

**Physics.** — *The "VAN LEEUWENHOEK Microscope" in possession of the University of Utrecht.* By Dr. P. H. VAN CITTERT. (Communicated by Prof. L. S. ORNSTEIN.)

(Communicated at the meeting of October 29, 1932.)

In his book: "ANTONY VAN LEEUWENHOEK and his little animals" (Amsterdam 1932) C. DOBELL remarks in a footnote (page 324): "The lens examined by HARTING was in a microscope preserved at that date in the physical collection at Utrecht. The instrument now in the zoological collection of the same University is greatly inferior, its lens having a focal length of about  $\frac{1}{4}$  in. (fid MAYALL 1886)". On page 327, in the text itself DOBELL remarks: "Most of the recent descriptions and pictures of "LEEUWENHOEK's microscope" are based on the rather poor specimen now preserved in the Zoological Laboratory at Utrecht".

As it was generally believed in Utrecht that the microscope now in possession of the Utrecht University was identical with the specimen examined by HARTING, the above mentioned remarks urged me to compare it with HARTING's description (Het Microscop, III, page 43—44, Utrecht, 1850). Its dimensions proved to be in accordance with the dimensions given by HARTING ( $4.5 \times 2.5$  cm<sup>2</sup>), the length of the focussing screw is 1 cm, the number of threads on the screw amounts to 11. The lens is biconvex and has a focal length slightly less than 1 mm, which is in fair accordance with the magnification of 270 diameters, measured by HARTING. The magnification was measured directly by viewing an ABBE testplate having a line distance of  $\frac{1}{20}$  mm through the microscope. Five lines of this testplate were seen in a field of view, which was equivalent to a circle of 7 cm diameter at a distance of 25 cm. This gives a magnification of 280 diameters. Furthermore, the microscope examined by HARTING, was capable of resolving the 3rd group of lines on a NOBERT testplate, and with good illumination, also the 4th group (distance of the lines 0.0014 mm). Now the physical institute in Utrecht is in possession of such a NOBERT testplate, probably the same as used by HARTING, and it was possible to resolve the 4th group of lines. *Consequently there is no doubt that the microscope now in possession of the University of Utrecht is identical with the specimen examined by HARTING, and that, far from being an inferior and a rather poor specimen, it probably is as HARTING concluded, the best specimen known.*

In fig. 1 is reproduced a microphotograph of the ABBE testplate, i.e. a plate covered with a silver layer, wherein lines have been scratched  $\frac{1}{20}$  mm apart. The magnification is about 180 diameters. The lack of sharpness at

P. H. VAN CITTERT: THE "VAN LEEUWENHOEK MICROSCOPE" IN  
POSSESSION OF THE UNIVERSITY OF UTRECHT.

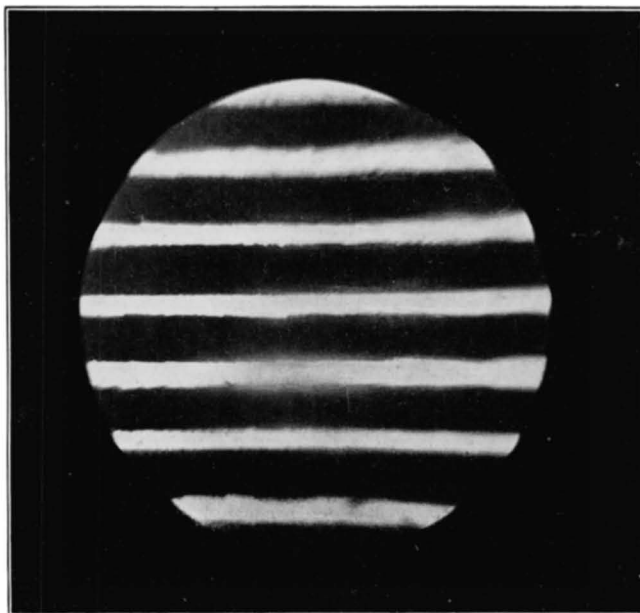


Fig. 1.

