, and from one to two inches by quarter inches. All chisels are made with blades having square edges or with beveled edges. The latter chisel costs slightly more than the square edge and has some advantages in the ease of sharpening.

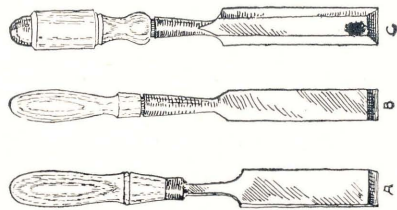


Fig. 8. Chisels.

Auger Bit

Auger bits usually come in sets of 13, ranging in size from one-quarter to an inch by sixteenths; that is $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$, $\frac{7}{16}$, and $\frac{1}{2}$.



Fig. 9. Auger bit.

The size of the bit is the size of the hole that is to be bored and is marked on the shank of the bit as for 5, 6, 7, and 8 indicating, of course, the number of sixteenths. Bits for boring holes larger

than one inch may be obtained but an expansive bit is a very efficient tool with wider range of usefulness and will cost much less than a set of bits exceeding one inch of the type shown. The cutter of the expansive bit may be adjusted and held in position by a screw thus regulating the size of the hole to be bored. The expansive bit is usually made in two sizes, the smaller size boring holes from $\frac{5}{8}$ inch to $1\frac{3}{4}$ inch and the larger size from $\frac{7}{8}$ to 3 inches. Each size is provided with two lengths of cutters.

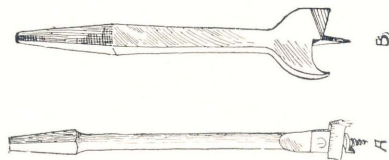


Fig. 10. Center bit and expansive bit.

The Gimlet Bit

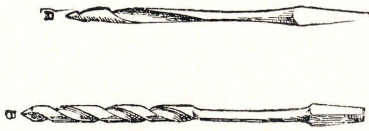


Fig. 11. German bit and twist drill.

of splitting the wood as the drill comes through.

The gimlet bit is made in sizes ranging from $\frac{2}{32}$ inch to $\frac{12}{32}$ inch by a difference in size of $\frac{1}{32}$ inch. This type of bit is good for boring small holes. When boring too small a piece one must be careful not to split the wood. A metal twist drill may be used in place of the gimlet with less danger

Bit Braces

All the bits mentioned above are driven by means of a brace, the most general form of which is called the brace. A ratchet brace for the small additional expense will probably be more satisfactory for handicraft club members. The ratchet is an arrangement which enables one to drive the bit where it is not possible to make a complete revolution of the brace. This result is accomplished by means of two pawls which may be made to fit in a notched wheel. When both pawls are resting in the notches the brace works the same as the simple brace. By turning a collar one or the other of the pawls may be raised and held out of the notch. If you wish to drive a bit into a corner where the brace will not make a complete turn, one pawl may be left in the notch and the other raised. The forward motion of the brace drives the bit. A backward motion leaves the bit stationary while the pawl which is in the notch slips back and takes its place in another notch ready to drive the bit forward on the forward stroke.

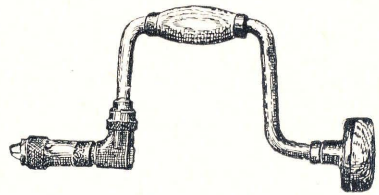


Fig. 12. Ratchet bit brace.

Reading Drawings

It will be impossible to give full details about drawings, construction and assembly for every article that is listed in this bulletin. A few suggestions, however, may be of benefit to the beginner.

All drawings and plans are difficult to read and understand. It should be kept in mind that a drawing shows the dimensions of each part of the article and how these parts join together. Solid lines in a drawing always denote the edge of stock that can be seen. The dotted line indicates the location of edges of stock that cannot be seen in that position. Dimensions are given by prolonging the lines and showing the distance between them by two arrow points $\left| \leftarrow 3'' \rightarrow \right|$. Most of the plans in this bulletin are drawn with the idea of showing top, front and side views. If all the information is not obtained from the one drawing, refer to the others, showing different views of the same article. The third angle projection, shown below, reprinted from the Industrial Art Magazine, illustrates clearly the three views of a drawing.

Always check the drawing with the bill of material to make sure that enough lumber, of the right dimension, is available for the desired article.

Articles need not be made from plans mentioned in this bulletin, nor be of the same specifications. The design, size of the article, thickness and width of lumber, and even methods of construction may vary in some cases, but generally, first year members should be encouraged to follow the instructions in this bulletin.

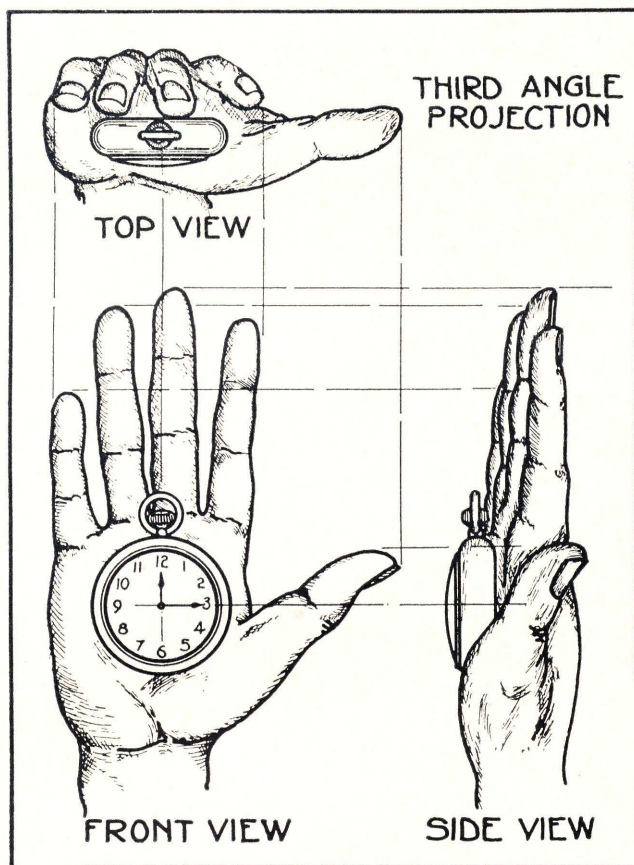


Fig. 13. Views of drawings.

LAYING OUT ROUGH STOCK

The tools needed for this are the rule, tri-square or steel square, marking gauge and a pencil. The rule used may be the single-piece rule or the folding two-foot rule such as carpenters use. Measure off and mark the length and width of the piece required. Connect these points by a line drawn with a pencil, using the ruler or other straight edge as a guide. If the marking gauge is used, adjust it to the proper

distance, and then mark by drawing the gauge toward you. If the pencil and rule are used the pencil is held against the end of the rule and the hand, with the thumb nail as a guide, is drawn toward the worker. Sometimes a sharp knife is used to scribe small but accurate dimension lines.

SQUARING STOCK

The fundamental basis for almost all handicraft work is the process of squaring stock.

A rough piece of soft wood, white pine, basswood or yellow poplar, is best for this exercise. A piece $3 \times 5\frac{1}{4}$ inches will make a convenient sanding block. There are six steps which should be memorized, and followed in their proper order. Each step involves one of the sides of a common board.

The surfaces must be true, smooth, straight and accurate to be complete. Because of their importance, the six steps are given.

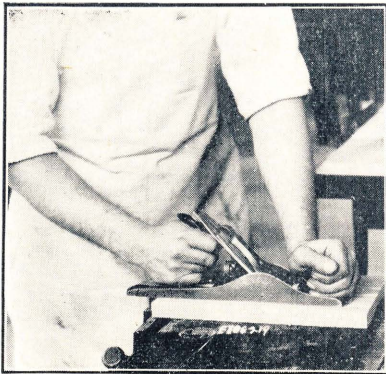


Fig. 14. Planing working face.*

1. Plane working face
 - a. Choose best face of a small board ($\frac{3}{4}$ " x 4" x 6")
 - b. Determine direction of grain
 - c. Take correct position at bench and plane
 - d. Test to see if face is level and even
 - e. Mark "number one" (Fig. 14)

2. Square working edge
 - a. Choose best edge
 - b. Plane one adjoining edge at right angles to the surface No. 1
 - c. Test from working face
 - d. Mark the working edge "number two" (Fig. 15)



Fig. 15. Edge planing.*

3. Square working end
 - a. Square line across face "number one" from working edge and across edge "number two" from working face
 - b. Plane to split the line
 - c. Test from working face and edge
 - d. Mark "number three". This is the working end (Fig. 16)

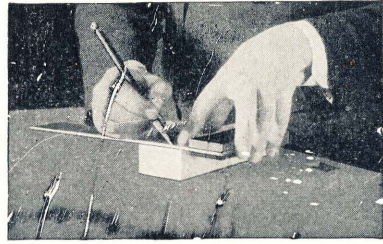


Fig. 16. Squaring the end surface.*

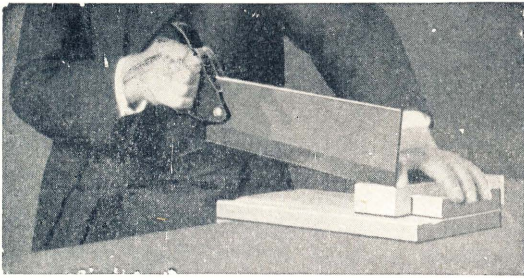


Fig. 17. Sawing cross grain. Back saw and bench hook.*

4. Reduce to correct length

- a. Hold rule along aris of working edge and working face and measure the correct length from end "number two"—mark with knife
- b. Square line across face "one" from edge "two" and

- c. across edge "two" from face "one"
- d. Use bench hook and saw about 1/16 inch over length with back saw
- e. Plane down to split the line
- f. Test from working face and edge—mark "number four" (Fig. 17)

5. Reduce to right width
 - a. Set marking gauge and check with rule
 - b. Gauge line on both faces holding head of gauge firmly against working edge. Caution—Never pull a gauge. Always push it
 - c. Plane to split the line and test from face "number one"
 - d. Mark this edge "number five" (Fig. 18)

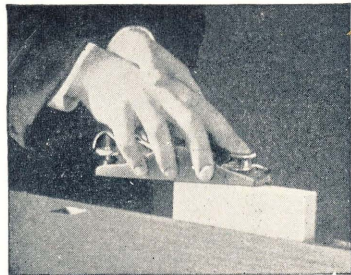


Fig. 18. End planing with block plane.*

6. Reduce to right thickness
 - a. Set marking gauge and check with rule
 - b. Gauge lines on both edges, holding head of gauge firmly against working face "number one"
 - c. Plane to split the line and test with tri-square
 - d. Mark this face "number six" (Fig. 19)

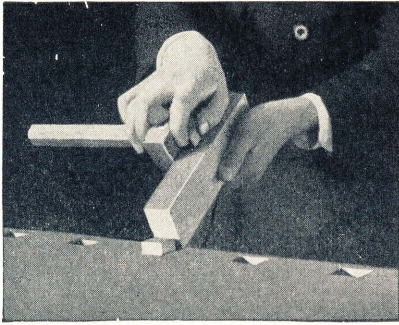


Fig. 19. Marking gauge in use.*

In reducing a piece of wood to dimensions the tri-square should be used constantly to obtain right angles with adjoining surfaces. The stock should be removed to the line, but the line should never be cut away.

MATERIALS

Beginners in woodwork should select articles with simple designs that require only small amounts of material and the use of the most common tools. White pine, cypress, basswood, yellow poplar, or any of the soft woods may be used for the exercises where great strength is not necessary. Many of the smaller articles can be made from old boards, scrap lumber, crating, or boxing material. Plywoods may be used to good advantage where articles are to be small, but durable. For coping saw exercises it will almost be necessary to use plywoods. Ordinarily no exercises in hardwood should be attempted until skill and good results have been obtained with the soft woods.

It may be of interest to 4-H Club members to know how to make up a lumber order and to calculate the number of board feet in various sized boards. A piece of wood gives in plain terms the necessary three dimensions. The thickness of the board is expressed by the first figure, width by the second, and length by the third. Type of material and the number of pieces are also indicated in making the order. For example:

White pine

2 pieces—2" x 4" x 10'

4 pieces—1" x 4" x 16'

The two small marks to the right and above the figures "2 and 4" means inches, and the one small mark to the right of the figures "10" means feet.

A board foot is one inch x 12 inches x 12 inches or its equivalent. The rule for finding the number of board feet in a piece of lumber is as follows: Multiply the thickness in inches by the width in inches, by the length in feet, and divide by 12. **Example:**

How many board feet in a piece of lumber 1 inch thick, 4 inches wide and 12 feet long?
$$\frac{1 \times 4 \times 12 = 48}{12} = 4 \text{ feet.}$$

*From "Agricultural Woodworking," by Lewis Roehl, Bruce Publishing Company, Milwaukee.

SANDPAPERING

When the woodworker is sure that it will not be necessary to do any more cutting with edged tools and not until then can he use sandpaper to finish a piece of work. The grit left in the pores of the wood by the sandpaper will take the edge off tools almost as effectively as will the grindstone. When sandpaper is used it should be treated as a tool, which it really is, and should be handled just as carefully. Sandpaper is numbered according to the size of the grains of sand used on the surface. For average work, sandpaper ranging from No. 00 to No. 3 is satisfactory. Commercial packages of sandpaper contain one ream, each sheet 9 inches by 11 inches.

How to Use Sandpaper

For the first sanding of a piece of lumber the coarse sandpaper is used, but it is seldom necessary to use numbers 2½ and 3 because they leave deep scratches that require considerable sandpapering with a finer paper to remove. If sandpaper is held under the hand it will follow the exact shape of the surface. If one attempts to sandpaper on or near an edge the paper will "drag" the corners and spoil the neat sharp lines, making them rounding. If the surface of the paper is examined, it will be noted that, most, if not all, of the cutting has been done by the spot upon which one's fingers rested. This means a waste of paper and time, as well as a poor piece of work if one is to overcome all of those difficulties. The sanding block may be used to good advantage. A convenient size for a sanding block is 3 inches by 5 inches, a form which can be made to fit the convenience of the club member. A large sheet of sandpaper is cut into four equal pieces and drawn over the edges of the block. The face of the block over which the paper is drawn should be perfectly straight, flat, and smooth, so that every part of the paper will come in contact with the surface of the wood. Sandpaper thus held will not follow the small depressions in the surface but will cut only on the high spots, gradually bringing them level. The paper cannot drag the edges because it is held up by the block. In fact, the block gives more perfect control of the cutting of the sandpaper and makes it an efficient tool. The paper, however, should not be tacked to the block for it is necessary to renew it often and tacking takes too much time and may crack or spoil the block. The sandpaper should always be pushed straight forward and pulled straight back. This means sanding parallel to the grain of the wood, with the end grain being the only exception. Careless cross-grain strokes with the paper will cause scratches that show plainly when the wood is finished.

WOOD FASTENERS

Proper assembly of the articles is an important part of the handicraft member's work. Nails, screws, glue, and dowels all have their proper places in the assembly of articles. Consider your problem and select the wood fastener most suitable to your needs.

Nails

Nails are sold in quantity by the keg containing 100 pounds of nails—20, 30, 40, 50 and 60d are “base”.

Wire nails are also bought and sold by weight, the size is according to the standard wire gauge and length in inches is taken into consideration in specifying the size and in fixing the price per pound.

Common wire nails are thick and have large, flat heads. They are used in rough work where strength is desired. Finishing nails are used for fine work such as inside woodwork and cabinet work. Casing nails are somewhat thicker and stronger than finishing nails; they have smaller heads than common nails.

SIZE	LENGTH IN INCHES
$\frac{3}{4}$	$\frac{3}{4}$
$\frac{7}{8}$	$\frac{7}{8}$
2d	1
3d	$1\frac{1}{4}$
4d	$1\frac{1}{2}$
5d	$1\frac{3}{4}$
6d	2
7d	$2\frac{1}{4}$
8d	$2\frac{1}{2}$
9d	$2\frac{3}{4}$
10d	3
12d	$3\frac{1}{4}$
16d	$3\frac{1}{2}$
20d	4
30d	$4\frac{1}{2}$
40d	5
50d	$5\frac{1}{2}$
60d	6

Brads

Brads vary in size from $\frac{3}{8}$ " to $1\frac{1}{2}$ " and are made from wire varying in gauge from No. 20 to No. 11. For fine work brads up to 1" in size are commonly used.

Screws

Next to nails, screws are the most common fasteners used in woodwork. The setting of screws requires more time and labor but gives a much stronger joint. Flat-headed and round-headed types of wood screws are the most common in use. Use a flat-headed screw where a flat surface is desired. On exposed surfaces a round-headed screw presents a neater appearance. To fasten two pieces of wood together with screws, (1) drill the first hole large enough to allow the shank of the screw to slide in easily; (2) drill the second hole slightly smaller than the diameter of center portion of the screw. The second hole is sometimes omitted in very soft wood. For flathead screws use a countersink and ream out the first hole deep enough to permit the head of the screw to drop down flush with the top of the wood. Soap or oil on the threads of the screw will make the screw easier to drive, especially in hardwood.

Corrugated Fasteners

The wiggle nail or corrugated fastener is a little device that can be used for tightening up loose joints or cracks. It is commonly used in fastening window frames, screen doors and in joining boards together. It is a nail which has a good deal of strength for holding two surfaces together side by side.

The wiggle nail is made with plain edges for hardwood and saw edges for soft woods and can be obtained in different sizes.

Glue

Use of glue is one of the secrets for producing good work. Glue is so strong that when properly used it is frequently stronger than the wood itself. Ordinary cold glue is convenient because it is always ready, but it is not so strong as hot glue.

Animal glue is used hot, while fish and vegetable glues are usually liquid glues and are used cold. Glue may be applied with either a brush or a paddle.

Before using hot glue, be sure to have everything in readiness. Have the work and clamp handily arranged for quick use. Put the pieces together that are to be glued, see that they fit and will quickly go together when glue is applied. Warm the joints so the glue will penetrate into the wood.

Casein glue may be purchased in powdered form and diluted with $2\frac{1}{8}$ parts of water.

FIRST YEAR DRAWINGS

Required: Sanding Block

Bench Hook	Letter and Pencil Holder
Bench Vises	Match Box
Bird Feeder	Milk Bottle Holder
Bird Shelter	Milk Stools
Book Rack	Necktie Racks
Bread Boards	Nesting Boxes
Cake Board or Crock Cover	Paper Knives
Ceramic Articles	Paper Towel Rack
Christmas Tree Standard	Pen and Pad Holder
Clothes Line Reel	Roller Towel Hanger
Corner Shelves	Sandpaper Block
Conservation Signs	Saw Jointer
Coping Saw Exercises	Swinging Door Holder
Door Stop	Thermometer Stand
False Bottom	Tooth Brush Rack
Feed Scoop	Towel Holder
Fish Line Reel	Whisk Broom Holder
Foot Scrapers	Window Support
Garden Trellis	Window Ventilator
Home-made Vises	Work Bench
Knife Rack	Wren Houses
Knife Strop	

SANDING BLOCK

The sanding block is required of all first-year members. Select a piece of white pine, basswood or poplar $\frac{7}{8}$ " x 4" x 6". This piece is larger in width and length than the required size of a sanding block ($\frac{7}{8}$ " x 3" x $5\frac{1}{4}$ ") to allow for mistakes that will be made.

