tions up to nearly 28 per cent by weight of solute and at 20° intervals from 20° to 120°.

The values of P_2 at each temperature when plotted against $(\varepsilon - 1)/(\varepsilon + 2)$ give straight lines which, when produced, meet at a common point at $(\varepsilon - 1)/(\varepsilon + 2) = 1$. The slopes of these lines yield the following moments in Debye units ($D = 1 \times 10^{-18}$ E.S.U.).

t	μ	t	μ
20°	4·30 D	80°	4·25 D
40°	4·30 „	100°	4·22 „
60°	4·25 „	120°	4·19 „

The average is 4·25 D, which is in good agreement with the value 4·23 D for the vapour recently published by Sugden and Groves[4]. These results will shortly be published and discussed in more detail elsewhere.

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[1] Müller, *Phys. Z.*, **33**, 732; 1932. **34**, 689; 1933. **35**, 346; 1934.
[2] Jenkins, NATURE, **133**, 106, Jan. 20, 1934. *J. Chem. Soc.*, 480; 1934.
[3] Sugden, NATURE, **133**, 415, March 17, 1934.
[4] Sugden and Groves, *J. Chem. Soc.*, 1094; 1934.

Cyclic Components of Paraffin Wax

CRYSTALLOGRAPHIC considerations have led Mr. Yannaquis[1] to the conclusion that some of the components of paraffin wax belong to the naphthenic series. In the course of our work on the composition of asphalts derived from paraffinous petroleum[2], similar conclusions were reached with regard to some fractions of wax, which had been prepared by solvent extraction from petroleum asphalts.

Successive crystallisations from pyridine and ether, followed by an ultimate crystallisation from benzene, enabled us to separate the bulk of the paraffin wax into four fractions of different melting points. Elementary analysis of those fractions, carried through most carefully, proved that there is always a certain deficiency in the hydrogen content as required by the formula $C_n H_{2n+2}$.

Fraction	1	m.p.	76° C.	C: H ratio corresponds to	$C_n H_{2n+1}$
„	2	„	63° C.	„	$C_n H_{2n}$
„	3	„	57° C.	„	$C_n H_{2n-2}$
„	4	„	50° C.	„	$C_n H_{2n-3}$

It is obvious that the first fraction is to be considered as a mixture of true paraffins with some cyclic hydrocarbons which are most probably the chief components of the remaining fractions. The iodine number being rather small and amounting to 5 only, the occurrence of cyclic hydrocarbons in undistilled paraffin wax seems to be adequately established. The decrease of the hydrogen content of the fractions is followed by an increase of the specific gravity from 0·798 at 80° C. to 0·817 at 80° C. and of the refractive index n_D^{80} from 1·4470 to 1·4558. Another fact pointing to the cyclic constitution of these hydrocarbons is the slope of the temperature-viscosity curve, which is markedly steeper in the case of fractions with a smaller hydrogen content.

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[1] *Ann. Combustibles liquides*, **9**, 295; 1934.
[2] *Asphalt und Teer*, **32**, 708; 1932. **33**, 421; 1933.

Red 'Water-Bloom' in South African Seas

WHILE the R.R.S. *Discovery II* was refitting in Simonstown, a remarkable profusion of a red 'water-bloom' was observed in Simons Bay. The sea close inshore was strongly discoloured, large areas appeared blood-red. These were often sharply marked off from other areas in which the sea was of a more normal greenish hue. Motor-boat runs indicated that the red water extended along the greater part of the east coast of Cape Peninsula on July 15 and 16, 1934. Similar phenomena were observed during a previous commission, once early in June 1930 on entering Table Bay from the north, and on several occasions in False Bay.

Microscopic examination showed that the discoloration was caused by myriads of ciliate Protozoa, belonging to *Mesodinium* or some closely allied genus. They instantly disintegrated when ordinary fixing methods were attempted, and moved too fast to permit of detailed examination when alive. The general form was as indicated in Fig. 1, a globular mass of reddish granules contained within a trans-

c. 40μ

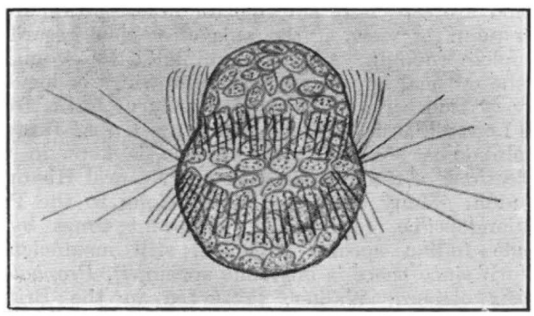

FIG. 1.

parent pellicle, provided with a double ring of cilia. They suddenly perished after brief exposure to strong light; all structure was lost instantaneously and the red granules turned yellow, and later, green. This was evidently the cause of the green scum that accumulated at the tide line all along Cape Peninsula at the time. Probably the granules are symbiotic zoochlorellæ, for they appeared to maintain an independent holophytic existence for some time after the death of the ciliates. These organisms approach the northern *Mesodinium rubrum* more closely than any other species described in the literature available, but Hamburger and von Buddenbrock's[1] figures are not adequate to determine whether it is indeed the same. So far as I can ascertain, ciliates have not previously been recorded as a cause of extensive discoloration of the sea.

A brief general account of the formation of 'water-bloom' by micro-organisms, sometimes thick enough to be destructive to the higher forms of marine life, appeared last year in NATURE[2]. Dinoflagellates appear to be the most frequent cause[3,4], but euglenoid flagellates have also been known to form it[5]. Off South Africa, *Noctiluca scintillans* is mentioned as a cause of 'red water' in summer. Unfortunately, all our observations have been made between May and October when we have rarely obtained *Noctiluca* in large numbers, but I suggest that further study of 'red water' round the Cape, particularly in relation