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## I. A Catoptric Microscope. By Robert Barker, M. D. F. R S.

Though Microscopes, compos'd of Refracting Glasses only, have been vastly improved, as to their Effects of magnifying; yet they have been attended with such great Inconveniences, that their Application to many Arts, in which they might be very convenient, is not so common as might be expected, and Mankind have reap'd but a small Part of the Advantage obtainable from so surprizing and useful an Instrument.

Among the Inconveniences mentioned, these are the most considerable:

1. That in order to magnify greatly, it's necessary the Object-Glass be a Portion of a very minute Sphere, whose Focus being very short, the Object must be brought exceeding near; it will therefore be shaded by the Microscope, and not visible by any other Light than what passes through itself; in this Case therefore, Opake Objects will not be seen at all.

2. Objects illuminated this way, may be rather faid to eclipse the Light, than to be truly seen, little more being exactly represented to the Eye, than the Out-line; the Depressions and Elevations within the Out-line appearing like so many Lights and Shades, according to their different Degree of Thickness or Transparency; though the L. I contrary

contrary happens in ordinary Vision, in which the Lights and Shades are produced by the different Exposure of the Surface of the Body to the inci-

dent Light.

3. Small Parts of large Objects cannot eafily be applied to the *Microscope*, without being divided from their Wholes, which in the Case of Vivi section deseats the Experiment, the Part dying, and no more Motion being observed therein.

4. The Focus in the Dioptric Microscope being fo very short, is exceeding nice, the least Deviation from it rendring Vision turbid; therefore a very small Part of an Irregular Object can be seen di-

stinctly this way.

To remedy these Defects I have contrived a Microscope on the Model of the Newtonian Telescope, in which I have been greatly assisted by that excellent Workman, Mr. Scarlet, jun. I shall say nothing of the Effects of this Instrument, excepting that it magnifies from the Distance of 9 to 24 Inches, having the Honour of shewing this Instrument to this learned Society.

## Explanation of the Figures.

Fig. 1. The entire Microscope mounted on its Pedestal, on a proper Joint, contrived so as to di-

rect the Instrument, towards any Object.

Fig. 2. The Section of the Instrument, in which AB is the larger concave metalline Speculum, CD the lesser Concave metalline Speculum; EF a hollow Brass Screw to fasten in the 1st Dioptrical Glass, or

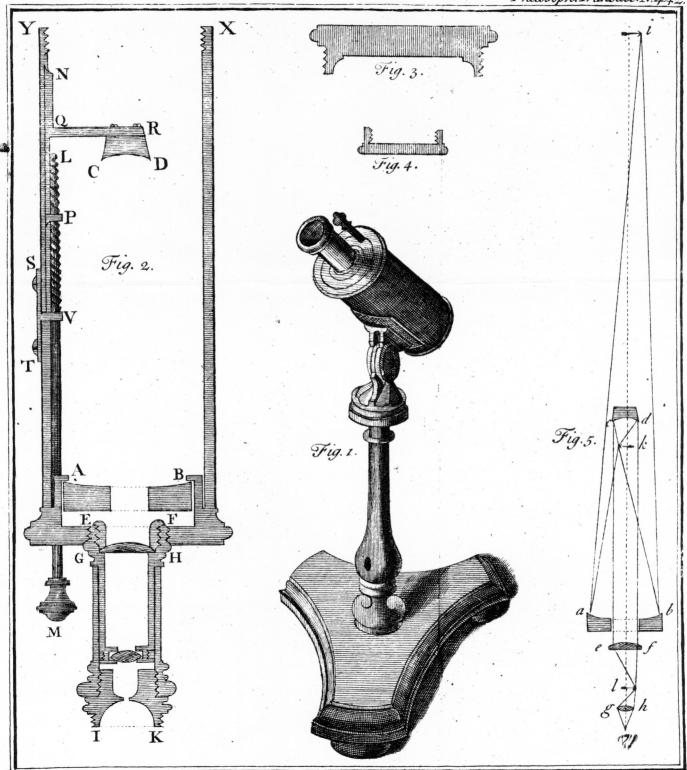
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Plano-convex Lens; GH another Screw fastening on the hollowCylinder EF I K(in which the Dioptric Glasses are contain'd) to the Body of the Microscope; I K a Cap with a small Perforation, serving as an Aperture to the Eye-Glass, or 2d Lens (convex on both Sides); ML is a long Screw passing through the Nuts P and V, serving to bring the small Speculum to a proper Distance from the larger; NQ a sliding Piece mov'd by the Screw, carrying the Stem QR, and little Speculum CD; YX a Screw for the Cap at Fig. 3; that at Fig. 4, is to be screwed on the Aperture I K.

Fig. 5. Shews the Construction of the Microfcope, in which i is an Object supposed erect; from which Rays falling on the Speculum a b, will be reflected to the Focus k, where they will form an inverted Image, and being reslected by the small Speculum c d, they will pass through the Persoration of the great Speculum, and falling on the Plano-convex Glass e f, converge again, and form an erect Image at l; which being brought very near to the Eye, and so considerably magnified, will be distinctly seen through the Eye-Glass g b.

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II. An



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