It is not necessary to follow the detailed instructions in squaring stock in order to reduce this block to the required size.

After the block is reduced to proper size, take a small piece of No. 0 sandpaper ($\frac{1}{4}$ of full sheet) and wrap it around a small, smooth and square piece of lumber. Sand carefully the two flat surfaces and the two edges *with the grain* and the two ends across the grain.

A quarter-sheet of sandpaper or a full sheet folded will conveniently fit over the block.

COPING SAW EXERCISES

For beginners who do not have the ability or the confidence to use the larger tools, coping saw exercises may be substituted as the first exercises.

Vegetable markers, garden and lawn ornaments are just a few examples shown on pages 19, 20, 21. Other plans, obtained elsewhere will be satisfactory provided they are not too difficult for first-year members.

Material

$\frac{1}{4}$ "- $\frac{1}{2}$ " waterproof veneer or solid stock
No. 9 wire or $\frac{1}{4}$ " dowels

KNIFE RACK

Material

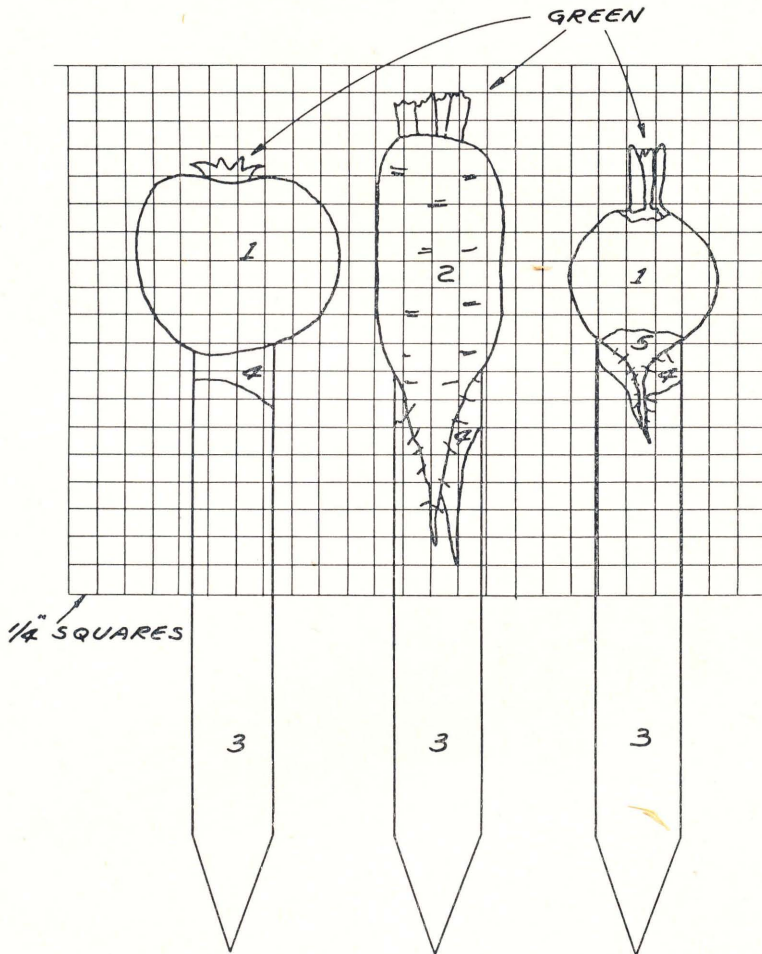
Back and Shelf	1 piece $\frac{1}{2}$ " x $7\frac{1}{2}$ " x 12"
Moulding	1 piece 12" long

NESTING BOXES

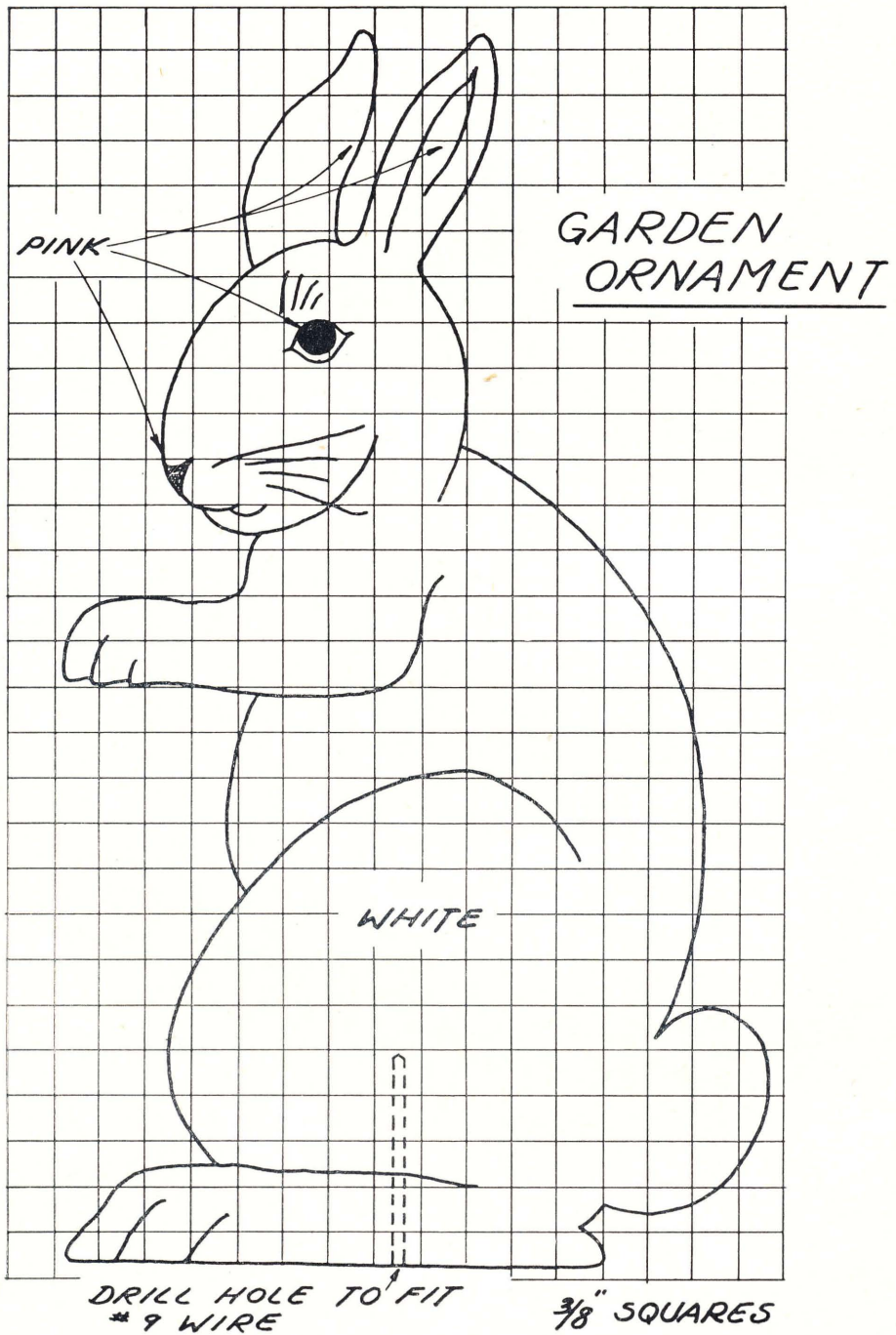
Material

Fox Squirrel and Wood Duck	1 piece $\frac{1}{2}$ " x 12" x 12'0"
Raccoon	1 piece $\frac{1}{2}$ " x 12" x 15'0"

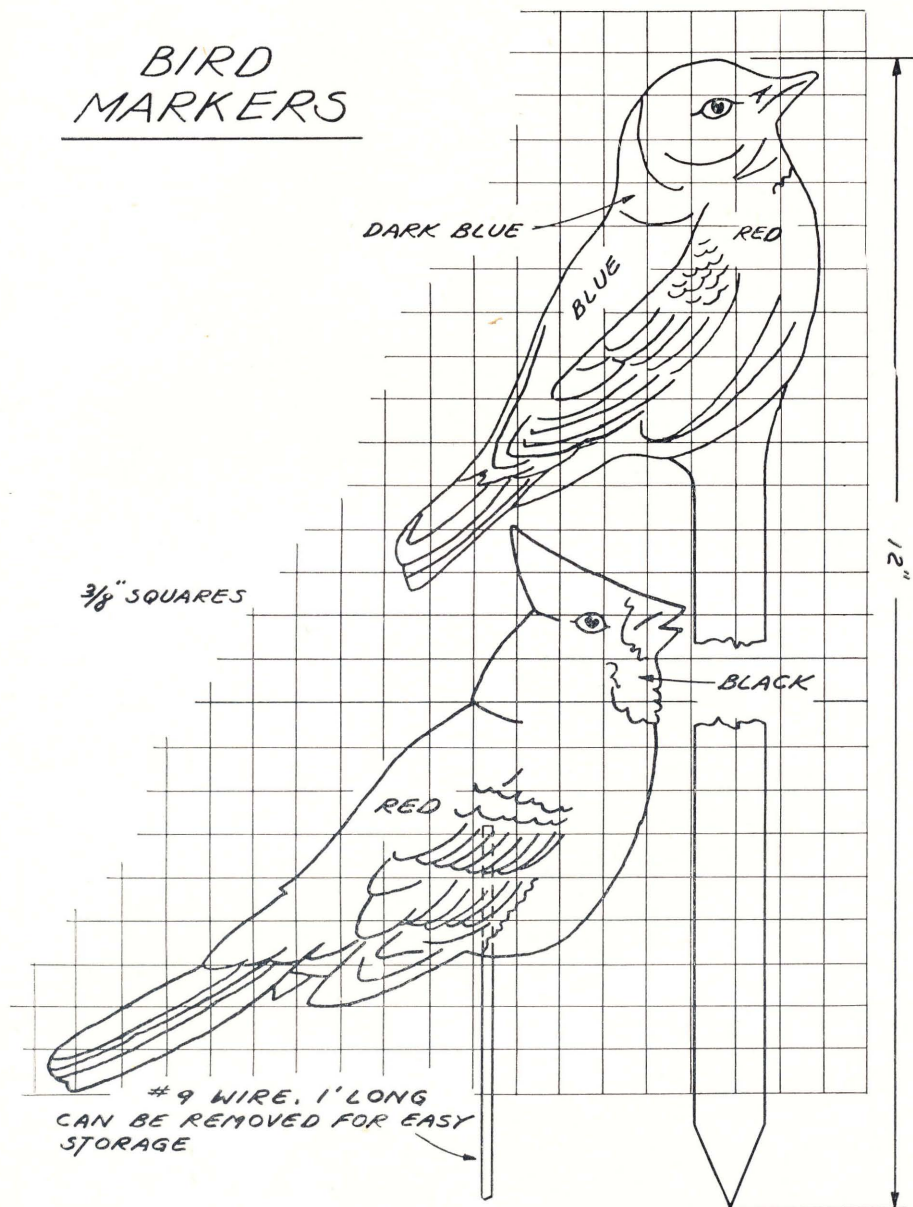
COLORS -
1. RED
2. ORANGE
3. PLAIN
+ BLACK
5. WHITE



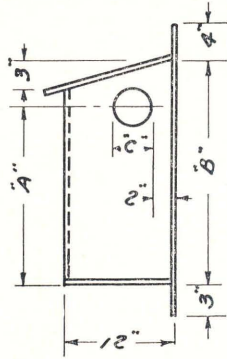
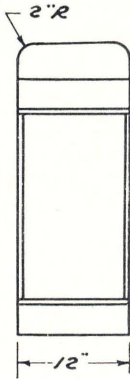
VEGETABLE MARKERS



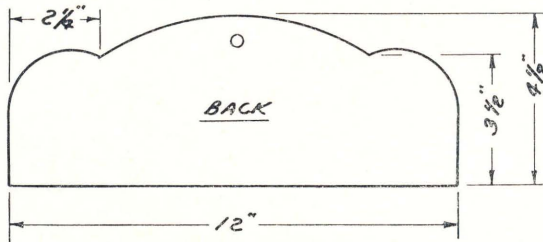
BIRD MARKERS



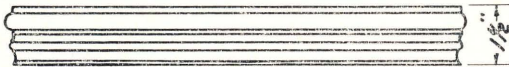
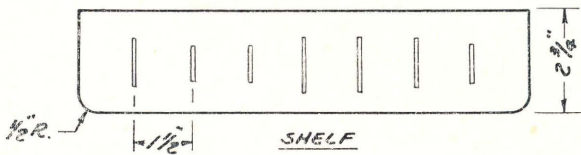
NESTING BOXES



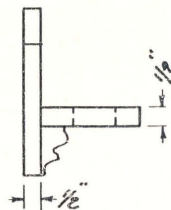
	A	B	C
FOX SQUIRREL	19"	24"	3 1/2"
WOOD DUCK	19"	28"	4 1/2"
RACCOON	19"	36"	5 1/2"



KNIFE RACK



MOULDING



ASSEMBLY

NECKTIE RACKS**Material**

1 piece $\frac{1}{2}$ " x $4\frac{1}{4}$ " x $12\frac{1}{4}$ "
 2 pieces $\frac{3}{4}$ " x $1\frac{1}{2}$ " x $1\frac{3}{4}$ "
 1 dowel rod $\frac{1}{2}$ " x 12"

or

1 piece $\frac{1}{2}$ " x $4\frac{1}{4}$ " x $12\frac{1}{4}$ "
 1 piece 1" x 2" x 1"
 1 piece $\frac{3}{8}$ " x 12"

BIRD FEEDER**Material**

$\frac{1}{2}$ " waterproof veneer or solid boards

Roof	2 pieces $\frac{1}{2}$ " x $4\frac{1}{2}$ " x 7"
Back	1 piece $\frac{1}{2}$ " x 6" x 10"
Bottom	1 piece $\frac{1}{2}$ " x 6" x 5"
Ledge	1 piece $\frac{1}{2}$ " x 1" x 24"
	1 piece tin $\frac{3}{4}$ " x 7"

ROBIN SHELTER**Material**

$\frac{1}{2}$ " white pine or some other soft wood.

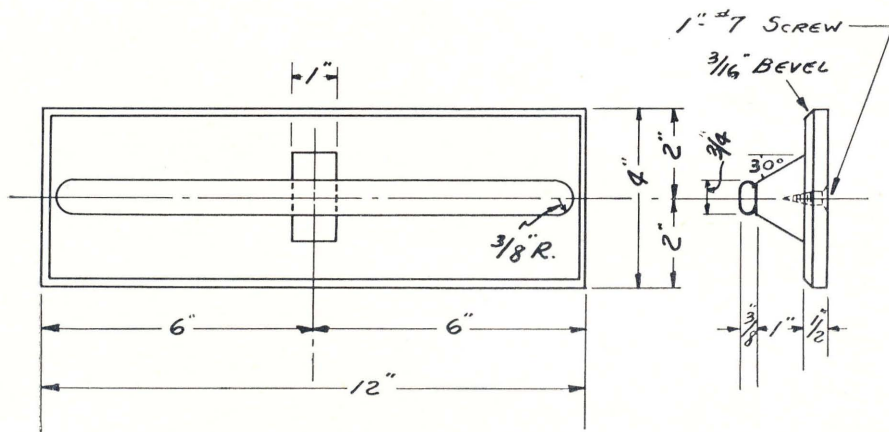
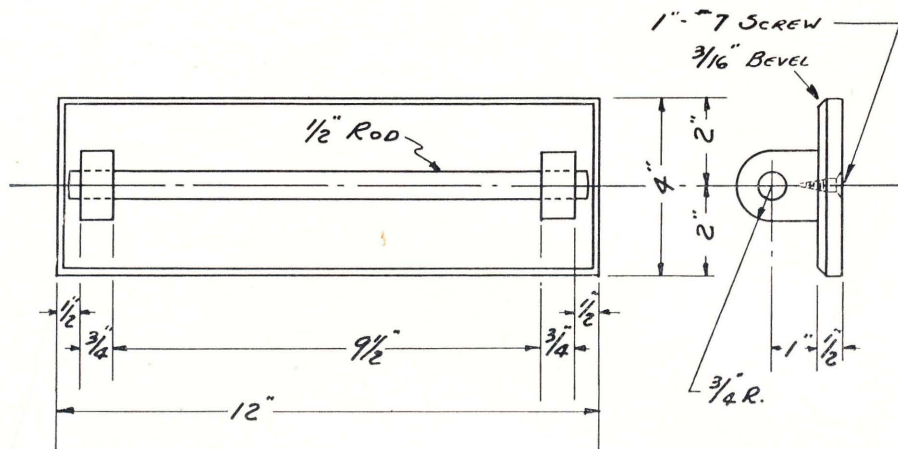
Top	1 piece $\frac{1}{2}$ " x 7" x 11"
Bottom	1 piece $\frac{1}{2}$ " x 6" x 8"
Back	1 piece $\frac{1}{2}$ " x 6" x 16"
Sides	1 piece $\frac{1}{2}$ " x 8" x 18"
Front	1 piece $\frac{1}{2}$ " x $1\frac{1}{2}$ " x 7"

