The Manual Arts Project in the Industrial Club work does not limit the contestant to any definite task or kind of work. Nearly every home is supplied with such basic woodworking tools as saws, hammer, chisels, etc., and boys and girls who like to make things will find that many seemingly difficult articles can be produced with relatively few tools.

In this series of project circulars, the fundamental principles governing the selection and use of tools will be emphasized, and only those articles will be suggested that are of some practical importance. Every worker in wood or metal should know how to read and use working drawings. Special suggestions will be given club members, so they may design the articles they plan to make.

Whenever possible, especially during the school year, it is suggested that the Manual Arts Project work be done at school. By cooperation, many can share the cost of the few special tools that will be needed by all, although only used occasionally. Club members who may have to work at home, and who have the use of but few tools, will be given special instructions or suggestions, upon request.

The bulletins of the Oregon Agricultural College are sent free to all residents of Oregon who request them.
The following list of tools has been prepared for the convenience of rural school teachers and pupils who do not have the requisite tools for carrying on manual training. It pays to buy good tools and to accept no cheap substitutes. This list is intended to be suggestive only, and more definite or specific information regarding tools, lumber, drawings, supplies, etc., will be gladly furnished, by the Department of Industrial Arts, Oregon Agricultural College, upon request.

Approximate cost of tools for each bench, one of each:

<table>
<thead>
<tr>
<th>Tool</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Block Plane</td>
<td>$0.50</td>
</tr>
<tr>
<td>Jack Plane</td>
<td>$1.75</td>
</tr>
<tr>
<td>Bevel Edge Chisel ¼&quot;</td>
<td>$0.35</td>
</tr>
<tr>
<td>Bevel Edge Chisel ½&quot;</td>
<td>$0.40</td>
</tr>
<tr>
<td>Back Saw, 12&quot;</td>
<td>$1.00</td>
</tr>
<tr>
<td>Marking Gauge</td>
<td>$0.10</td>
</tr>
<tr>
<td>Four Fold Rule</td>
<td>$0.25</td>
</tr>
<tr>
<td>Wing Dividers 6&quot;</td>
<td>$0.20</td>
</tr>
<tr>
<td>Try Square</td>
<td>$0.20</td>
</tr>
<tr>
<td>Stone Stone</td>
<td>$0.50</td>
</tr>
<tr>
<td>Bench Screw</td>
<td>$0.60</td>
</tr>
<tr>
<td>Oil Stone</td>
<td>$0.25</td>
</tr>
<tr>
<td>Slip Stone</td>
<td>$0.60</td>
</tr>
<tr>
<td>Nail Hammer, 7 oz.</td>
<td>$0.40</td>
</tr>
<tr>
<td>Glue Pot</td>
<td>$0.45</td>
</tr>
<tr>
<td>Cabinet Scraper, 3”x5”</td>
<td>$0.30</td>
</tr>
<tr>
<td>Draw Knife</td>
<td>$0.75</td>
</tr>
<tr>
<td>Bevel Square</td>
<td>$0.25</td>
</tr>
<tr>
<td>4 Hand Clamps, 6”</td>
<td>$1.40</td>
</tr>
<tr>
<td>4 Pair of Door Clamp Fixtures, Tay-lor's, No. 31</td>
<td>$5.00</td>
</tr>
<tr>
<td>A very durable Manual Training Bench with rapid acting vise, may be secured for approximately $12.00</td>
<td></td>
</tr>
</tbody>
</table>

Each of the following tools will prove very useful in a manual training shop; they can be easily built by the pupils: Bench Hook (Fig. 2), Drawing Board (Fig. 3), Saw Horse (Fig. 4), and Miter Box (Fig. 5).

**MATERIALS—WOODS.**

The most common wood of medium cost in Oregon, suitable for furniture, is yellow fir, soft grain, from the upland preferred. It works easily, is fairly durable, and takes stain and polish very well. It costs about 4c a board foot.
For fine furniture, quarter white oak is the best of woods. It is hard, strong, easily worked, does not shrink badly, takes a fine polish, and has a beautiful figure. It is one of the most expensive of woods, costing about 12c a board foot.

Cedar is well adapted for making chests, closets, and places for storing goods, as worms do not like the smell of the wood.

Second growth ash is strong and tough, suitable for double-trees, single-trees, tool-handles, and for all purposes, in short, where strength and lightness are desired.
Sugar pine is soft, light, and easily worked, suitable for making patterns, for boxes, carving and cheap constructions. Its cost is approximately 6c a board foot.

FINISHING.

The purpose of a stain is to change the color and to enhance the grain and texture of the wood.

Oil stains are made by mixing the pigments, burnt and raw umber, burnt and raw sienna, Vandyke brown, green drop, black, chrome yellow, etc., in turpentine or benzine. The proper tone may be secured by mixing two or more of these pigments.

Spirit stains are much used and are very penetrating.

The object of filling is to give a perfectly level surface for a basis on which to apply varnish or other finish. It should be used on all porous woods after stain has been applied.

Varnish is usually a resin dissolved in spirits of turpentine, benzine, etc., so that when applied to a wood surface the spirits dry out, leaving a thin coat of resin.

Shellac dissolved in grain alcohol and applied with a brush dries rapidly, leaving the work free from dust.

Wax (bees wax and other ingredients dissolved in turpentine), is easily applied.

Stains, fillers, varnishes, shellacs, waxes, etc., are usually prepared by companies which make a business of preparing these finishes; and for the novice, at least, it is better to buy some good brands already prepared than to make them himself.