

"flakes" in such various and inconsistent localities—viz. in blood, urine, the brain, in tumours, and even in the breath—has hitherto aroused no suspicion of their true nature; and it is only when we remember how few investigators have minds achromatic enough to enable them to see objective facts without subjective colouring, that we can offer a plausible explanation of this remarkable phenomenon. Does not the delusion which, if I am correct, has thus entangled several eminent observers, form one of the most curious episodes in the history of medical microscopy? and should it not serve as a warning to future generations of students?

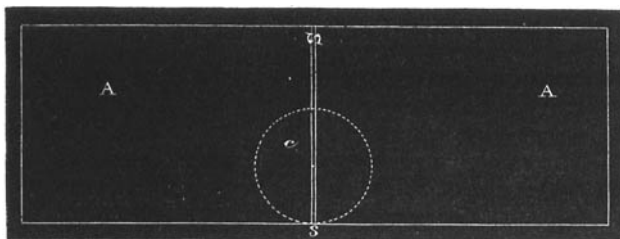
Nevertheless, being always open to conviction, I hereby challenge any devout believer in pigment-flakes to bring me an honest specimen of urine, or blood from any ordinary case of disease, in which can be demonstrated either pigment-flakes, pigmentary particles, or pigment-scales.

PHILADELPHIA, November 7, 1874.

III.—On a Modification of the "Slit" for Testing Angle.

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It is only within a few days that I have used the "slit" devised by Mr. Wenham to cut off false light, as he says. Having always made the test of the verity of my measurements this condition, viz. that the object be in focus and in view with *the extremest rays traversing the sector*, there could remain no chance of my being mistaken. But in tracing a diagram to demonstrate the effect of aberration when the slit was used without cover and at the closed point, I hit upon a ready means of use of the slit *to test angle with cover, and without, almost simultaneously*.



An ordinary glass object-slide, silvered on its upper surface, A. S, the slit cut through the amalgam (or silver). c, covering glass, with test diatoms in balsam between cover and slide, in the

slit. (Also, a central portion of the cover *might* be a *dry* mount of the same diatoms.)

My course is to find out, in the first place, what the field of the objective to be measured is, by means of a stage micrometer. I then cut the width of the field or less, as I choose, through the silvering, guiding the knife against a metal straight-edge. A little dilute acid cleans the slit-space. In the case of the $\frac{1}{4}$ th measured in London the breadth of slit required was closely to $0.015''$ *to span the field*, an unneeded breadth for the purpose of angle-measurement.

I will now relate my experience with the apparatus in a trial of it on a $\frac{1}{4}$ th closely similar to the one Mr. Wenham tried his invention on. I induced the owner of the objective, a resident of this city, to bring it in and witness the trial.

Thickness of cover used $\frac{1}{10}$ inch, which the objective at "closed," just focussed through upon the objects in the balsam, or in the dry mounted portion, with air contact. The edges of the slit trenched slightly upon the field of view in the eye-piece, a "B" of medium aperture.

To get the angle as Mr. Wenham got it, the *uncovered* portion of the slit was brought into view. A clear air-space between, of course. The angle was less than 100° ,—scarcely 90° . The covered portion of the slit was then brought into view, *cover dry*. The angle was all my thin* stage would admit of, about 160° , but the aberration even with the very thick cover and *contact* (with brass setting of front lens) rendered the trial indecisive as to useful angle.

But observe; with *water contact* and the object-slide having been transferred to *bottom* of the thin stage, the objects were nicely defined even with light incident *almost* exactly parallel with the surface of the slide.

Furthermore, with a slit one-half or one-third the breadth of the field, the result was just as satisfactory *with water contact*; but with air only intervening, the angle was reduced, accordingly *as the field* was reduced, from less than 100° (small enough!) to one-half or one-third *that* angle.

Properly used, it is evident that for taking angles a *narrow slit* of field-aperture is as good as more, and therefore a slit at the focus suitable for $\frac{1}{12}$ th might serve for $\frac{1}{4}$ th. In fact, what suits a $\frac{1}{20}$ th ought to serve for *all powers below*. The thinnest covering glass will do, that being needed merely to secure the objects, as tests of definition, in place. The space may be filled up with glycerine to contact as well, ordinarily. Always, where only infinitely near to 180° of aperture is to be measured. Water has too low refraction to *correct* in place of glass.

* Not "zinc"! stage; see 'M. M. J.' for August, 1874, p. 65.

I may as well state here what is of *real* importance in *using* such an objective as the $\frac{1}{8}$ th, i. e. of maximum (or large), angle and long working distance through cover. That objective goes best with the *thicker* covers, therefore the thin covers $\frac{1}{300}$ to $\frac{1}{100}$ should be supplemented with glycerine instead of water. This gives best command of *all* thicknesses of cover, notably if the objective is *corrected for best work* through the nearly *thickest* covers it will penetrate.

Boston, Nov. 25, 1874.