WREN HOUSES**Material****No. 1**

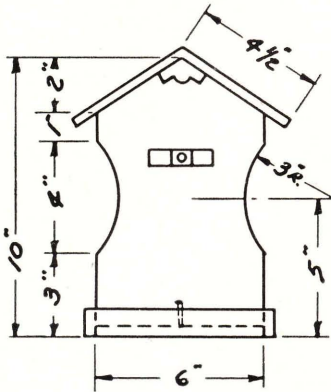
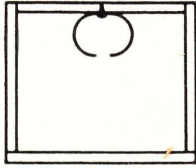
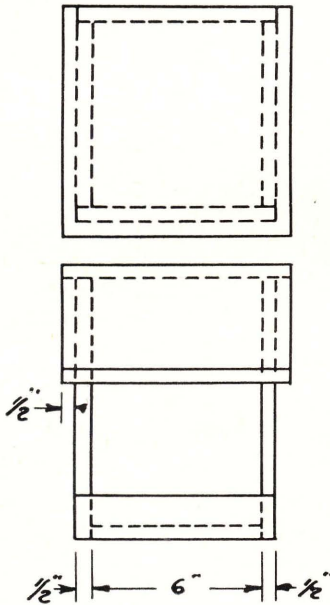
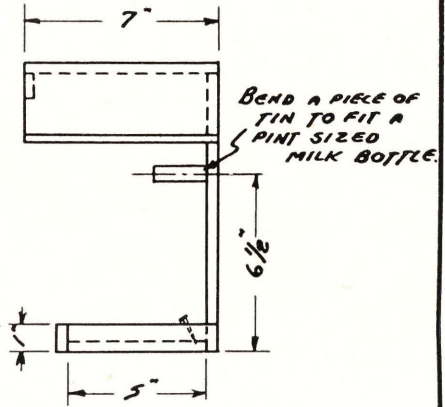
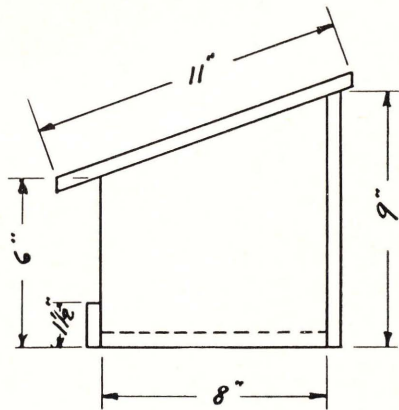
Bottom and Top	1 piece $\frac{3}{8}$ " x 8" x 16"
Front, Back and Sides	1 piece $\frac{3}{8}$ " x 5" x 36"

No. 2

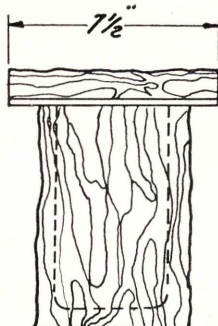
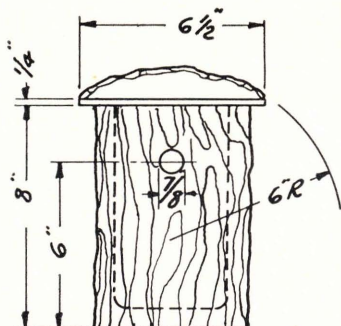
Top and Bottom	1 piece $\frac{3}{8}$ " x $6\frac{1}{2}$ " x 16"
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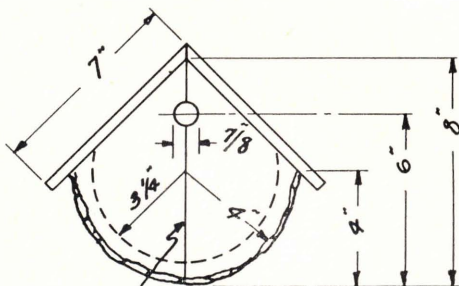
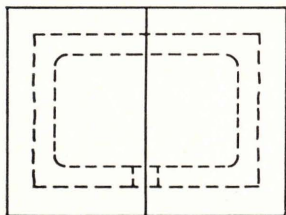
NECKTIE RACKS

SECTION
BELOW
ROOFBIRD FEEDERROBIN SHELTER

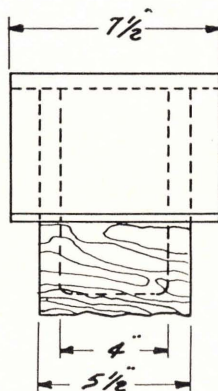
RUSTIC WREN HOUSES

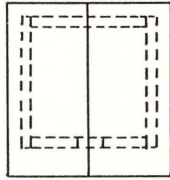


ELM, BIRCH OR
OTHER SUITABLE
LOG MAY BE
HOLLOWED OUT
BY BORING SEVERAL
HOLES AND USING
CHISEL AND GOUGE.

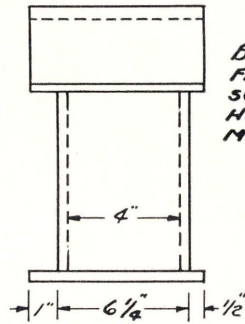
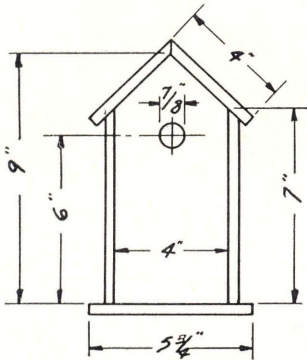


LOG MAY BE HOLLOWED
BY SAWING FIRST.

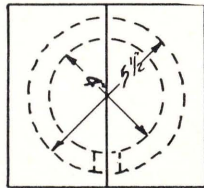


BIRD HOUSES FOR WRENS

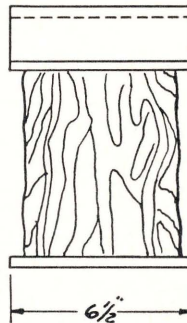
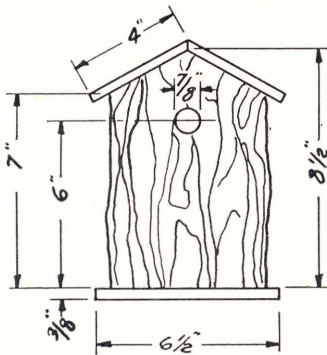
ALL STOCK - $\frac{3}{8}$ " THICK



BOTTOM MAY BE FASTENED WITH SCREWS OR HINGED TO PERMIT CLEANING



ELM, BIRCH, OR OTHER SUITABLE LOG MAY BE HOLLOWED BY BORING SEVERAL HOLES, THEN USING CHISEL AND GOUGE.



METAL STRIP MAY BE USED ON RIDGE OF ROOF TO INSURE A DRY NEST.

WORK BENCH

A suggestion for clubs that do not have a work bench.

Material

Yellow Pine, except as noted.

Rough Lumber to Order.

1. Top and one leg (vise end)—2" x 8" x (30" + 2x length of bench)
2. Tool trough and upper cross rails—1" x 6" x (6'-8" + length of bench)
3. Stretcher and lower cross rails—1" x 8" x (30" + 2x length of bench)
4. Legs—2" x 4" x 5½"
5. Leg (vise end)—2" x 10" x 32" (maple)
6. Vise jaw—2" x 8" x 30" (maple)
7. 1 screw for vise
8. 1½ doz. 2½" No. 2 flathead screws
9. Follower—1" x 3" x 2'-0" (maple)

BENCH HOOK

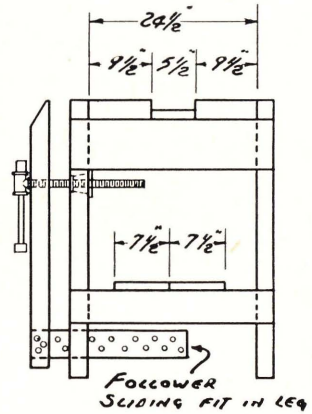
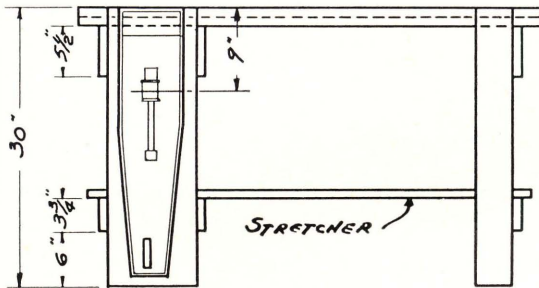
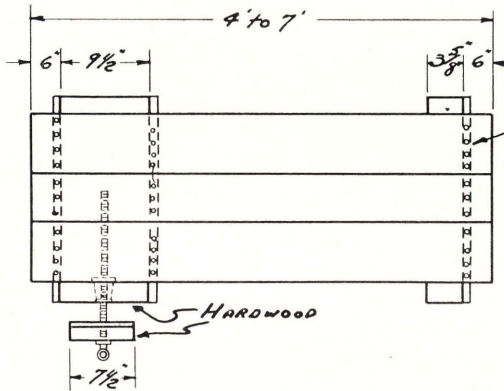
A good bench hook is a very important article for planing, chiseling, and sawing small stock. It may be used instead of the vise.

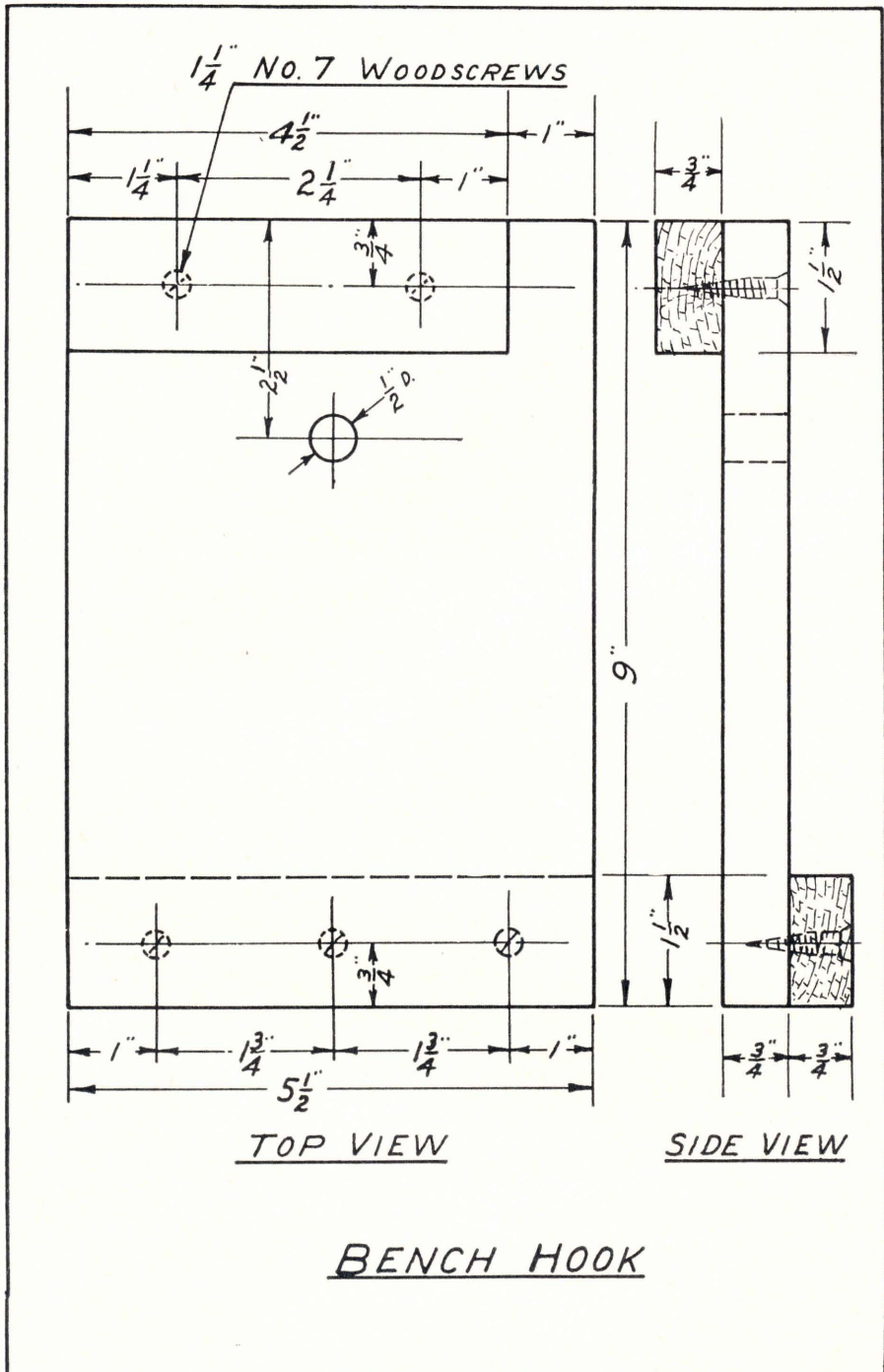
This exercise will test your patience, "stick-to-it-iveness," and skill. From the experience gained you will know that the succeeding articles will be easier to make, and the results will be more satisfactory.

Three pieces of ¾" stock will be required—one 5½" x 9", one 1½" x 4½", and one 1½" x 5½". Follow the directions for reducing and squaring stock to dimensions as shown by Figures 14 to 20, inclusive.

After the three pieces have been squared, mark the places for the screws and bore the holes in the two 1½" pieces with the 6/32" drill. Assemble by screwing these two pieces on to the 5½" x 9" board with 1¼" No. 7 flathead screws. Fasten all screws on the under side of the bench hook. Bore a ½" hole in the center of the board 1" from the top cleat. This will enable you to hang up the hook when not in use.

WORK BENCH





BREAD BOARD**Material**

Maple, birch or beech is the best material, although white pine and others can also be used.

Suggested—One piece $\frac{3}{4}$ " x $9\frac{3}{4}$ " x $16\frac{1}{4}$ ".

Method

Square the stock to the proper dimensions. If the stock is $11/16$ " thick, it will not matter. However, the flat surface should be planed smooth. Measure $1\frac{3}{4}$ " along each edge and cut off the corners. Smooth the corners with a block plane. With a marking gauge, run a line all around $\frac{1}{4}$ " from the edge on the face and all around $\frac{1}{4}$ " from the face on the edge. Plane down to the marks. Care should be taken when planing on the ends not to splinter the wood.

WHISK BROOM HOLDER**Material**

Type—This article can be made from crating material or veneer wood or any other thin material that is easily worked.

Back	1 piece— $\frac{3}{4}$ " x $3\frac{1}{4}$ " x $8\frac{1}{4}$ "
Holder	1 piece— $\frac{3}{4}$ " x $2\frac{1}{4}$ " x $6\frac{1}{4}$ "

HOME VISES**Material**

Either maple or oak—one piece 1" x $8\frac{1}{4}$ " x $8\frac{1}{4}$ ".

Ten $1\frac{1}{2}$ " screws, either No. 11 or 12.

or

White pine—one piece 2" x 4" x $12\frac{1}{4}$ ".

Two flathead screws $3\frac{1}{2}$ ".

or

White pine—one piece $\frac{3}{4}$ " x $3\frac{1}{2}$ " x $10\frac{1}{4}$ ".

one piece $6\frac{1}{4}$ " x $6\frac{1}{4}$ ".

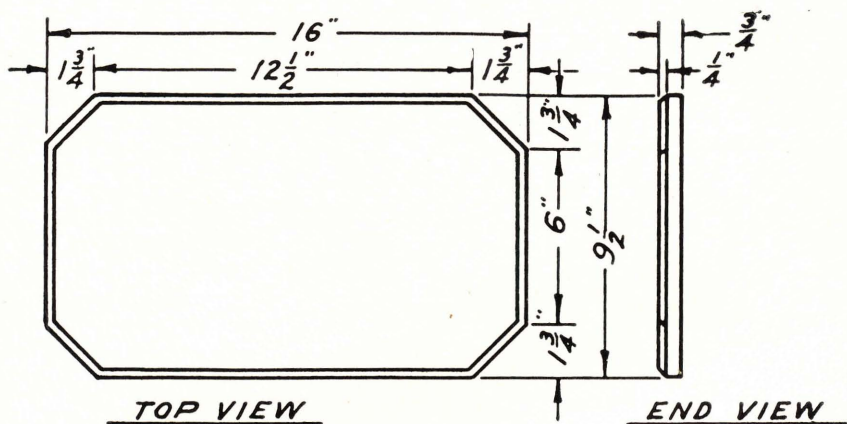
Screws: 5— $1\frac{1}{2}$ " No. 8

1—2" No. 12

WINDOW SUPPORT**Material**

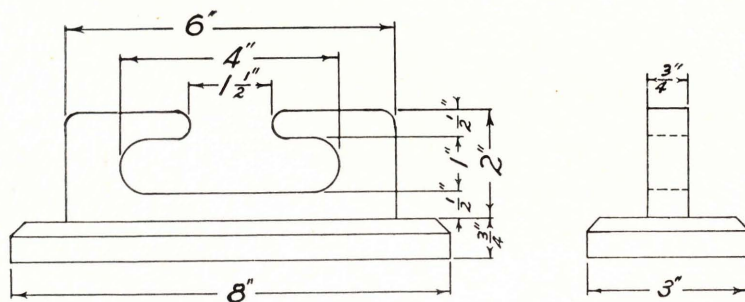
The lumber best suited for use in making the window support is white pine or basswood.

One piece $\frac{7}{8}$ " x $3\frac{1}{4}$ " x $14\frac{1}{4}$ ".

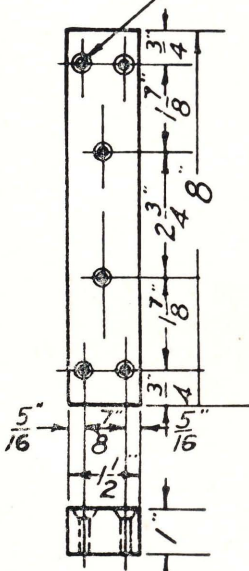
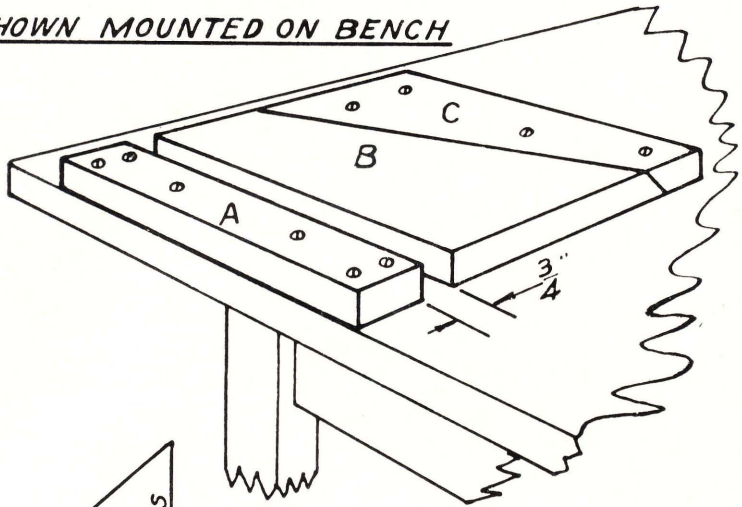


BREAD BOARD

WHISK BROOM HOLDER



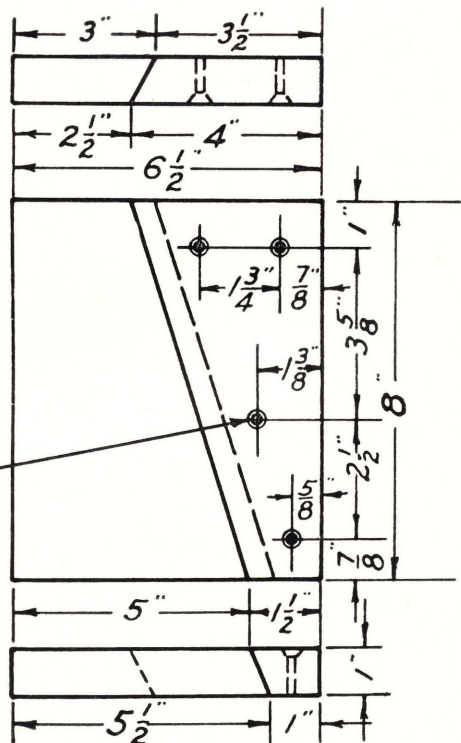
VICE SHOWN MOUNTED ON BENCH



PIECE A

HOME VISE

HOLES FOR $1\frac{3}{4}$ " NO. 12 SCREWS



PIECES B AND C

CAKE BOARD OR CROCK COVER**Material**

The material for this article may be either pine or basswood. It should be free from knots and well seasoned.

