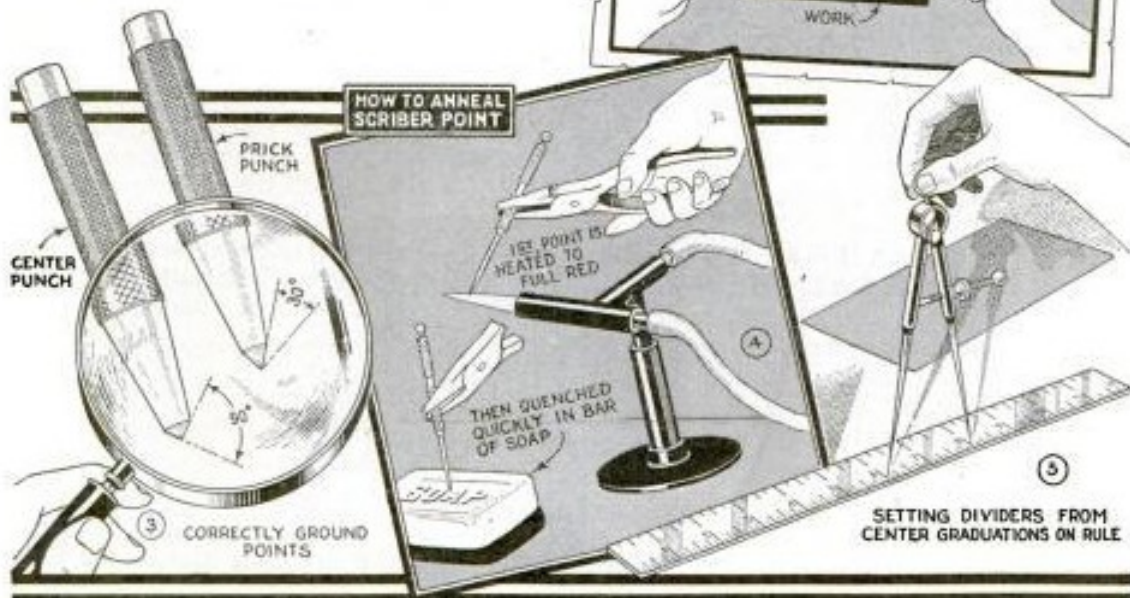
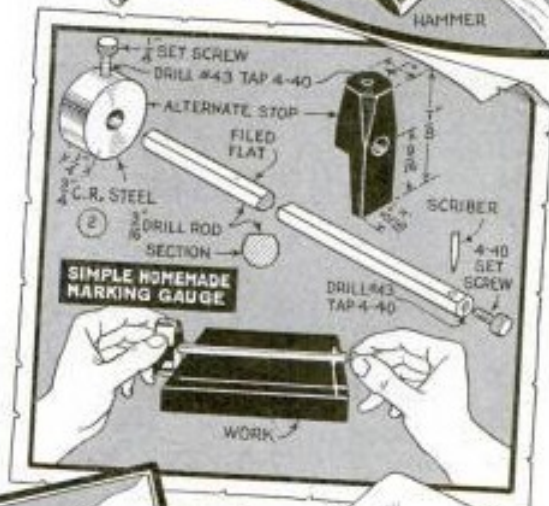
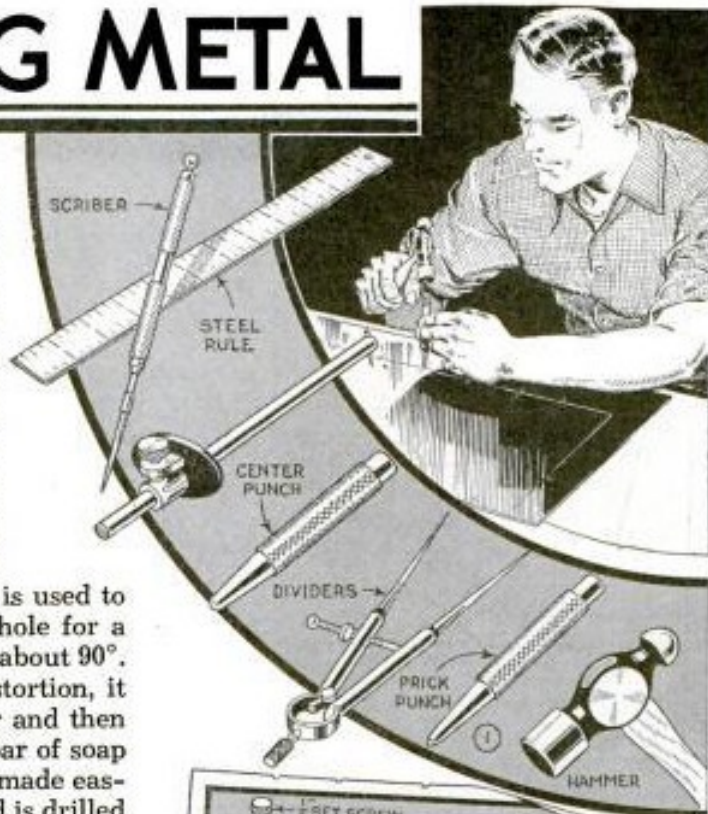
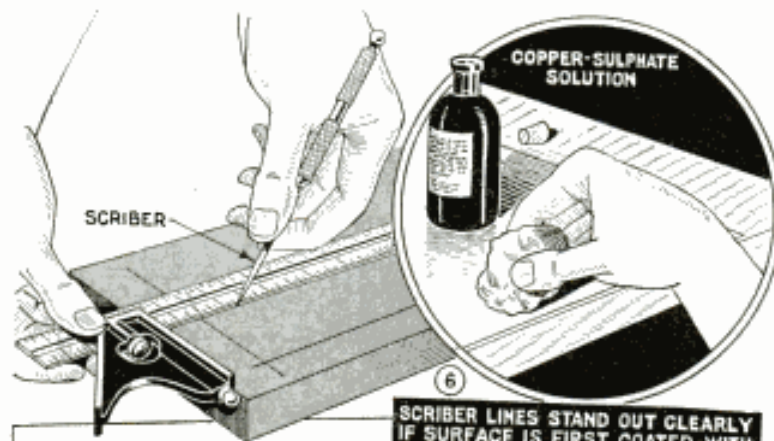