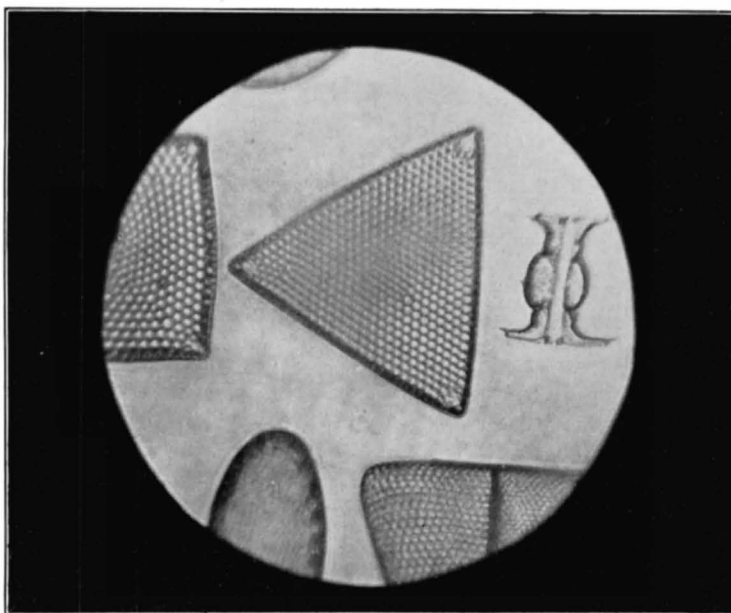


Fig. 2.

the borders of the photograph is mainly due to chromatic aberration. The irregularities in the borders of the lines show that the resolving power of the lens is fairly good and that structures of about  $\frac{1}{500}$  mm can be easily resolved. Fig. 2 shows a photograph of some diatomees. The magnification is slightly more than 200, the length of the sides of the triangle being 0.18 mm. The slight indistinctness in the centre of the field of view is partly due to some scratches on the top of the very highly curved lens, partly to the fact that the image does not lie in a plane, but on a curved surface. It is astonishing that a lens with a free aperture of less than half a millimeter can give such a large image without showing a greater curvature than is observed.

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**Chemistry.** — *The Thermal decomposition of Paraffin wax in the Presence and in the Absence of Hydrogen of High Pressure.*  
By H. I. WATERMAN, A. J. TULLENERS, and J. DOOREN. (Communicated by Prof. J. BÖESEKEN).

(Communicated at the meeting of September 24, 1932.)

In previous communications a comparative examination was made of the gaseous and low boiling products (gasoline), obtained in the thermal decomposition of paraffin wax by berginization (high pressure hydrogen) and by cracking (without addition of hydrogen)<sup>1</sup>). A comparative examination of the higher fractions, which gave analogous results, was described in 1929<sup>2</sup>).

In PERQUIN's Thesis the results of these investigations were summarized as follows:

1. The quantities of the products boiling up to 150° are about the same for berginization and for cracking (32—34% of the paraffin wax after 90 minutes at 450° C.).
2. In both products the presence of considerable quantities of paraffin-hydrocarbons has been detected with great certainty.
3. The products obtained by cracking are considerably less saturate.
4. Besides the higher degree of unsaturation of these cracking-products they differ qualitatively more from the products obtained by berginization, as their boiling-points become higher.

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<sup>1</sup>) H. I. WATERMAN and A. F. H. BLAAUW, Rec. trav. chim. **45**, 284 (1926); H. I. WATERMAN and J. N. J. PERQUIN, *ibid* **46**, 813, (1927); Comptes rendus du 7<sup>me</sup> congrès de chimie industrielle, octobre 1927, Chimie et industrie, numéro spécial, April 1928, p. 244. The same subject is discussed more in detail in J. N. J. PERQUIN's Thesis: Bijdrage tot de kennis van het BERGIUS-proces, Delft 1929.

<sup>2</sup>) H. I. WATERMAN, T. W. TE NUYL and J. N. J. PERQUIN, Journal of the Institution of Petroleum Technologists **15**, 369—371 (1929).