One piece $\frac{3}{4}$ " x 12" square.

One piece $\frac{3}{4}$ " x $10\frac{1}{2}$ " square.

Three spools.

SAW JOINTER**Material**

White pine or basswood—one piece $\frac{3}{4}$ " x $2\frac{1}{4}$ " x $4\frac{1}{2}$ "
 one piece $1\frac{1}{4}$ " x $2\frac{1}{4}$ " x $4\frac{1}{2}$ "
 four No. 8 flathead screws $1\frac{1}{4}$ "

SWINGING DOOR HOLDER**Material**

Type—The best kind of material to use for making this article is white pine, tamarack or hemlock, preferably white pine.

Specifications—2 pieces 2" x 2" x 24"
 2 strap hinges $1\frac{1}{2}$ " wide
 12 No. 6 screws 1"

THE MATCH BOX**Material**

Type—The best material to use in making this article is either veneer wood, packing box material, or any other thin material that can be obtained.

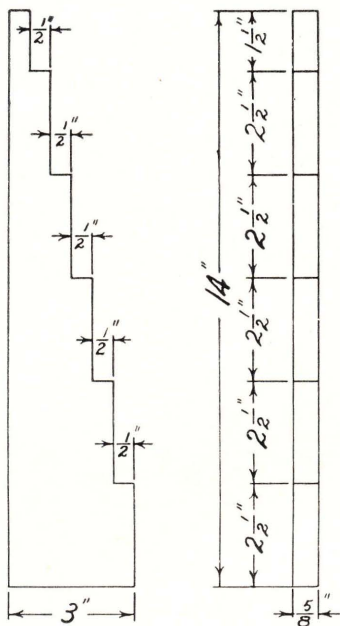
Back	1 piece— $\frac{1}{4}$ " x $3\frac{3}{4}$ " x $7\frac{1}{4}$ "
Sides	2 pieces— $\frac{1}{4}$ " x 2" x $5\frac{1}{4}$ "
Front	1 piece— $\frac{1}{4}$ " x $2\frac{1}{4}$ " x $3\frac{3}{4}$ "
Bottom	1 piece— $\frac{1}{4}$ " x 2" x $3\frac{1}{4}$ "

ROLLER TOWEL HANGER**Material**

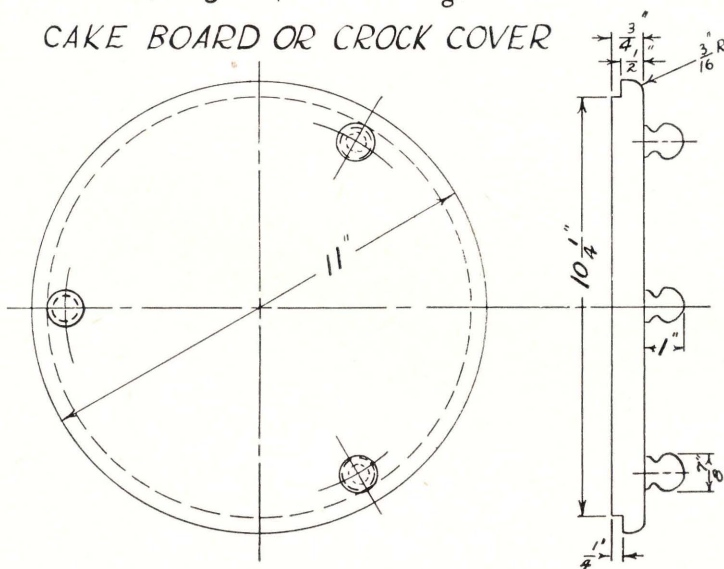
White pine, basswood, poplar or maple

Ends	2 pieces— $\frac{3}{4}$ " x $3\frac{1}{4}$ " x $4\frac{1}{4}$ "
Roller	1 piece— $1\frac{1}{2}$ " x $1\frac{1}{2}$ " x 20"
Back	1 piece— $\frac{3}{4}$ " x $4\frac{1}{4}$ " x 21"

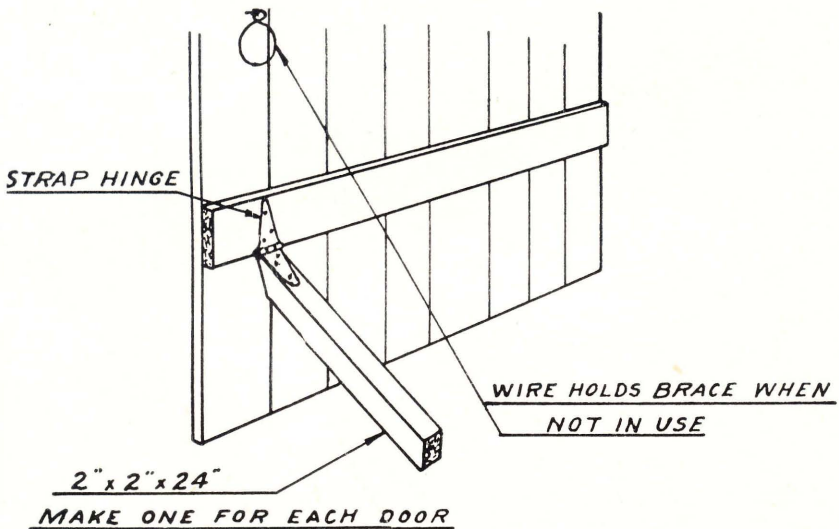
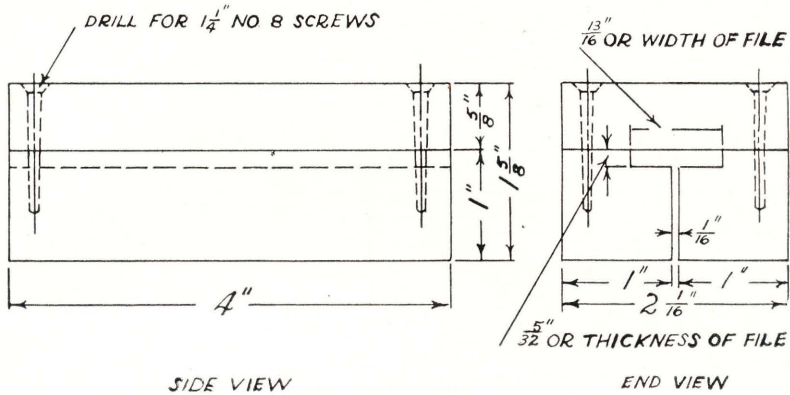
WINDOW SUPPORT



CAKE BOARD OR CROCK COVER



SAW JOINTER

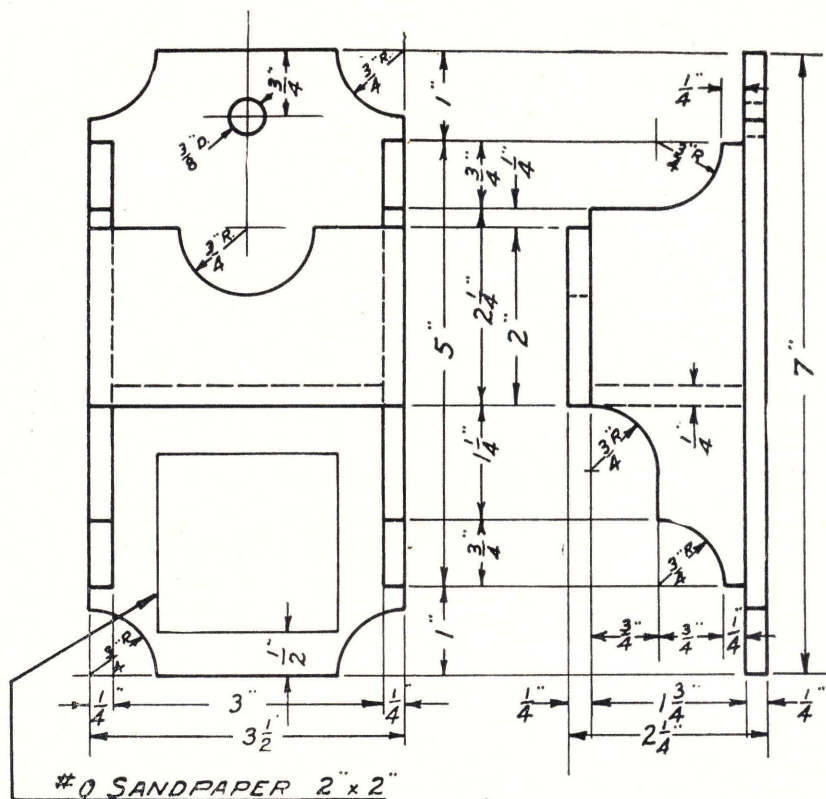
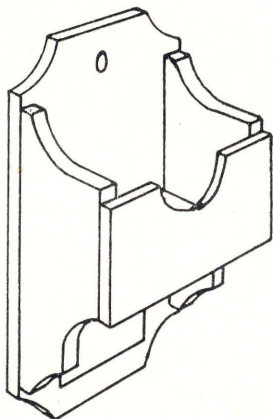


2" x 2" x 24"

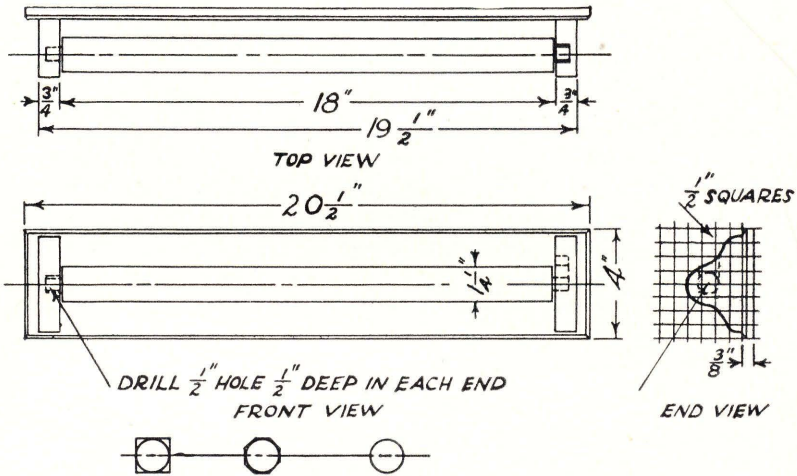
MAKE ONE FOR EACH DOOR

WIRE HOLDS BRACE WHEN
NOT IN USE

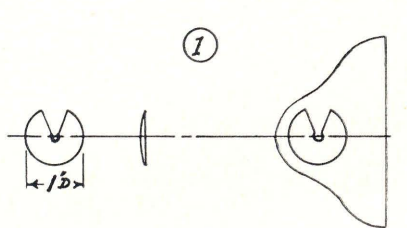
SWINGING DOOR HOLDER

FRONT VIEWSIDE VIEWMATCH BOX

ROLLER TOWEL HANGER



SUGGESTIONS



TIN DISKS NAILED TO END BLOCKS.
NAIL SO TIN WILL BULGE
USE 6D NAILS IN ENDS OF ROLLER

②

10D NAILS, WITHOUT HEADS,
MAY BE USED IN ROLLER IN
PLACE OF DOWELS.

③

ROLLER SHADE HANGERS MAY
BE USED WITH A SMALL ROLLER
HAVING NAILS AS DOWELS.

TOOTH BRUSH HOLDER**Material**

White pine or box-wood will serve very well for this article.

Top	1 piece— $\frac{3}{8}$ " x $1\frac{1}{2}$ " x $5\frac{1}{4}$ "
Rest	1 piece— $\frac{1}{2}$ " x $1\frac{1}{2}$ " x $4\frac{3}{4}$ "
Back	1 piece— $\frac{3}{8}$ " x $5\frac{1}{4}$ " x $8\frac{1}{4}$ "

LETTER AND PENCIL HOLDER**Material**

Veneer material will be the most satisfactory. Walnut or mahogany preferred for uprights. Pine or basswood for bottom.

Bottom	1 piece— $\frac{3}{8}$ " x 7" x 7"
	1 piece—design molding
Sections	4 pieces— $\frac{1}{4}$ " x $5\frac{3}{4}$ " x 5"
	No. 16 brads $1\frac{1}{4}$ "

CHRISTMAS TREE STANDARD**Material**

White pine, spruce, boxing or crating lumber.

Foot	2 pieces—2" x 4" x $20\frac{1}{4}$ "
Braces	4 pieces—1" x 2" x $15\frac{1}{4}$ "
	4 screws— $\frac{1}{4}$ " x $2\frac{3}{4}$ " or 3"
	4 hinges—1" x 3"
	24 screws—to fit hinges

CONSERVATION SIGNS**Material**

Pine, hemlock, spruce or basswood and veneer wood

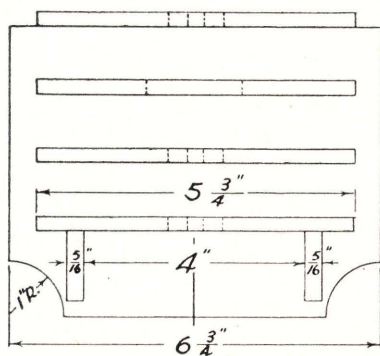
Frames	2 pieces— $\frac{1}{2}$ " x $\frac{3}{4}$ " x $22\frac{1}{4}$ "
	2 pieces— $\frac{1}{2}$ " x $\frac{3}{4}$ " x 28"
Back	1 piece—veneer $\frac{1}{4}$ " x 22" x 28"
	Molding or lath for margin

THERMOMETER STAND**Material**

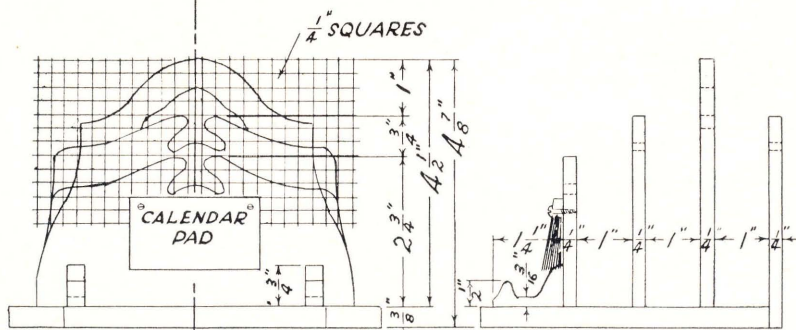
White pine, basswood or yellow poplar.

Base	2 pieces— $\frac{3}{4}$ " x 2" x 10"
	4 pieces— $\frac{3}{4}$ " x 2" x 2"
	1 piece— $\frac{3}{4}$ " x 3" x 3"
Upright	1 piece—1" dia. x 5'
	6 screw hooks

LETTER AND PENCIL HOLDER

USE $1\frac{1}{4}$ " #16 BRADS

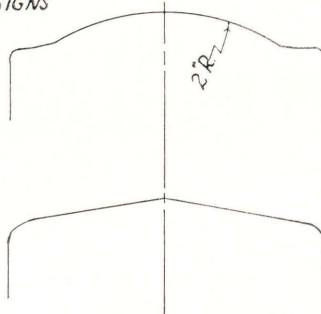
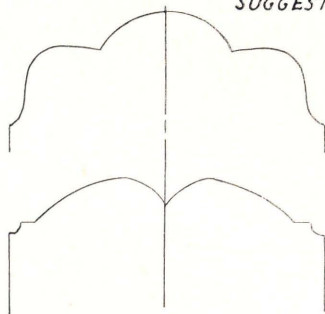
TOP VIEW



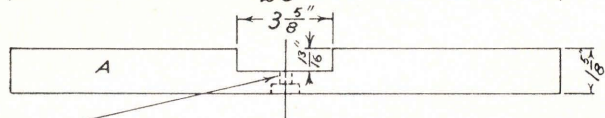
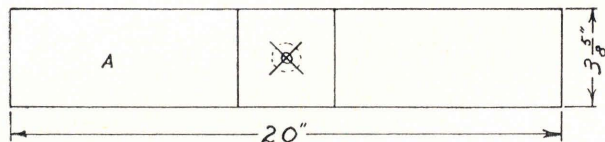
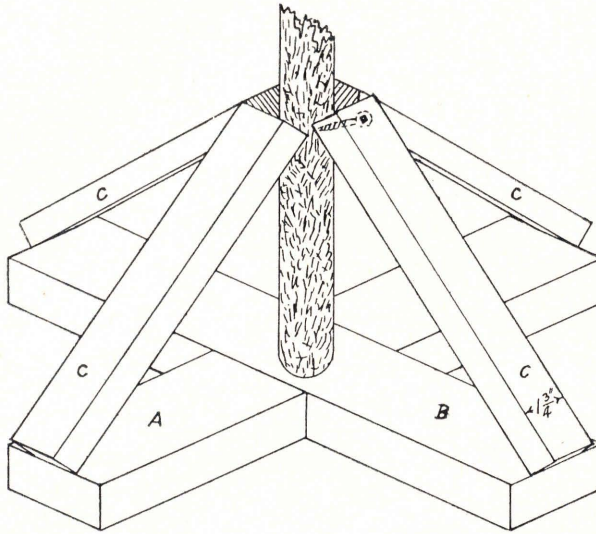
FRONT VIEW

