WAVE-LENGTHS OF MAXIMUM ABSORPTION $\lambda_{\max}$ IN $m\mu$

Rhodopsin	500			
Iodopsin		560		
Dominators	500	560		
Modulators	450-465	500	520-530	580-610
Vitamin A in conc. H_2SO_4	465		530	590 620*
Vitamin A in conc. H_3PO_4	440-480		520	600
Retinene ₁ in conc. H_2SO_4	440-460		520	560 664*
Retinene ₁ in conc. H_3PO_4	470	500	550	590

* Shown better with the antimony trichloride reagent.

The conditions under which modulator analogues have been produced are obviously unphysiological. In the complete absence, however, of evidence for modulator precursors other than vitamin A and retinene₁ in rhodopsin eyes, the potentialities of these substances need to be explored. If it be granted that a *prima facie* case has been made out, the next and more difficult task will be to establish the physiological methods for stabilizing the modulator analogues.

It may be suggested tentatively that the greater width of Granit's modulator curves compared with the absorption bands of the analogues is consistent with a greater optical density of the modulators in cones than of rhodopsin in dark-adapted rods. Since the optical density varies as the product of molecular extinction coefficient and concentration, either or both could be important. The large difference between the thresholds of scotopic and photopic vision is well established; the quantum efficiency of the photo-decomposition of rhodopsin is nearly unity, and the molecular extinction coefficients of the modulator analogues are very high, but the substances fade less quickly than rhodopsin. The quantum efficiency of photochemical decomposition of modulators should thus be very low.

The photopic receptor substances, presumably conjugated proteins, may then be present at cone surfaces at relatively high optical density; they must be relatively thermostable as otherwise there would be a spontaneous sensation of light¹⁴; and finally, once detached from the protein moiety, halochromic or ionized prosthetic grouping derived from vitamin A or retinene would yield materials known to be present in retinas.

The special difficulties which are met in the study of photopic receptors make it important to pursue the study of the porphyropsin-retinene₂-vitamin A₂ system, because comparison of the rhodopsin-porphyrpsin systems at all stages may be fruitful. The visual systems of invertebrates having eyes lacking either vitamin A₁ or A₂ present a further problem.

¹ Boll, F., see ref. 4, p. 193.

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⁴ Granit, R., "Sensory Mechanisms of the Retina" (London, 1947).

⁵ Morton, R. A., and Goodwin, T. W., *Nature*, **153**, 405 (1944).

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⁸ Dartnall, H. J., and Goodeve, C. F., *Nature*, **139**, 409 (1937).

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¹⁰ Bliss, A. F., *J. Gen. Physiol.*, **29**, 299 (1946).

¹¹ Wald, G., *Nature*, **140**, 545 (1937).

¹² Bliss, A. F., *J. Gen. Physiol.*, **29**, 277 (1946).

¹³ Meunier, P., and Vinet, A., "Chromatographie et Mesomerie" (Paris 1947).

¹⁴ de Vries, H., *Nature*, **161**, 63 (1948).

OBITUARY

Dr. A. L. Du Toit, F.R.S.

THE death of Alexander Logie Du Toit on February 25 has removed a particularly interesting figure from the stage of international geology. Born in South Africa on March 14, 1878, he received his early education at Bishop's College, Cape Town, whence he proceeded in turn to the Royal Technical College, Glasgow, and the Royal School of Mines, South Kensington. His connexion with Scotland is recalled by an important paper on Old Red Sandstone and Highland Border rocks, communicated to the Edinburgh Geological Society in 1902. Most of his researches, however, concern his home country, South Africa. At one time or another he held official positions on the Geological Survey and Irrigation Department of the Union; and later, in private practice, he acted for De Beers Consolidated Mines. In 1925 he led a government expedition to the Kalahari. His text-book, "The Geology of South Africa", published in Edinburgh in 1926, is indispensable to students of the subject, and includes welcome chapters on soil and economics.

In geology, as in astronomy, workers in the southern hemisphere have much that is special to tell their comrades of the north, because they look in a different direction. The southern continents, including India, are so closely comparable in their late Palaeozoic and early Mesozoic histories that Suess long ago separated them from the rest of the world under the name Gondwanaland. In 1910, F. B. Taylor, and in 1912, A. Wegener, advocated continental drift on a scale that would account, without intervening subsidence, for the present apparently scattered distribution of the components of Gondwanaland. Du Toit had visited Australia by the time he learnt of the new hypothesis; and now, not content with further comparisons based on reading alone, he persuaded the Carnegie Institution of Washington to send him across to South America. Here, in Brazil, Uruguay and the Argentine, during the latter half of 1923, and with generous support from the local governments and geologists, he was able to accomplish a remarkable amount of field exploration, and to master the very difficult relevant literature. The results are set out in a Carnegie Institution publication entitled "A Geological Comparison of South America with South Africa" (1927). The treatment shows little mercy to readers, who have to stagger on under the impact of strange geographical and stratigraphical names; but the impression is conveyed that a path has been blazed through a hitherto impenetrable jungle. The author himself entertains no doubt as to the drift separation of South America and South Africa. He maintains the same outlook in "Our Wandering Continents" (1937), where a gallant attempt is made to rewrite the whole of world geology.

To turn to quite another aspect of the man, it is worth recording that among his friends Du Toit laid claim to the faculty of dowsing.

The Geological Society of London honoured Du Toit with the Wollaston Fund in 1919, and the Murchison Medal in 1933. These awards were fittingly bestowed during the presidencies of G. W. Lamplugh and Thomas Holland, who successively had learnt much of South African geology during visits of the British Association in 1905 and 1929. Du Toit was elected a fellow of the Royal Society in 1943.

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