# MARKING METAL

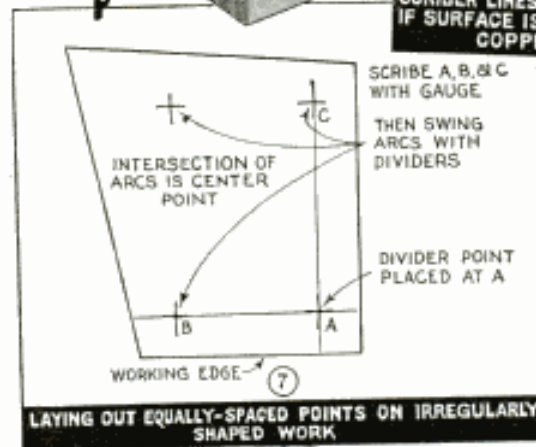
LAYING out metal work requires that the surface be marked clearly at points where drilling, cutting or forming are required. Only a few simple tools are needed, Fig. 1, but they must be hard, to score or punch the work. If desired, you can make some of the tools, such as punches, scribers and marking gauges. A prick punch, Fig. 3, is used for marking a point, and has its end ground at an angle of about  $30^\circ$ , while a center punch is used to make an indentation to start a hole for a drill, and has its point ground at about  $90^\circ$ . To harden a scriber without distortion, it can be heated to a full red color and then quenched by plunging it into a bar of soap as in Fig. 4. Marking gauges are made easily from drill rod, Fig. 2. One end is drilled and tapped to take a set screw, which locks a scriber point in a hole about  $\frac{1}{8}$  in. from the end. A piece of darning needle will do for the scriber.

To make scribed lines show better, many shopmen rub whiting, turpentine or chalk over the surfaces to be marked. Another method is to swab the clean metal surface with a solution made by dissolving a few crystals of copper sulphate in a cup of water and adding a few drops of nitric acid.

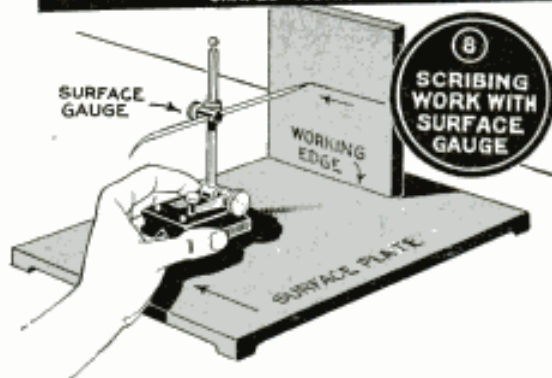




6  
SCRIBER LINES STAND OUT CLEARLY IF SURFACE IS FIRST COATED WITH COPPER SULPHATE



7  
LAYING OUT EQUALLY-SPACED POINTS ON IRREGULARLY SHAPED WORK



8  
SCRIBING WORK WITH SURFACE GAUGE

This solution is left on for a few minutes before wiping it off, Fig. 6, and covers the surface of iron or steel with a thin copper plate through which scribed lines will show clearly.

In setting dividers, it is generally easier to adjust them by feel rather than by sight. To do this, place one point in a convenient graduation of a steel scale and adjust it until the other point sets in the proper graduation, Fig. 5. The end of the scale should never be used as a starting point for measurement, as it may be inaccurate. In laying out work for drilling, a starting point from which to begin all measurements must be selected. Generally, a finished surface or edge of the piece is satis-

factory. To make clear the methods used in locating points for drilling, take as an example, the laying out of a metal block for four evenly spaced holes, as in Fig. 7. Knowing the dimensions of the block and the desired spacing of the holes, the marking gauge is set and a line AB is described with the gauge 1 in. from the side of the block. The gauge is then adjusted to  $1\frac{1}{4}$  in. and a line AC is described. The intersection of these two lines marks the center of the first hole, and should be prick-punched carefully. The other holes can be located with dividers. Set them for a spacing of 2 in. and using A as a center, describe a short arc in the direction of C. The intersection of this arc with the scribed line locates hole C. Similarly, B is located, using A as a center. To locate the fourth hole, two arcs must be described, one at a distance of 2 in. from B and the other at a distance of  $2\frac{1}{2}$  in. from C.

If a surface plate and surface gauge are available, the work can be rested on a suitable edge on the plate, and the lines scribed with the surface gauge, as in Fig. 8. In some cases, this is more convenient than using a marking gauge. If the surface gauge is not available, a machinist's square, or even a try square with a scriber clamped to it, provides a temporary substitute. After locating and marking the centers of the holes, the dividers should be set to a radius of the desired holes and circles drawn for each hole. Then before drilling, the center should be enlarged with a center punch to assure an easy start for the drill. Before the hole is enlarged to full size by the drill, the work should be examined to make sure that the drill is central. The line scribed about the circumference of the hole makes this easy.

## Repairing Worn Crib Doors

One farmer repaired sliding doors on his corner crib, that had worn and splintered at the lower edges, by facing the edges with angle iron. The wide side of the iron was screwed to the inside of the doors, thus avoiding any place for water to collect.