SUGGESTED DESIGNS

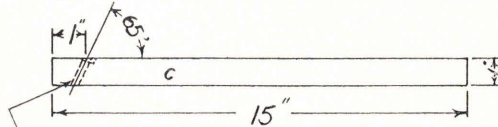
SIDE VIEW



CHRISTMAS-TREE STAND

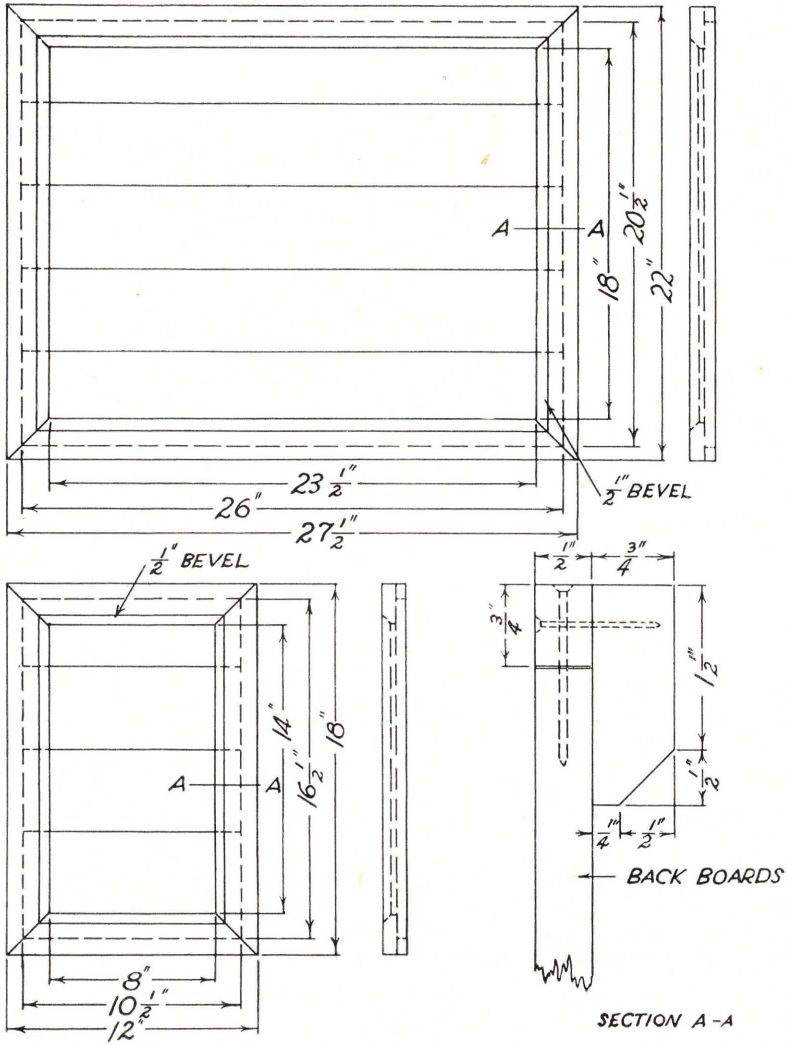


$\frac{3}{8}$ " DRILL AND COUNTERSINK FOR 3" LAG SCREW AND WASHER



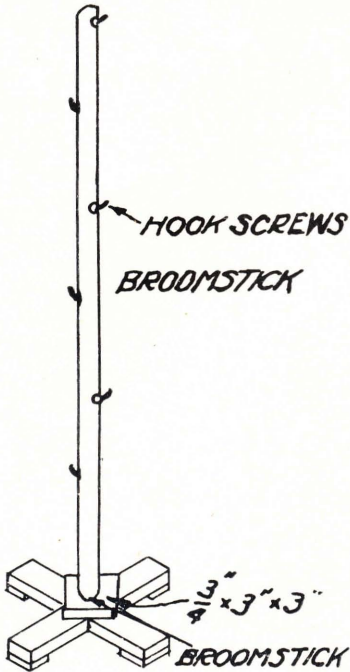
$\frac{1}{4}$ " DRILL AND COUNTERSINK FOR $\frac{1}{4}$ " X $2\frac{3}{4}$ " LAG SCREW

CONSERVATION SIGNS

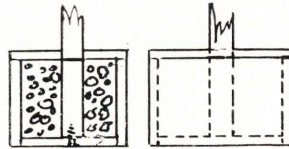


THERMOMETER STAND

SUGGESTIONS FOR THE BASE

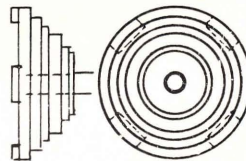
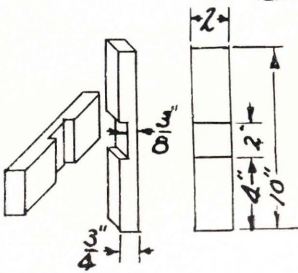


BROOMSTICK SET IN
CAN OF CEMENT



CHALK BOX FILLED
WITH COARSE GRAVEL

SETS IN HOLE BORED
THRU CENTER OF CROSSPIECE



A NUMBER OF WOODEN DISKS
MAY BE FASTENED TOGETHER
HOLE IS BORED FOR BROOMSTICK

FALSE BOTTOMS**Material**

White pine or basswood.

6—10 lath strips $\frac{1}{4}$ " x $1\frac{1}{4}$ "

PAPER TOWEL RACK**Material**

White pine or basswood.

Ends	2 pieces— $\frac{3}{4}$ " x 5" x 5" x width of paper (about 11")
Roller	1 piece—1" dia. x width of paper
Brace	1 piece— $\frac{3}{4}$ " x 1" x width of rack
Back	1 piece— $\frac{3}{4}$ " x 5" x 11"

WINDOW VENTILATOR**Material**

White pine or basswood.

Ends	2 pieces— $\frac{3}{4}$ " x 8" x 8"
Strips & braces	5 pieces— $\frac{1}{4}$ " x $1\frac{1}{2}$ " x window width
	1 piece glass or thin veneer

FISH LINE REEL**Material**

Veneer, pine, fir, or hardwoods.

1 piece— $\frac{3}{8}$ " x $2\frac{1}{2}$ " x $8\frac{1}{4}$ "

KNIFE STROP**Material**

White pine, maple, or gum.

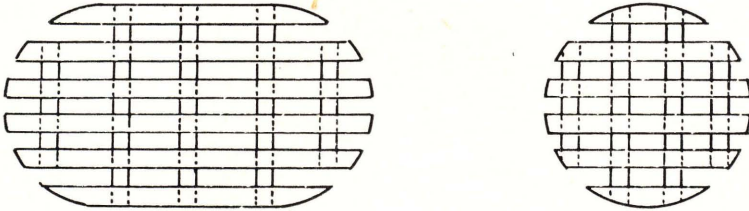
1 piece— $\frac{3}{8}$ " x $2\frac{1}{4}$ " x $15\frac{1}{4}$ "

MILK BOTTLE HOLDER**Material**

White pine, crating or boxing lumber may be used.

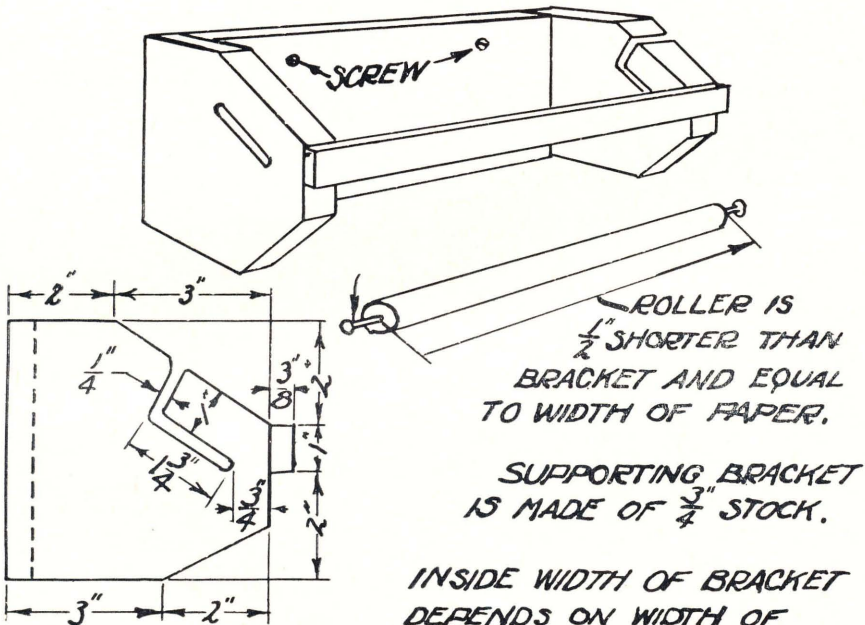
Top	1 piece— $\frac{3}{4}$ " x $5\frac{3}{4}$ " x $12\frac{1}{4}$ "
Back and Rack	2 pieces— $\frac{1}{2}$ " x $4\frac{1}{2}$ " x 10"
Sides	2 pieces— $\frac{1}{2}$ " x 4" x $4\frac{1}{2}$ "
Braces	1 piece— $\frac{1}{2}$ " x $1\frac{3}{4}$ " x 3"

FALSE BOTTOMS



$\frac{1}{4} \times \frac{1}{4}$ STRIPS ARE EVENLY SPACED
BRACES ARE OF THE SAME MATERIAL
FORM IS $\frac{1}{2}$ " SMALLER THAN BOTTOM OF
PAN OR BOILER TO BE USED

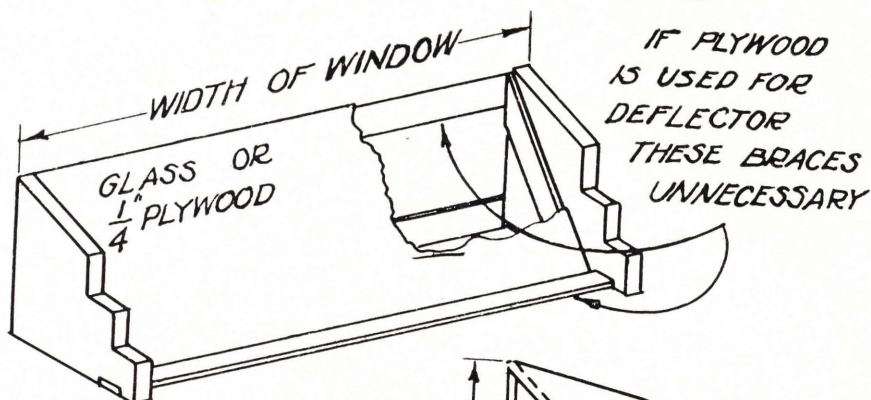
PAPER TOWEL RACK



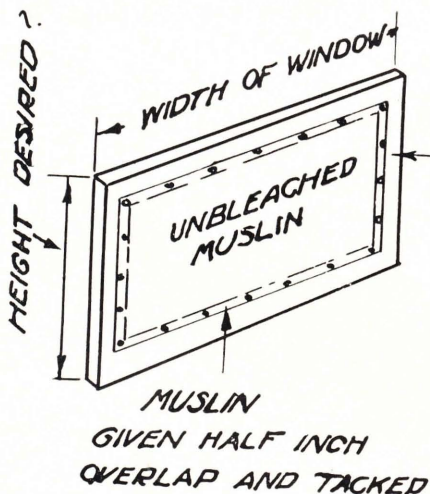
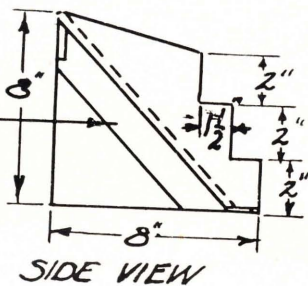
SUPPORTING BRACKET
IS MADE OF $\frac{3}{4}$ " STOCK.

INSIDE WIDTH OF BRACKET
DEPENDS ON WIDTH OF
ROLL PAPER, VARYING
DIAMETER OF ROLL IS
RECONED WITH BY THE
SLOTS.

WINDOW VENTILATORS

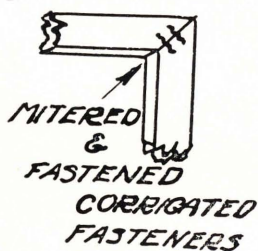


TACKING STRIPS AND BRACES ARE OF $\frac{1}{4}$ " \times $1\frac{1}{2}$ " STRIPS



WOODEN FRAME

JOINTS

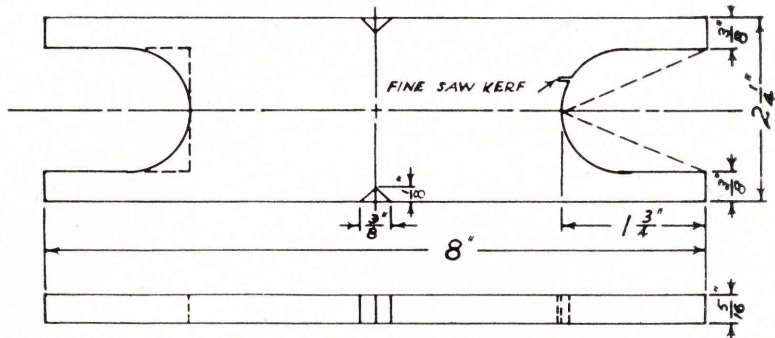


FOR A WIDE WINDOW A CENTER BRACE MIGHT BE NECESSARY OR TWO SECTIONS MAY BE HINGED TOGETHER.



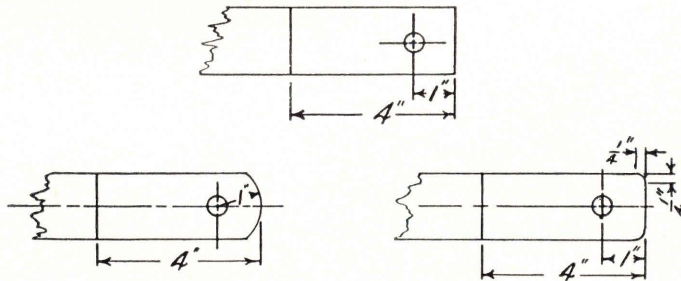
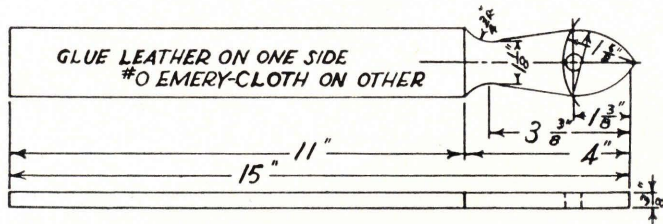
HALF LAP FASTENED WITH 1" BRADS.

FISH LINE REEL



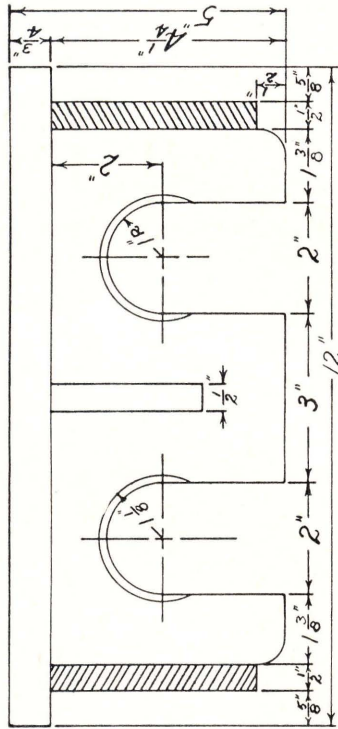
DOTTED LINES SHOW OPTIONAL END OUTLINES

KNIFE STROP

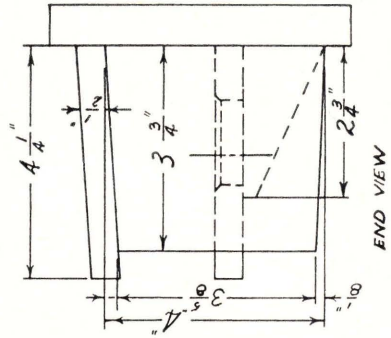


OPTIONAL TREATMENT FOR HANDLE

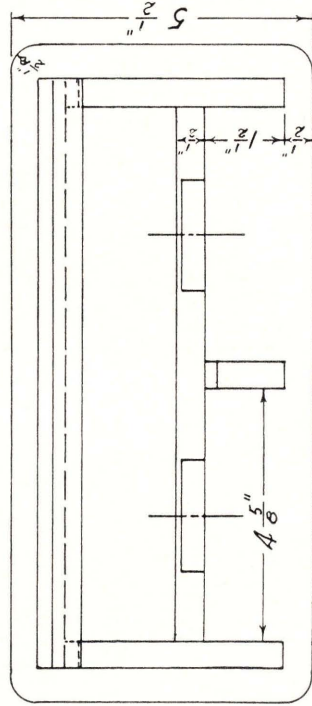
MILK BOTTLE HOLDER



TOP VIEW, WITHOUT COVER



END VIEW



FRONT VIEW

FOR EACH EXTRA BOTTLE
ADD 4 7/8" TO THE LENGTH

FOOT SCRAPERS

See detail drawing for size, type, and materials.

CORNER SHELVES**Material**

It is necessary to have veneer for this exercise. Sizes, shapes and designs will vary according to your plans. $\frac{1}{4}$ "- $\frac{3}{8}$ " veneer recommended.

PAPER KNIVES**Material**

This is a hand carving exercise. Contrasting woods, i.e., maple and walnut may be glued together to form handle. Sizes and designs will depend on individual.

GARDEN TRELLIS**Material**

White pine, cypress, or cedar are best for trellises.

Upright	1 piece—2" x 2" x 4'
Braces	1 piece— $\frac{3}{4}$ " x $1\frac{1}{2}$ " x 7'0"
	8 No. 8 flathead screws $1\frac{1}{2}$ "

TOWEL HOLDER**Material**

Maple, beech, or oak should be used in making this article.

Back	1 piece— $\frac{7}{8}$ " x $3\frac{1}{4}$ " x $5\frac{1}{4}$ "
Top	1 piece— $\frac{5}{8}$ " x 1" x $2\frac{1}{2}$ "
	2 flathead screws—No. 8, $1\frac{1}{4}$ "
	1 sphere— $\frac{5}{8}$ " diameter (agate)

FEED SCOOP**Material**

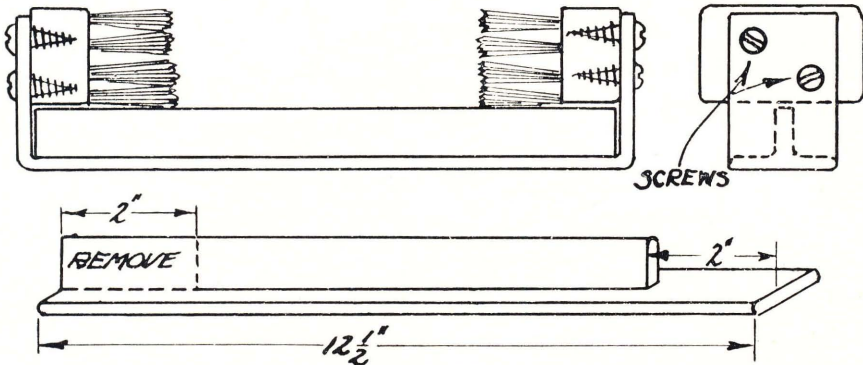
Pine, poplar, cypress or even hardwood may be used.

