ART. XXXI.—*On a Pigment in Oysters.*

By G. H. ROBERTSON, M.Sc.

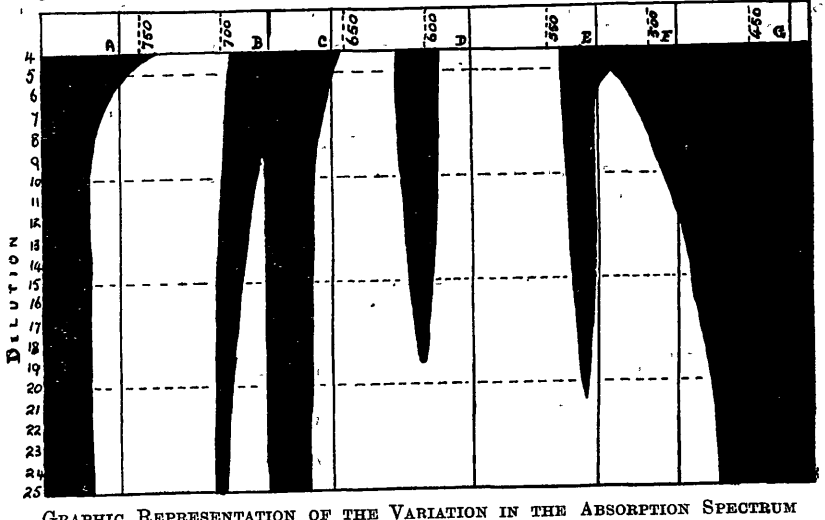
[*Read before the Otago Institute, 7th October, 1913.*]

THE existence in the Stewart Island oyster of a pigment with a distinct absorption spectrum has already been recorded by J. Malcolm.* This investigator noticed that when dried oyster was extracted with ether, chloroform, benzene, or other fat-solvent a solution was obtained which gave a single band in the red—nearer the infra-red than the characteristic methaemoglobin band. The pigment was found in all the samples examined.

The present investigation was directed towards mapping out the variation of the spectrum with dilution, and the reactions of the pigment, with a view to placing it in one of the known classes of animal pigments.

Of all solvents, the pigment was found to be most soluble in ether, and accordingly this solution was used for spectroscopic examination. The results of this examination will be seen in the accompanying figure.

At the highest concentrations obtained two bands are seen, both in the red. As the dilution increases, a band appears in the blue-green about the neighbourhood of the E line. At a slightly greater dilution the broad band



GRAPHIC REPRESENTATION OF THE VARIATION IN THE ABSORPTION SPECTRUM OF SOLUTIONS OF OYSTER PIGMENT WITH CHANGING DILUTION.

at the red end splits into two, and now over a considerable range of dilution four bands are visible. At greater dilutions the various bands disappear, as shown in the figure, which is drawn accurately to scale. The band in the red, between the B and C lines, persists long after the other bands have all been lost sight of. This is probably the band observed by Malcolm.

Chemically the pigment is characterized by its great stability. Alcoholic or alcohol-ether solutions were used, and when the addition of the reagent caused no change in the position of the bands it was presumed

* Trans. N.Z. Inst., vol. 44, 1912, p. 265.

that no change had taken place. Attempts to oxidize the pigment with potassium ferricyanide, with aqua regia, and with pure nitric acid left the pigment apparently unchanged. Reduction with ammonium sulphide and with sulphurous acid had a similar non-effect. The pigment is stable to acids—strong hydrochloric—and to alkalies, standing boiling with watery potash, but broken up by boiling with alcoholic potash.

Though these chemical results are negative on the whole, yet they serve to distinguish the pigment from all the known haemoglobin compounds.

It was considered possible that more than one pigment was present, and efforts were made to effect a separation. Extracts made with hot alcohol precipitate on cooling. Both residue and filtrate contain pigment, but with the same bands. If an ethereal extract be evaporated down almost to dryness, and then taken up with an equal amount of absolute alcohol, the same bands are seen as in the original ether solution. The residue, insoluble in the alcohol, gives in ether solution the same series of bands, and with the same relative proportion of depth. The ethereal solution of the pigment is greenish-yellow in colour, not fluorescent.

The pigments already recorded* in *Mollusca* are haemoglobin, haematin, haematoporphyrin, and biliverdin. The ready solubility in ether of the present pigment excludes all four of these; its spectrum excludes all of them except perhaps haematin, which, in acid solution, certainly has four bands, but in the following positions: 1, between C and D; 2, close to D; 3, between D and E; 4, towards F. All but the first are lost in alkaline solution of haematin.

A second series of pigments recorded in *Mollusca* are those belonging to the melanin group, to which this pigment certainly does not belong.

The solubilities of this pigment in the fat-solvents would suggest relationships to the lipochromes, a series of pigments associated with fats; but these are in general unstable, and all have but two bands, in the region between the F and G lines.

Art. XXXII.—*Some Experiments on Tutin and Tutu Poisoning.*

By John Malcolm, M.D.

[*Read before the Otago Institute, 7th October, 1913.*]

The following is a short description of some work on tutu and tutin poisoning that has occupied me at various periods since the publication of the joint paper on tutin by Dr. Fitchett and myself in the "Quarterly Journal of Experimental Physiology" (vol. 2, p. 335, 1909). In the beginning of that paper we gave the history of the previous work done on the subject, and a practically similar account is also given by Dr. Fitchett in a paper published in these Transactions (vol. 41, p. 286, 1909).

Since the publication of these papers, a paper entitled "On the Toxicology of the Tutu-plant" has been published by W. W. Ford in the "Journal of Pharmacology and Therapeutics" (vol. 2, 1910). Dr. Ford had received some tutin from Mr. Aston, Wellington, and had experimented in very

* O. v Furth, Vergleichende chemische Phys. der niederen Tiere, pp. 527–33