MICROSCOPE on the lathe

(part one)

A GREAT merit of model engineering 1s the insight that it gives you into many branches of engineering and science.

In practising it, you get into the habit of seeing through appearances and principles. You gradually realise that workshop practice and mechanical engineering are based on geometry and that there are strong ties between model engineering and full-scale practice.

This is a progress which, from the beginning, may occupy several years comparable to an apprenticeship before a career in engineering.

In the later stages, you can go into a works, with a minimum of further specialist training. For all you really need is a period to become accustomed to the difference in scale.

The comparison does not end here. In your own little workshop you may have microscopy as a secondary interest to lathework. You may also do some photography. If so, you have the means for becoming well " clued up " or " with it " in regard to many instruments and principles which are used in a modern works or toolroom.

Basic principles

At first,. you may think that there are only simple and obvious connections between lathework, microscopy and photography. Under a microscope, parts can be examined for surface finish. With a camera, you can photograph models and tools.

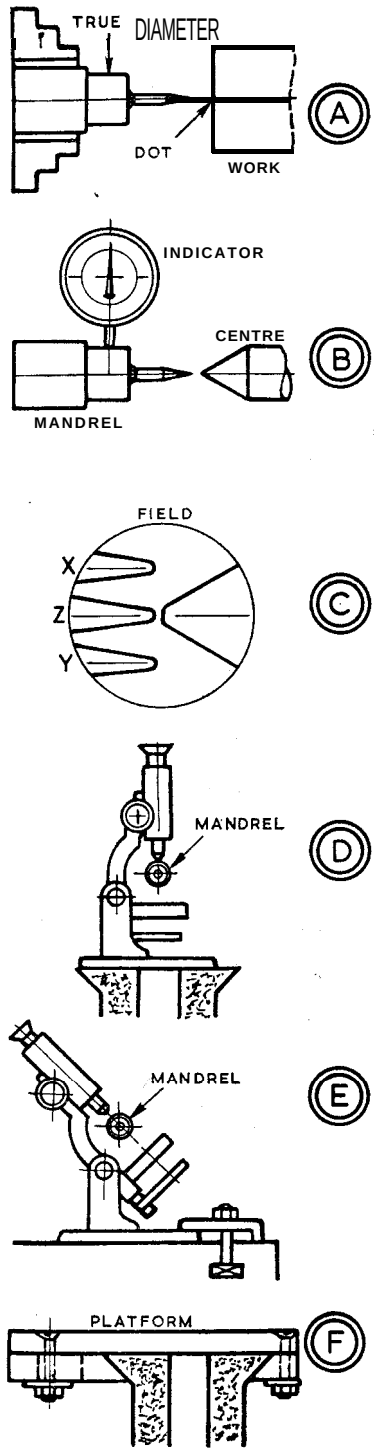
Similarly, lacking information to the contrary, you may think that all the different microscopes and pieces of optical equipment of a modern toolroom are outright inventions of latter-day brains.

But you would be wrong.

Most of the spadework of optics and microscopy was done in a period which began in about 1600 with Jansen, the inventor of the compound microscope, and ended in about 1900 with Abbe of Jena Glass and Zeiss optical works. Modern workers have merely gone over the ground again, using established principles and modifying methods and adapting equipment.

With reservations, modellers can do the same.

In my articles of 26 November and 3 and 10 December 1959 I made suggestions, from my own experience, for using a folding camera, or its lens, in a profile projector. Essentially, they were hints on the application of principles for making home-workshop equipment function like toolroom instruments.



Optical applications

As a microscope, my first hint is that you use it for truing a needle point from which work can be set up on the vertical slide. This is a method which you employ when you have to centre, drill and perhaps bore work on the vertical slide, using tools in the chuck. The work is marked out first, and sometimes is centre dotted. Then you adjust the vertical slide and the cross-slide to bring the scribed lines or the dot to the needle point on the chuck, as at ***A***.

A condition of accuracy is that the point is dead on the lathe axis. Assuming that it is right, you can machine a diameter on the mandrel. and clock this true on other occasions, as at B. But there are several presumptions in the method. One is that the point is true when you machine the diameter. Another is that you do not knock it in setting up work, or when the mandrel is out of the chuck.

In my view, there is only one way to be certain that the point is true- to watch it and true it under a microscope. For the point, you can use a sewing needle soldered in the mandrel. Turning the chuck slowly, you see the point move in the microscope field, as at C, X to Y. You adjust the laws until it is steady at Z. If you bump it in setting up the work, you recheck it and, if necessary, retrue.

For this job, you should have little difficulty in mounting a microscope on a lathe whatever size each of them may be.

On many lathes, the instrument can be stood on the bed, as at ***D***. On others, it can be clamped to the cross-slide, as at E-at least for the first setting before the vertical slide is mounted. On others again, a hardwood platform can be used, as at F, with blocks as required. ❑