	1 piece of thin sheet iron 10" x 12"
	1 piece of hardwood $\frac{3}{4}$ " x $4\frac{3}{4}$ " x $5\frac{1}{4}$ "
	1 piece of hardwood $1\frac{1}{4}$ " diam. x $4\frac{1}{2}$ " long
	1 carriage bolt $\frac{5}{16}$ " x 6" long and a $\frac{5}{16}$ " washer

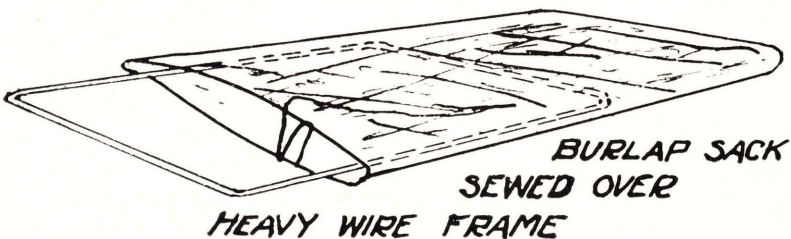
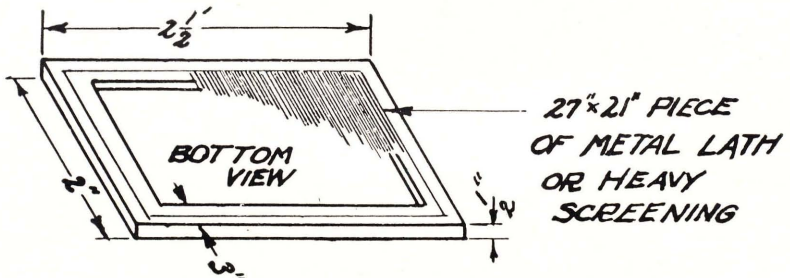
FOOT SCRAPERS

FRONT VIEW

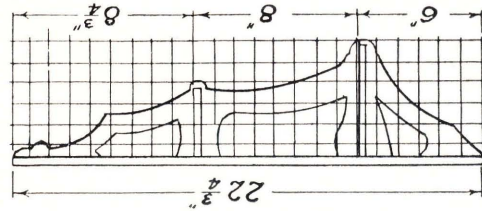
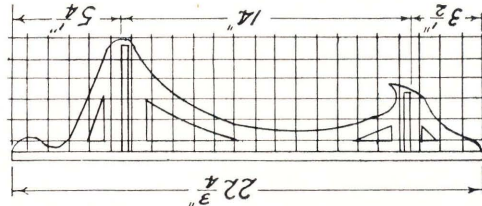
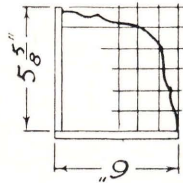
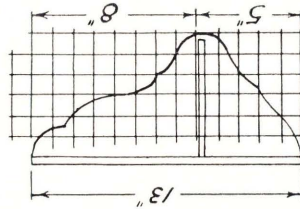
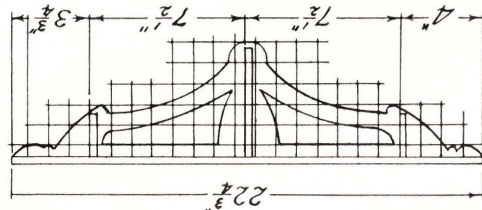
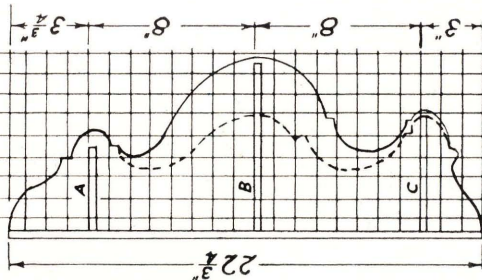
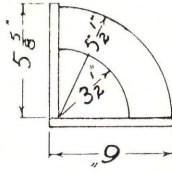
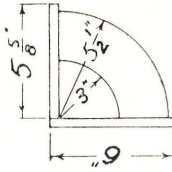
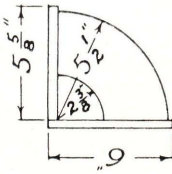
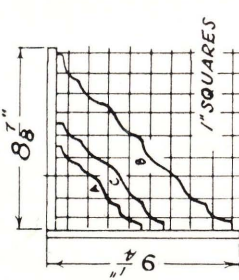
END VIEW



SECTION FROM "T" IRON IS REMOVED AND ENDS BENT UP FORMING BACK ON WHICH TO SCREW SCRUB BRUSH. BRUSHES CLEAN EDGES OF SHOES WHILE SOLE IS SCRAPED.



CORNER SHELVES



ALL PIECES $\frac{3}{8}$ " THICK OR $\frac{1}{4}$ " PLYWOOD

E

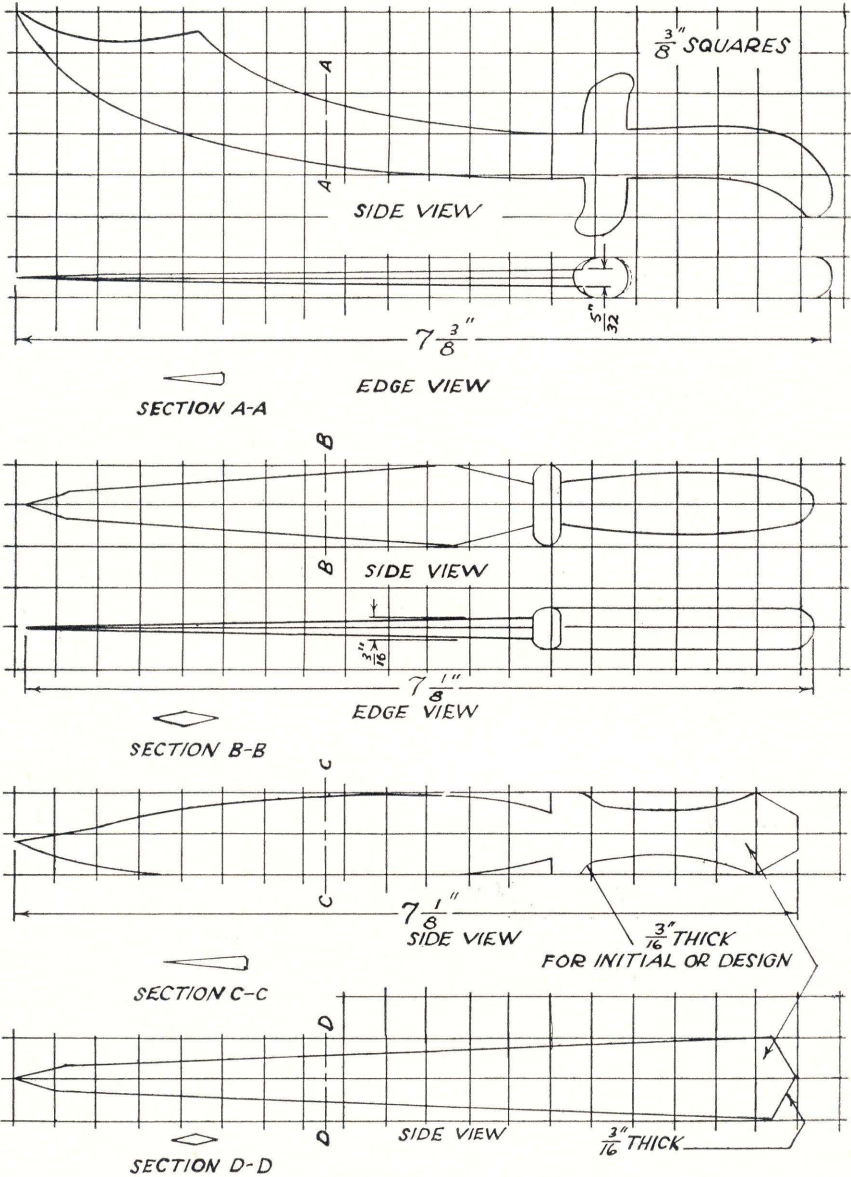
D

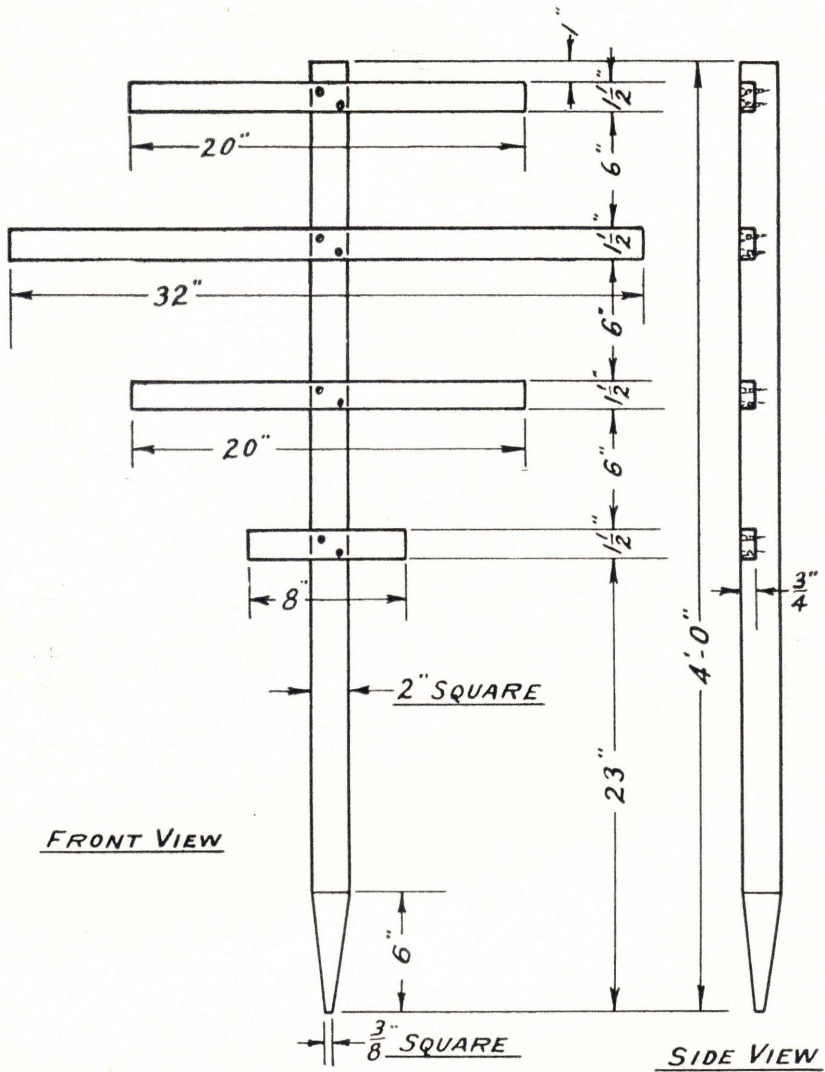
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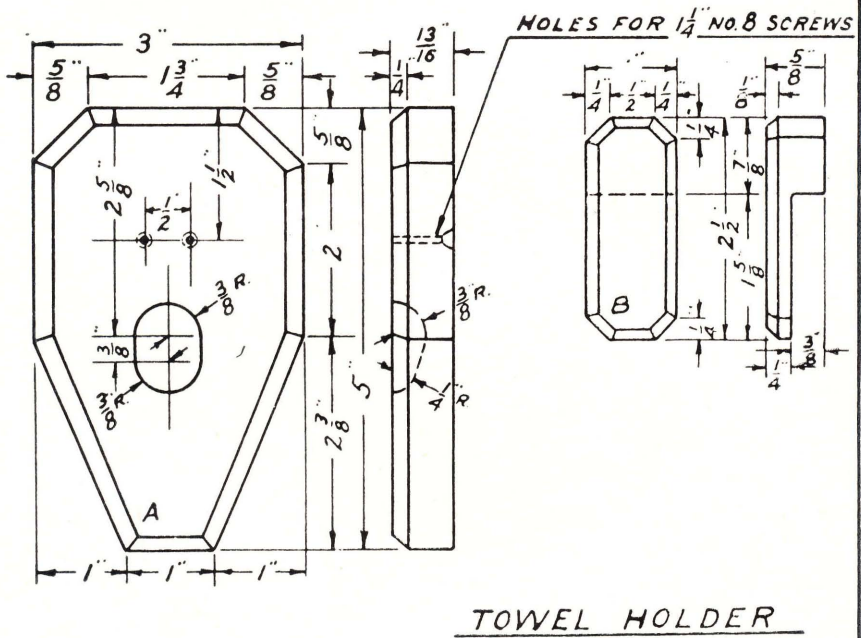
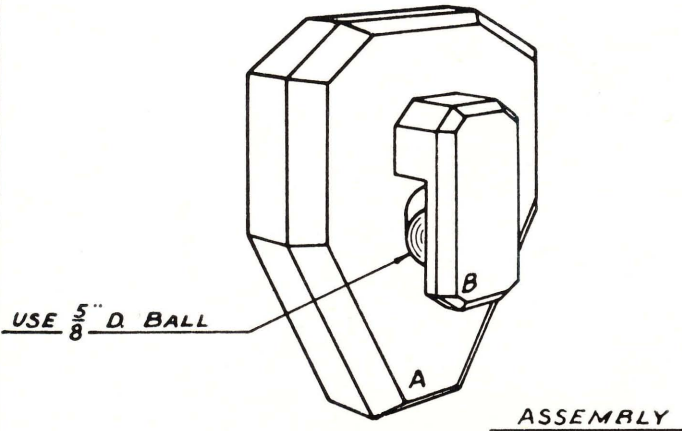
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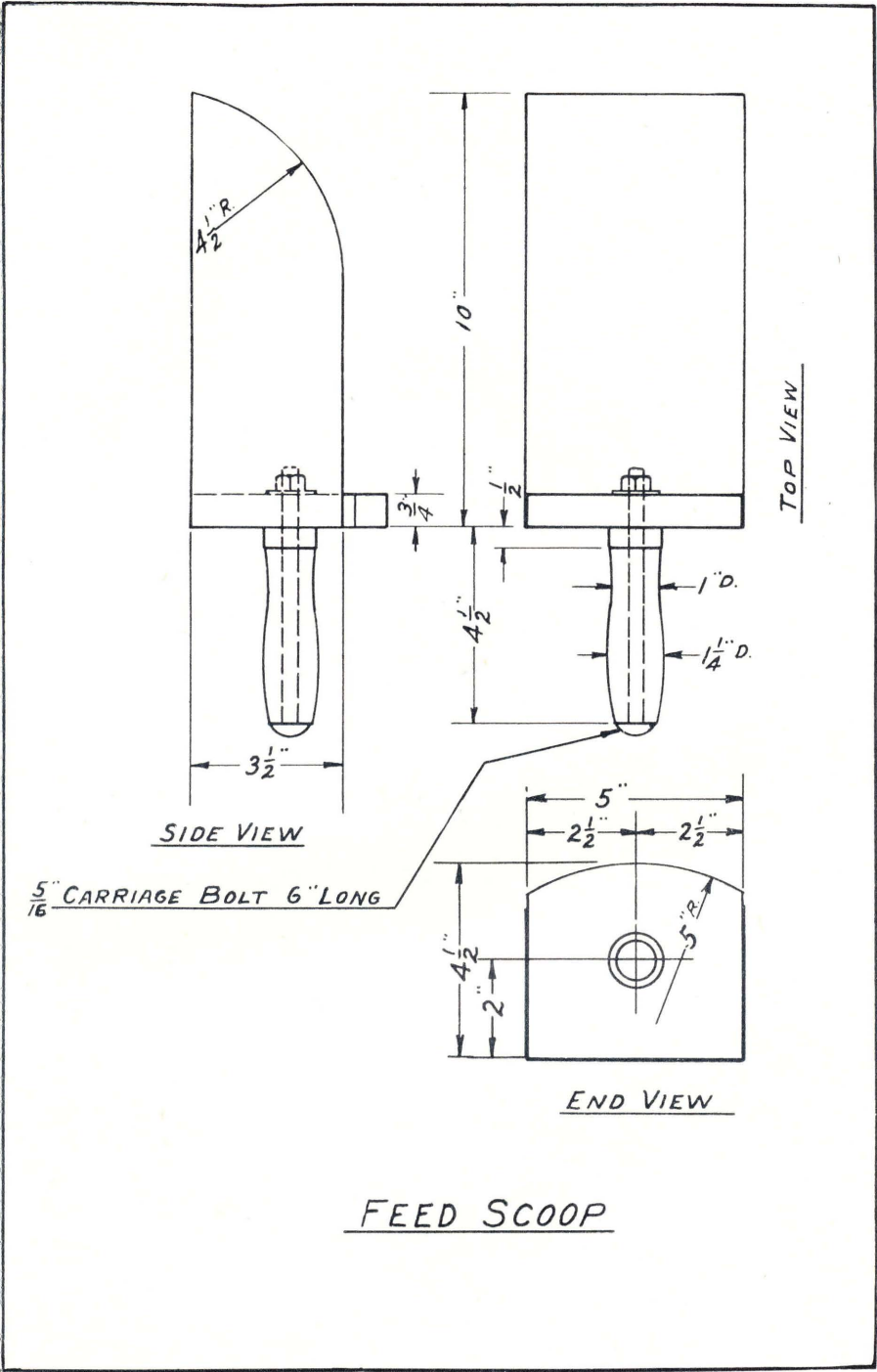
A

PAPER KNIVES



GARDEN TRELLIS





THREE-LEGGED MILK STOOL**Material**

Yellow pine or white pine can be used for the seat. Hardwood should be used for the legs, preferably hickory or maple.

Top	1 piece— $1\frac{1}{2}$ " x $9\frac{1}{4}$ " x $12\frac{1}{4}$ "
Legs	3 pieces— $1\frac{1}{2}$ " diam. x $8\frac{3}{4}$ " long

ONE-LEGGED MILK STOOL**Material**

Yellow pine or white pine will serve equally well.

Top	1 piece— $1\frac{3}{4}$ " x $5\frac{3}{4}$ " x 12"
Leg	1 piece— $1\frac{3}{4}$ " x $3\frac{3}{4}$ " x $9\frac{3}{4}$ "

BREAD OR MEAT BOARDS

These may be cut out into forms of rabbits, turtles, and other designs.

Material

Maple, birch or beech.

1 piece— $\frac{1}{2}$ " x 9" x 15"

CLOTHES LINE REEL**Material**

$\frac{1}{4}$ "- $\frac{1}{2}$ " veneers.

1 piece— $\frac{1}{4}$ "- $\frac{1}{2}$ " x 7" x 12"
--

PENCIL AND PAD HOLDER**Material**

$\frac{1}{4}$ " veneer.

