

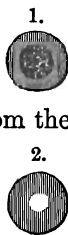
ART. XXXVII.—*On the evidence furnished by Photography as to the nature of the markings on the Pleurosigma Angulatum*; by Prof. O. N. ROOD, of Troy, New York.

It is well known that the delicate markings on this infusorial shell have been diligently studied by microscopists for more than ten years, still the form of the dots is made a subject of dispute, one party maintaining it to be hexagonal, while their antagonists insist that it is circular. Photography has been called upon to aid in a settlement, and photographs of this shell were obtained by Mr. Whenam, which distinctly exhibited the *hexagonal* structure.

Without taking any particular interest in the controversy, I have devoted some time to photographing this test object, and have lately succeeded in obtaining, by the method indicated in my article in the September No. of this Journal, a fine, intense, sharp negative, magnified 1000 diameters.

Almost the whole shell was nearly in focus, a large portion being in very accurate focus. When this negative was examined by the microscope, the dots were seen to be distinctly *circular*, and well-defined; by the aid of photography an enlarged and sharp negative was obtained, (magnified 7000 diameters) which yielded good prints on paper, showing the markings to be circular.

The dots in these negatives were not uniformly shaded but presented an appearance like that seen in the diagram, fig. 1. Furthermore, although the interior dark circle seemed to the eye uniformly dark, this was not actually the case, as was demonstrated by copying the negative with the camera and varying the time of exposure, when it became evident that the deposit of silver grew regularly denser from the circumference to the centre of these little circles; thus in this process positive prints on glass were obtained by the camera presenting the appearance roughly indicated in fig. 2.



Mr. Whenam states, that he has ascertained by a $\frac{1}{50}$, that the markings on this test object are due to spherical particles of quartz; it would appear that the results here detailed favor this view.

As will readily be comprehended by photographers, the delicate *shading*, which has been described, though very distinct on glass, *cannot be seen in prints on paper*, for exactly the same reason that the delicate shades in ambrotypes are lost, when an attempt is made to obtain prints on paper from them.

The production of *hexagonal* markings, which are often obtained, is probably due to a slight defect in the focal adjustment, as well as to a slight inequality in the oblique annular illumination.

The following is an instructive experiment: in a plate of brass a large number of circular holes are drilled, their disposition, &c. being similar to that of the circular dots on the shell in question; the plate is then carefully blackened. In my experiment the plate was a copy of an enlarged negative. The plate thus patiently prepared is placed before a bright light and the photographic camera leveled at it, a distance being selected such that small images of the circular holes are obtained. The full aperture of the lens should be employed.

By varying the focal adjustment of the camera slightly, these true circles become converted into tolerable hexagons, rhombs, or triangles, the latter being less distinctly marked than the two former.

Also, by altering the focus, an apparent reversal of the lights and shades takes place, the positions of the bright circular dots being seemingly occupied by dark dots; this is caused by the expansion of the thicker portions of the dark spaces between the circles, and so far as I can judge, with the means at my command, the reversal of the lights and shades in the dots on this test object examined by the microscope, under the imperfect focal adjustment, is due to the same cause, and is more apparent than real.

As it is impracticable to publish prints from these negatives in this Journal, samples will be sent, on application by letter, to those who may be particularly interested in this subject.

Troy, September 7th, 1861.