MICROSCOPE

ON THE LATHE-5

The parts of a microscope which are essential for use on a lathe are the objective lens and the ocular. You must have these to advance beyond the stage of the magnifying glass. But how you come by them, and how they are mounted and used, are matters of chance and choice which admit of wide variation.

When you have a microscope, you can use it for some jobs on the lathe without ada tation. For others, the tube with objective and ocular can be removed and mounted in a clamped holder of the sort shown at ***A.*** Alternatively, objective and ocular can be taken out of the tube and used with a home-made one, as at C. Again, this tube can be clamped in a holder, as at ***A,*** or it can be sweated to a shank, as at C. Thus these few basic parts can be used for several mountings on the lathe; they can be employed with stands for bench microscopes.

When you have no microscope, you can buy the objective and ocular separately, new or second-hand. Then you make other parts to suit. With a new objective and ocular, this keeps the cost down to a few pounds.

There are other ways of overcoming difficulties and reducing expense on special equipment. For many purposes, another lens can be used to save a microscope objective. You can use most low-power microscope objectives by screwing out the front glass to give reduced magnification; one objective can do the work of two. You are not limited to a definite length of tube between objective and ocular. Increasing the distance between them gives greater magnification. Thus, according to need, you can combine lenses and oculars, and reduce or increase magnification. Briefly, you can ring many changes.

Diagrams ***A*** and C illustrate simple holders for the topslide. The microscope can be pointed towards the lathe spindle or across its axis. By the first mounting, you true work through scribed lines or a centre dot. By the second, you observe a fine line on a centre finder-and adjust the job so that the line is steady.

The holder ***A*** consists of three parts: the cap and the base in aluminium, duralumin or brass, and the shank, which can be in any of these non-ferrous alloys, or in mild steel. I favour mild steel, to resist marks from clamping. The scrapbox may provide all the pieces, as there are no binding dimensions, except that the base should be about 1 1/2 in. wide, to provide enough length of channel for the microscope tube. To prevent scratches on a polished tube, you can wrap it in paper, having allowed for the thickness of the paper when you were machining the radius. The shank you can pack up like a lathe tool, to bring the microscope to centre height.

It is best for cap and base to be one piece of material for tooling the radii with a flycutter, as at ***B.*** The vertical slide should be adjusted firmly, and drawn upwards to resist the cut.

After this operation, the cap can be sawn from the base. Both can be finished in the independent chuck. Make the base shorter than the cap by dimension Z, to keep the microscope near the slide. Two screws and a stud with a shallow nut secure the base to the shank. The cap has a pressed-in reaction button.

The holder at C also consists of three parts, four, including the shank, which should be a casting in brass from ***a*** wood pattern. The three parts are the lens holder, which is threaded for the objective, the bush for the ocular, and the tube to join them-all in brass. The tube should be 3/16 in. Iarger than the ocular. Then the push-in bush is machined with 1/32 in. eccentricity. By rotating it, you move a cross-wire in the ocular to help in setting up. The bush is a good friction fit, and so is the lens holder, which is secured by small screws.

The pattern for the shank is made as at ***D. You*** tool the radius in the casting with a flycutter from the topslide. With care, it can be sweated to the tube to leave no solder showing.

Both holders can be used with an angle holder, or bracket, so that the microscope can be tilted at an angle to the work. ❑