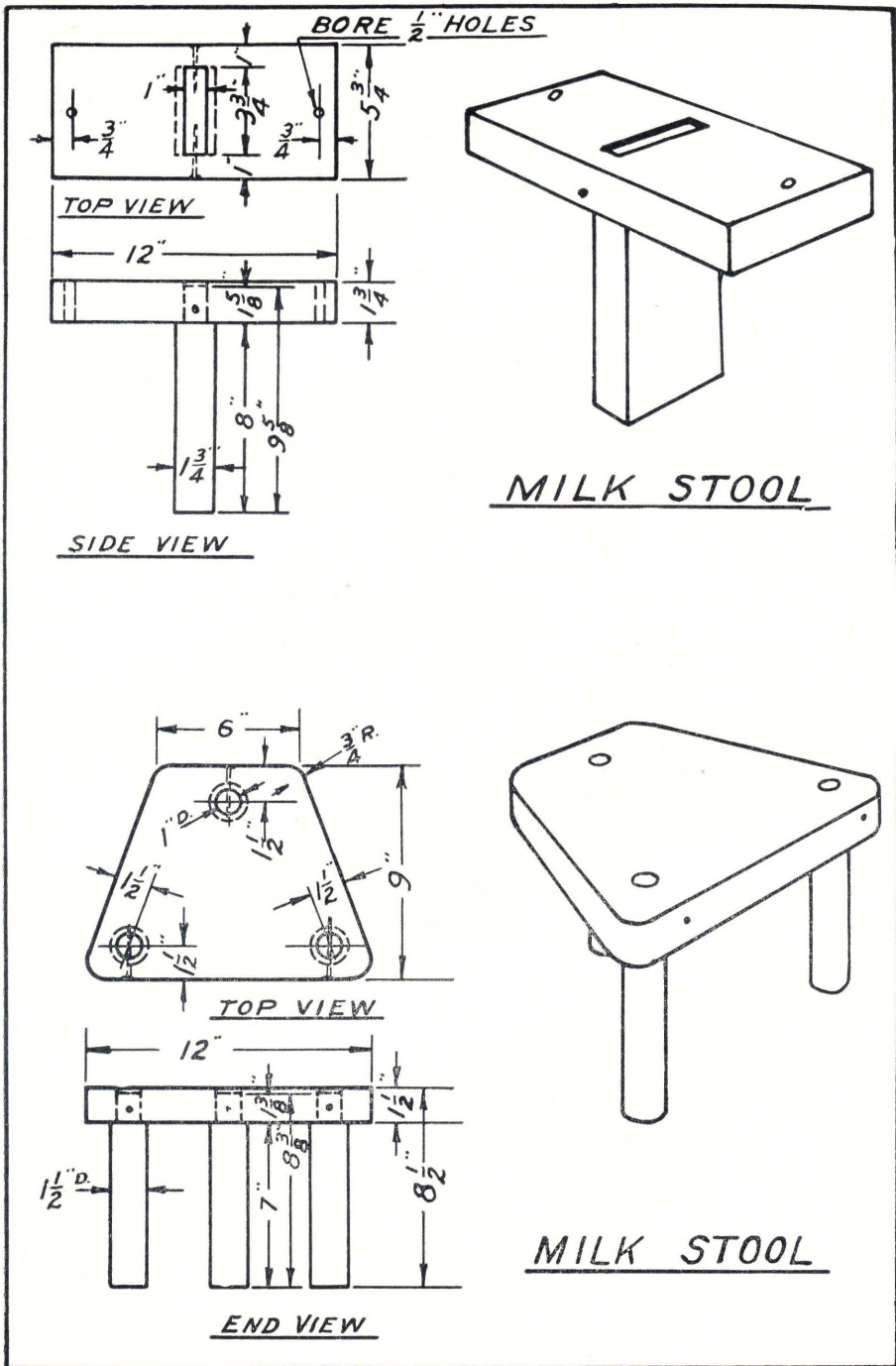
Figure	1 piece— $\frac{1}{4}$ " x $7\frac{1}{4}$ " x 8"
Base	1 piece— $\frac{3}{4}$ " x $4\frac{1}{4}$ " x $4\frac{3}{4}$ "
Pencil Holder	1 piece— $\frac{3}{4}$ " x $\frac{3}{4}$ " x $2\frac{1}{2}$ "

BOOK RACK**Material**

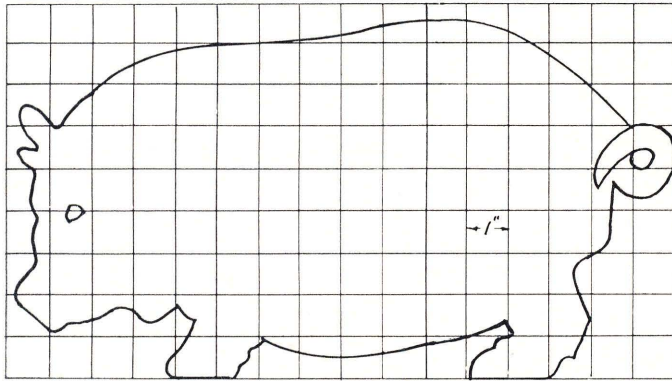
Walnut, figured gum, maple veneers.

Braces	2 pieces— $\frac{1}{2}$ " x 5"
Base	1 piece— $\frac{1}{2}$ " x 5" x 12"
	4— $1\frac{1}{4}$ " roundhead screws

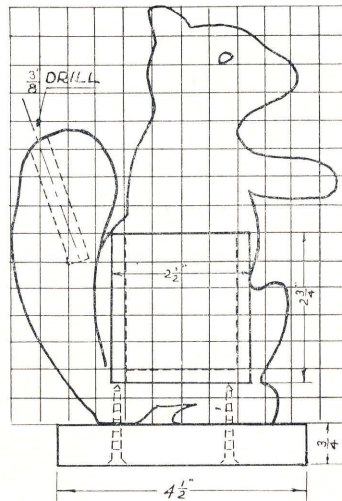
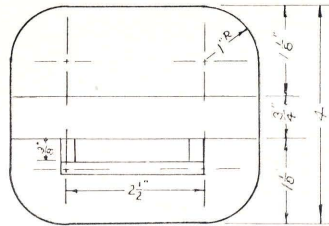
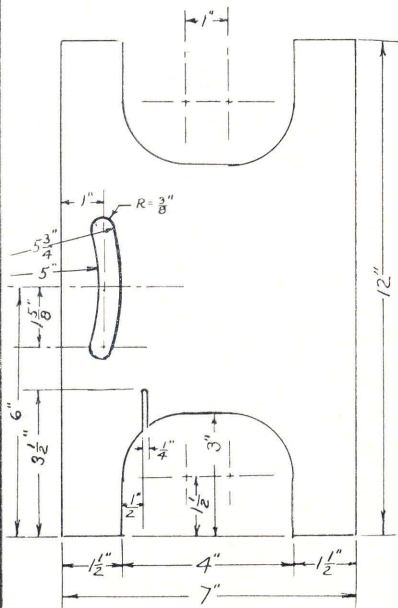
The two U-shaped pieces ($3\frac{1}{2}$ " x 5") are cut out of main board and used as uprights.



BREAD BOARD

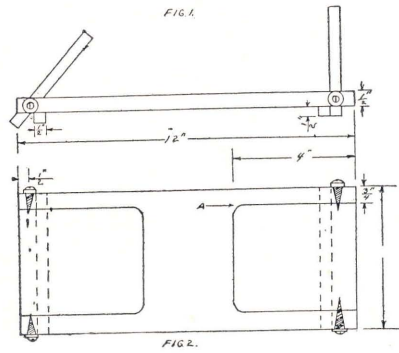


CLOTHESLINE REEL



1/2" SQUARES

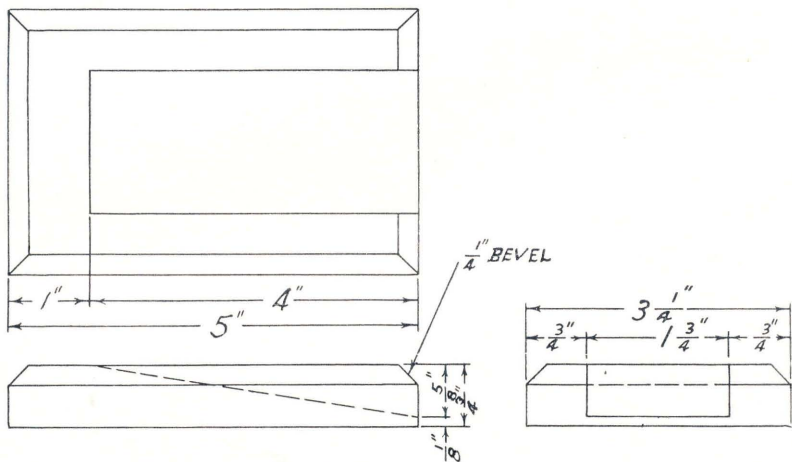
PENCIL AND PAD HOLDER



BOOK RACK

DOOR STOP**Material**

Any type of wood may be used. Match stop with wood in door.
One piece—1" x 3 1/2" x 5 1/4".

DOOR STOP

CERAMICS

Because of the interest manifested by camp craft members in plaster casting, the subject is included in this bulletin. Should handicraft members wish to make ceramic articles instead of wood exercises, credit up to two articles will be allowed in first- and second-year requirements. Second-year members should make an exhibit of molds and plaster shells as well as the articles. Different forms of plaster can be used but the one that has given the best results is Hydrocal. It is an extremely hard, low-absorption, casting plaster with a very fine texture, making it less porous than some of the others. Surface hardness and tensile strength are from two to four times greater than the standard plaster casting, depending on the amount of water used in the mixing process. The setting time is 15 to 30 minutes under ordinary conditions.

If Hydrocal cannot be bought, art plaster, dental plaster, molding or even gauging plaster may be substituted. Keene cement has in the past been used successfully, although it requires 24 hours for complete setting.

Suggestions for Making Molds, Shells and Plaster Castings

Molds

1. Obtain a small plaque as a pattern or model.
2. Put one-eighth to one-fourth inch of modeling clay on back of the pattern.
3. Place the model with clay onto a clean piece of glass. Apply a thin coat of rubber to the model with a clean one-inch paint brush.
4. Extend rubber coating onto the glass about one inch from the edge of the model.
5. After 10 minutes inspect the rubber coat and remove any air bubbles.
6. Apply six or seven more coats at 45- to 60-minute intervals.
7. When brush is not in use it should be placed in a soapsuds solution.

Plaster Shells

1. Build box-like form one inch higher than the rubber mold. Have space between form and the model at least one inch.
2. Form can be constructed of wood, tin or stiff cardboard.
3. Joints should be tight to prevent plaster from running out of form.
4. It is necessary to have work table level to form even shells.
5. Grease rubber mold with vegetable (not lubricating) oil.
6. Mix a thick gauging plaster and pour over greased mold.
7. Plaster may be reinforced with strands of hemp rope or heavy twine.
8. When thoroughly dry remove the box-like form.
9. Remove the shell, rubber mold and model from the glass.
10. Separate the shell from the rubber and the model.

11. Peel off the rubber mold from the model.
12. Wash rubber mold inside and outside.
13. Trim the inside edges of the rubber mold with small scissors.
14. Allow shell and mold to dry for several days.

Casting

1. Equipment needed. Several tin cans (No. 3, "coffee" or a No. 10), measuring cup, two water pails, several small mixing spoons, putty knife, scoop or large spoon, and wiping cloth.

2. Put clean water into a tin can. The amount will depend upon cubical contents of rubber mold.

3. Sprinkle Hydrocal into the water slowly until all the water is absorbed.

4. When material is well soaked (one or two minutes), mix by hand or by spoon to a smooth consistency.

5. Place shell (open surface up) on a level table.

6. Fit the washed rubber mold into the shell.

7. Pour plaster mixture into the rubber mold.

8. Jar or tap the shell to eliminate air bubbles or pockets.

9. Leave first cast in shell for at least an hour. Succeeding casts can be taken out as soon as they are hard.

10. A hanger may be inserted in the back of the cast in the form of a hairpin or a paper clip.

11. Removal of cast from the rubber mold is made when there is evidence of heat in the plaster.

Finishing Articles

1. Cast should dry thoroughly for several days.

2. Seal surfaces with either shellac, paint sealer or a flat lacquer.

3. Colors in oil with a small amount of turpentine will be very satisfactory.

4. Metal bottle caps are convenient containers for mixing colors.

5. For finer work the small art brushes may be more convenient.

6. When no details in coloring are necessary the paint may be applied with small wads of cotton.

HANDICRAFT CLUB MEETINGS

The handicraft clubs should hold work meetings at least every two weeks. Special work periods may be held as often as the local leader and club members desire. The club should also have at least six regular business meetings during the club season. Each one should have a definite purpose. Subjects that will be discussed, naturally, will depend upon the interest of the local club. The following is a suggested outline for the organization meeting.

A. Business Meeting (local or county extension agent in charge)

Enrollment of members in the club.

Election of officers from membership of the club.

(president, vice-president, secretary-treasurer)

Selection of a name for the club.

Selection of the time, date, and place for the next regular meeting.

Appointment of committees to draw up constitution, by-laws and other plans for various parts of the club program.

B. Instructions

Explanation of the duties of the club officers and members.

Distribution of club literature and explanation of its use.

(4-H club bulletin, wood identification bulletin, report blanks and reference bulletins on the project.)

Explanation of the 4-H handicraft club requirements.

Program for next club meeting and assignment of work.

Discussion of the club program for the season.

C. Social

After the clubs are fully organized part of the meetings can be devoted to social activities. Games, contests, programs and parties can be arranged for the interest of the club members. "The Michigan 4-H Messenger," a monthly publication from the Boys' and Girls' club office will offer many suggestions for recreational material.

Suggested Outline for a Later Club Meeting

A. Business Meeting (Club president in charge)

Meeting called to order by president.

Roll call by secretary. Members respond by reporting on previously assigned topic.

Reading of minutes of last meeting by secretary.

Old business.

New business.

Arranging details for next meeting.

B. Instruction

How to keep a shop clean.

Discussion on care of tools.

Demonstration—"Parts of the Plane".

C. Social

Club program—games and contests.

Refreshments.

Suggestions for Handicraft Club Programs

- I. The following may be used in answering roll call:
 - a. Name of kinds of soft woods that may be used in handicraft work.
 - b. Name of standard makes of the different tools, such as, Stanley planes, Disston saws, etc.
 - c. Statement of handicraft articles already completed.
 - d. Statement of handicraft articles to be made this year.
 - e. States of the United States which lead in the production of lumber.
 - f. Name of kinds of trees which grow in your community.
 - g. Cost per thousand feet of different kinds of lumber.
 - h. Name of tools shown by secretary.
 - i. Give number of nail or screw shown by secretary.
 - j. State amount of time spent on handicraft work since last meeting.
 - k. What our club should be doing.
 - l. Name different kinds of finishes which can be applied to articles.
 - m. Names of paint manufacturing companies.
 - n. Something useful that we could make for which we have no plans.
- II. The following may be used as topics for talks or discussions by club members or club leaders.
 - a. How I am keeping my report up to date.
 - b. Best methods of keeping tools in good condition.
 - c. How I am using my handicraft articles at home or on the farm.
 - d. The use of paint, stains, wax, or shellac in handicraft.
 - e. How to arrange an exhibit of the articles made by our club.
 - f. The advantages and disadvantages of doing handicraft work alone at home.
 - g. The advantages and disadvantages of doing handicraft work at the school house.
 - h. How to identify the different kinds of trees.
 - i. How to identify the different kinds of woods.
 - j. How our school board can help our club.
 - k. How father and I are planning a farm work shop.
 - l. How to procure the tools necessary for our club work.
 - m. Debate: "The value of home-made articles vs. factory-made articles."
 - n. Why write a report on handicraft work.
 - o. What handicraft clubs are doing in Michigan.
 - p. What kind of prizes should be given for handicraft work.
 - q. Talks by local men engaged in similar work.

WOOD FINISHING

Wood finishing is a trade by itself. In 4-H club work the member who does the woodwork also completes the finishing. The purpose of wood finishing is to protect the wood from moisture, dirt, weather, and to increase the beauty of the surface. All wood should be well dried or seasoned, as the drying process is called, before it is used in any kind of construction. Wood not properly dried is likely to check, crack, or warp, and break down the finish. Remember that the kind of finishing will depend upon the nature of the wood, type of article chosen, and where it is going to be used.

The main points to keep in mind when finishing wood are:

1. Make a smooth surface.
2. Remove grease spots or discolorations.
3. Remove excess glue, if glue was used for jointing.
4. Remove dents in the wood.
5. Fill holes and checks.
6. Sanding.
7. Apply finishes.

The smooth surface is obtained by use of the smoothing tools. The plane and scraper should be used on each piece before the article is assembled, being sure that all saw cuts or other irregularities are removed by these tools.

Grease spots or discoloration may be removed by rubbing with a cloth dipped in benzine, or naphtha.

If glue has been used, the excess glue should be removed. This can be done by applications of a cloth wrung out of boiling water. If the glue is not removed from the grain of the wood, it acts as a filler and prevents the finish from entering the wood.

To remove dents, wring out a piece of wet muslin and lay two thicknesses of it over the dented surface. Then apply to the cloth a hot pressing iron. By repeating this process, the dent is removed. The part that has been moistened should be sandpapered.

In filling holes and cracks several different methods are used.

A. In case of large holes a piece of wood that matches the rest of the wood should be inserted into the hole.

B. Smaller holes or checks can be filled by mixing some fine sawdust of the wood used with ordinary glue. This mixture when made into a thick paste can be applied to the hole. Care should be taken not to smear the glue to other parts of the surface.

C. For filling cracks in hardwoods, mix together one part of corn-starch and one part of wheat flour. To this mixture add one part of linseed oil with one part of Japan drier. This mixture when placed into the cracks will take any stain.

When the surface is level and all the cracks and holes are filled, the work is ready for the final smoothing. This may be done by using a No. 1 or No. 0 sandpaper or if the surface is flat, a fine scraper.

There are many types of finishes that may be applied to the completed article. Beginners should be satisfied with simple and easy

methods. It should not be necessary to use fillers, enamels or varnishes to obtain satisfactory finishes on small articles.

The first step in the process of wood finishing has been mentioned and is in reality a part of the workmanship of the owner.

The second step is the process of wood finishing, that of staining and coloring.

The purpose of the best finishes is, however, to bring out the natural beauty of the wood rather than to add mere color and striking effects. Paint is a very good substance to use on cheaper woods that have little or no natural beauty or graining.

Stains

Stains are wood dyes, usually dissolved in oil, naphtha, turpentine, alcohol, or water. For beginners, oil stains will serve the purpose better than others. These may be diluted with turpentine to obtain the desired shade. It is recommended to practice on some scrap lumber (similar to that used in your article) before the stain is applied to the constructed article. Stains should be applied quickly, covering all parts. Before the stain has time to dry, the surface must be wiped with a cloth or a wad of waste. If the color is too light, apply one or two, or even more coats until it is dark enough. If too dark, a damp cloth rubbed over the surface will absorb some of the stain and take up some of the color. End grain should be finished with stain of one-third to one-fifth strength. Stain should be allowed to dry at least 12 hours, and preferably 24. Avoid colored varnish or varnish stain in handicraft finishing.

Shellac

Shellac is made from lac crystals. Lac is obtained from the excretions of a tiny insect which infests trees in tropical regions. These insects are found by hundreds of thousands on these trees. The branches, bugs and all, are boiled. The liquid is strained through a canvas, and the strained portion is bleached, treated, and allowed to dry in thin sheets. It may be broken up, even powdered, and "cut" with alcohol to the desired consistency and made ready for use. Shellac, as a sealer is an excellent finish to use, but not a substitute for varnish, because it is not waterproof.

Before applying shellac to the surface be sure that the surface is dry and free from dust. Thin the shellac with denatured alcohol only if it should be too thick. A thin coat is always desirable. Apply with a full brush, do not go over the same portion again and again. Begin at the edge farthest from you and work one section at a time about the width of the brush straight across the grain brushing with the grain. Because shellac dries and sets quickly, it is easy to create "laps" which are very difficult to remove. For that same reason begin the next section across the wood before the first section has set and be careful not to overlap too heavily.

Varnish and wax when applied directly over an oil stain have a tendency to "bleed" through, thus preventing ready drying. Shellac, however, being a spirit varnish, acts as a shield between the two oil products. Shellac is sometimes used as a sort of liquid filler on new wood. Shellac is not a wearing surface, being brittle and somewhat affected by moisture.

Wax

Wax may be applied to all wood over any finish to:

- (1) Polish and beautify.
- (2) Protect and preserve wood or other materials.
- (3) Protect and preserve the life of other finish previously applied.
- (4) Make the surface easy to keep clean.

Wax is easy to apply. The surface does not have to be withdrawn from use, as is necessary with varnished surfaces. It is easy to renew, as any portion can be retouched whenever necessary without going over the entire surface. It is the most economical finish of all. The following procedure may be used: (1) Dust the surface. (2) Apply the wax with a cloth, spreading out in a thin, even coat. A thin coat polishes better and is more satisfactory than a heavy coat. Allow the wax to dry until the stickiness disappears, usually at about the end of 15 minutes. (3) Polish with a soft cloth or a brush. In polishing it is speed rather than weight that brings out the luster. Polish firmly, but fast, rather than try to bear down hard and polish slowly.

Handicraft boys can easily make their own wax, according to these formulas:

Soft Wax

1 part beeswax

1 part turpentine

The beeswax is cut into small pieces and allowed to remain overnight in the turpentine.

Paste Wax

$\frac{1}{4}$ pound of beeswax
1 pound of paraffin

$\frac{1}{4}$ pint of raw linseed oil
1 $\frac{1}{4}$ pints of turpentine

Melt the paraffin and beeswax over a slow fire or in a double boiler. Remove from the stove; add linseed oil and turpentine (both are inflammable) and stir vigorously. The congealed wax should be kept in a covered jar. Two thin coats are recommended with each coat rubbed in well. It is recommended that shellac in varnishing should be applied over the paint before the wax is used. One pound of this wax will cover approximately 250 square feet.

Paints

Articles to be used outside should either be oiled or painted. Use linseed oil, diluted with one-half to two-thirds turpentine, to articles that are not to be painted. Two or three coats will be sufficient. Oil is one of the oldest and best forms of finishing. There is no harm in oiling surfaces that are later to be painted.

Paints may be purchased in many colors and shades. Best results will be obtained if the printed directions are followed.

If the surface contains knots and pitch areas, shellac should be used to touch up these places. This will prevent the pitch from "bleeding" through and likewise act as a "grab coat" for the paint.

The first coat should be given 24 hours to dry. It is then sanded, to remove the imperfections and to smooth the surface for the second coat. Sometimes a third coat is applied.

All methods mentioned are practical for first year members. Any one, or a combination of these finishes is recommended for amateurs.

A	B	C	D	E	F	G
Linseed oil and turpentine	Linseed oil and turpentine Shellac	Stain Shellac	Stain Shellac Wax	Shellac	Shellac Wax	Paint

THE REPORT

The report is a definite requirement for completion. A report blank will be furnished each member in order that the work may be summarized. The report is exhibited with the handicraft exercises at the 4-H Club Achievement Day.

Each club member should know the cost of the lumber, finishing supplies, nails, screws, and other hardware used in the making of each article.

FINANCIAL STATEMENT

No.	Name	Cost of Material Used	Estimated Value
Required Exercise	Sanding block	\$.05	\$.10
First Exercise	Necktie rack	.15	.35
Second Exercise	Towel holder	.05	.20
Third Exercise	Match box	.10	.25
Fourth Exercise	Bread board	.10	.30
Other Exercises			
Totals		\$.53	\$ 1.45

(Note—Use additional sheet if necessary)

Total Estimated Value of Exercises	\$ 1.45
--	---------

Total Cost of Material Used on Exercises	\$.53
--	--------

Total Profit on Exercises	\$.92
-------------------------------------	--------

COST OF MATERIALS

The cost of materials include not only the amount for lumber used, but also sandpaper, nails, screws, hardware and finishing supplies. If the purchase price of the new lumber is not known, the cost should be estimated at 10¢ per board foot. Reclaimed or used lumber should be figured at 5¢ per board foot.

ESTIMATED VALUES FOR HANDICRAFT ARTICLES

The following is an estimated value of completed handicraft articles. Use these values in your report. Your club leader should help you estimate the value of other articles which you have made, if they are not in the bulletin.

First Year Exercises

Bench Hook, 25¢	Letter and Pencil Holder, 50¢
Bench Vise, 35¢	Match Box, 25¢
Bird Feeder, 75¢	Milk Bottle Holder, 75¢
Bird Shelter, 75¢	Milk Stool, 50¢
Book Rack, 35¢	Necktie Rack, 35¢
Bread Board, 35¢	Nesting Boxes, \$1.00
Cake Board or Crock Cover, 35¢	Paper Knives, 25¢
Christmas Tree Stand, 50¢	Paper Towel Rack, 50¢
Clothes Line Reel, 25¢	Pen and Pad Holder, 25¢
Conservation Signs, 75¢	Roller Towel Hanger, 50¢
Coping Saw Exercise, 15¢	Sanding Block, 10¢
Corner Shelves, 50¢	Saw Jointer, 25¢
Door Stop, 15¢	Swinging Door Holder, 25¢
False Bottom, 35¢	Thermometer Stand, 50¢
Feed Scoop, 25¢	Tooth Brush Holder, 35¢
Fish Line Reel, 15¢	Towel Holder, 20¢
Foot Scrapers, 50¢	Whisk Broom Holder, 35¢
Garden Trellis, 50¢	Window Support, 25¢
Home-made Vise, 35¢	Window Ventilator, 50¢
Hydrocal Articles, 5¢-25¢	Work Bench, \$5-\$10
Knife Strop, 15¢	Wren Houses, 50¢

ACHIEVEMENT EXHIBITS

The achievement day will have a very significant meaning to all handicraft club members who have completed their project requirements. Most of the achievement days are now conducted as all-county events. Exhibits from every member and all of the clubs in the county will be on display. This will give every member a chance to make comparisons, and inspect the advanced years work.

The 4-H exhibit is a public demonstration of what has been accomplished throughout the year, and is a means of interesting other boys in the work.

Handicraft exhibits are set up on long tables. Paper placed on the tables will give a neater appearance and help to show up the articles to better advantage. Each club will have a definite space and will place its exhibit according to the different years of work. Each boy's articles should be grouped together, and each article labeled with the name of the club member, year of work and name of the leader of the club.

Achievements may be held locally either before or after the county day. A short but instructive program should be given. The president of the club should preside at the meeting. A typical business meeting may be conducted. Roll call could be responded to by some statement pertaining to handicraft work, such as things that have been learned from the project. Articles made and cost. Properties and characteristics of Michigan's common woods. A short demonstration of some



Fig. 20. Exhibit at county achievement day.

kind could be given by some members of the club, making some simple exercise, sharpening tools, reading working drawings, etc.

Talk: What I think of Handicraft Club Work—Club Member

Talk: What I think of Handicraft Culb Work—A Father

Club Songs.

Instrumental Music.

Reading the best report of the Handicraft Club Members.

Talk and awarding of prizes—Judge of Exhibits.

Social Hour—Games, lunch, etc.

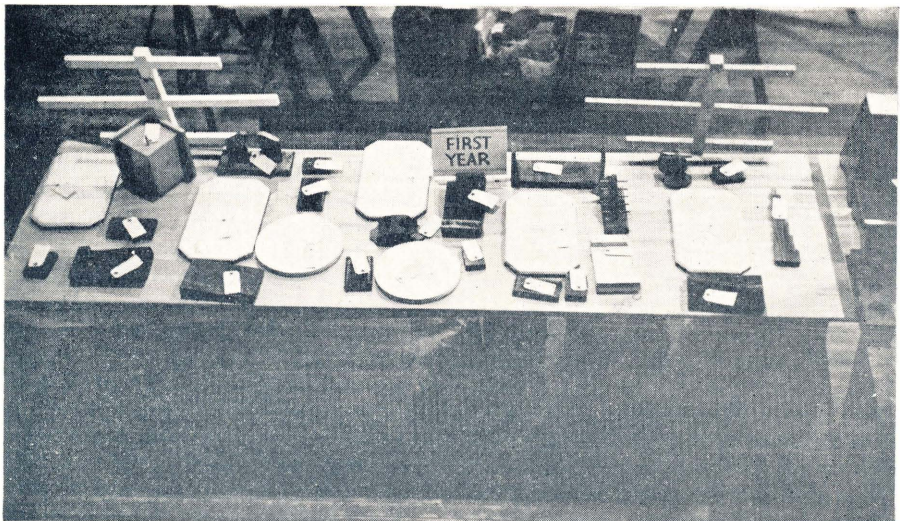


Fig. 21. First year exhibit of Busy Beechwood Beavers.

DEMONSTRATIONS

One of the best methods of presenting various subjects to club members or other groups is through a demonstration. What a club member learns by doing is usually more lasting than what he learns through books or lectures. All club work is demonstrational in method, and the team demonstration brings out the means and methods used by club members.

A demonstration is usually given by two club members working as a team, limiting their work to some phase of the club project. Demonstrations should frequently be a part of the club meeting, as they afford the members opportunity for self-expression and gaining skill and confidence. For local club meetings the demonstrations may be by individuals. This will give each member a chance to try out for the team to represent the club.

In a successful demonstration the members of the team are busy all the time, the discussion being correlated with the work done. In order to present their topics properly the team members must study their subject, have proper equipment and illustrative matter, and divide the demonstration into logical parts.

After the topic has been selected the team should make a careful study of the different things to be discussed in the demonstration. Before demonstrating in public the team should be properly instructed and trained. Each team member should be sufficiently familiar with the subject to speak convincingly during the demonstration and to answer questions asked by the audience. This requires a good general knowledge of the subject.

To demonstrate means to **show**. Every successful demonstration requires some equipment to illustrate the different parts or phases of the work. Remember, illustrative material and equipment play a large part in helping to show or demonstrate the subject under discussion.

What one sees is remembered longer than what one hears. The materials and equipment to be used should be carefully selected before the demonstration and checked over so that everything may be ready.

The following things may be suggestive in developing a team.

1. Select topic to demonstrate.
 - a. Show how to make an article.
 - b. Tell the use of some tool.
 1. Plane.
 2. Saw.
 3. Square.

If additional material is needed to fill out demonstration, discuss any one tool, how to sharpen and adjust.

4. How to file a saw.
 5. How to set a saw.
 - c. How to finish an article.
 - d. Caning a chair.
 - e. Common wood joints and their uses.
 - f. How to square a piece of stock and reduce to proper dimensions.

2. Select members for team.

In doing this, the leader selects two older members whom he thinks are best suited to make the demonstration or he places the selection on the basis of an elimination contest.

3. Preparation of team members and speeches.

Make a careful study of the topic selected for the demonstration. Arrange the subject matter in logical order and collect all the illustrated material possible to use with the speech. The members should train themselves to explain things as they are being done. Talk naturally so that the audience can understand. To make the best appearance it is well for the team to be dressed uniformly.

4. Parts of the demonstration:

a. Introduction.

The best speaker should make the first speech introducing himself and his teammate. Give a brief talk on club work, tell about the work and the purpose of the demonstration.

Suggested Outline for a Saw Filing Demonstration

Speaker A	Speaker B
Introduces himself and teammate in some novel way. Brief talk on club work as carried on in the nation, state and the community. Demonstration is part of club work. Nature and purpose of demonstration.	Gets material ready. Arranges tools, adjusts saw. Shows chart, etc.
Assists by showing parts of saw, pointing out differences as found and mentioned by speaker B. Show good and bad features of saws as mentioned by his partner.	Speaks on use of saw. Parts, differences between cut-off, rip, back, keyhole and coping saws. What to look for in buying saws. How to handle a saw.
Discusses the following: Jointing. Proper set for good work, and different types of lumber.	Shows how to joint. Shows hand set and anvil set. Use charts if possible.
Demonstrates how to hold file and shows chart	Tells how to file cut-off saw.
Tells how to file rip saw.	Demonstrates how to hold file. Shows chart.
Clears bench and prepares to help his partner answer any questions that may be asked.	Summarizes points. Asks if there are any questions. Closes.

b. **Demonstration proper.**

The various phases of demonstration are presented by the club members. While one speaks to the audience, the other assists by either preparing some part of the article to be made or performing an operation or any other action directly connected with the demonstration. The members should alternate in talking and working.

c. **Conclusion.**

Summarize points covered and give audience an opportunity to ask questions. If you are unable to answer any question asked, refer to the handicraft bulletin or any other book on wood working. Courteously avoid answering questions that do not pertain to the work.

Other Demonstrational Topics

1. The construction of any article.
2. The way to use a bench hook.
3. The correct way to use the common tools.
4. Simple finishes.
5. Cleaning finishing brushes.
6. Preparing and mixing finishes.
7. Weaving and recaning.

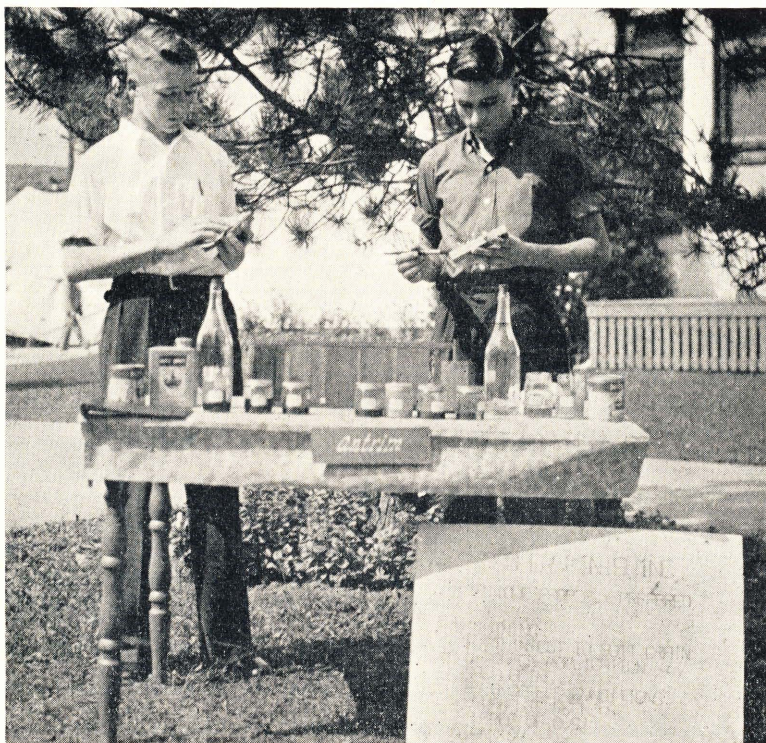


Fig. 22. A demonstration on wood finishing.

WOOD IDENTIFICATION CONTEST

The purpose of this contest is to stimulate an interest in the study of Michigan's commercial woods and to learn their characteristics, properties and uses. Knowledge of woods will be of value to handicraft members when they come to select lumber for their articles. The type of finish to apply will largely be determined by the nature of the wood.

Detailed information about wood identification can be found in 4-H Club Bulletin 26, "Wood Identification for 4-H Clubs." Handicraft clubs may obtain from their county extension agent a box of 14 wood samples for this study.

The wood identification contest is held sometime during the achievement day. It is optional with handicraft and forestry club members, but all are urged to participate. The two or three highest scoring boys in the county contest will be eligible to compete in the district elimination contests. At these events seven or eight boys will be selected to go to the Michigan State Fair to compete in the state contest.

Reference Material

This list of books is given as reference material for handicraft clubs. One or more of these texts should be found in the library of every rural school, or they may be purchased by the handicraft club.

Books:

- "Essentials of Woodworking," Griffeth, published by The Manual Arts Press, Peoria, Ill.
- "Elements of Woodwork and Construction," King, published by American Book Company, New York, N. Y.
- "Toy Patterns," Michael C. Dank, published by The Manual Arts Press, Peoria, Ill.
- "Keene's Cement Craft," Iowa State College, Ames, Iowa.

Magazines:

- Popular Homecraft, General Publishing Company, Chicago, Ill.
- Popular Mechanics, 200 E. Ontario Street, Chicago, Ill.
- Deltagram, 600 E. Vienna Avenue, Milwaukee, Wis.

Commercial Literature:

- Southern Pine Association, New Orleans, La.—100 Handy Helps—Southern Pine and Its Uses.
- Sargent and Company, New Haven, Conn.—Literature on Saws, Squares, Planes, etc.
- Detroit White Lead Works, Detroit, Mich.
- American Steel and Wire Company, Chicago, Ill.—Nail Chart.
- E. C. Atkins and Company, Indianapolis, Ind.—Literature on Saws.
- Henry Diston and Sons, Inc., Philadelphia, Pa.—Literature on Saws.
- A. E. Boyle Company, Cincinnati, Ohio—200 Things to Do With Plastic Wood.
- National Lead Company, 900 West 18th Street, Chicago, Ill.—Handbook on Painting.
- Grand Rapids Fibre Cord Co., Grand Rapids—Manual and Catalogue on Art Fibre Weaving.
- Brodhead Garrett Co., Cleveland, Ohio—Catalog on Manual Training Supplies.

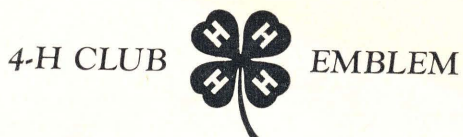
U. S. D. A. Bulletins: (Superintendent of Documents, Washington, D. C.)

- Farmers Bulletin No. 1452—Painting on the Farm.
- Miscellaneous Circular No. 66—Identification of Furniture Woods.
- Farmers Bulletin No. 1456—Homes for Birds.

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4-H CLUB MOTTO—“To Make the Best Better”



4-H CLUB COLORS—Green and White

4-H CLUB PLEDGE

I pledge

My head to clearer thinking,
My heart to greater loyalty,
My hands to larger service and
My health to better living

For

My Club
My Community and
My Country.