cells are prepared in exactly the same way). After a few hours or days in the glass bottle, the process of 'ageing' seems to be terminated. After that, the oil will give the same E.M.F. in a certain cell whenever it is taken from the bottle. A difference is also found between newly prepared and aged oil-mixtures, for example, of nitrobenzene and benzene. Dr. Y. Björnståhl, Uppsala, has told us that he has found similar ageing effects with the magneto-optic properties of nitrobenzene and some other liquids.

What has happened inside the oil? Dr. F. C. Frank, of Oxford (at present of Berlin), has suggested to us that the ions of the glass may have slowly dissolved into it. We are rather inclined to think that it is a question of molecular re-association. We have read the long discussion of Baker, Smits[5] and others without being much wiser. If anyone could give us a hint, we should be grateful for any communication, public or private, as we have very little time left for a special investigation of this question. So far we have mostly studied 'old' liquids, as giving more constant values.

Our work is still proceeding. By experiments on the short-circuiting of oil-cells and cataphoresis of oil droplets, we are now investigating the diffusion rate and the surface charge of the interfaces. Until this work is completed we intend to publish no more about oil-potentials. But we shall be very glad to have personal communication with Messrs. Craxford and Gatty and Lord Rothschild.

GÖSTA EHRENSVÄRD.
LARS GUNNAR SILLÉN.

Institute Experimental Zoology,
Institute of Physics,
University of Stockholm.
July 25.

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Mode of Action of Visual Purple

FOR the chemical theory of excitation of nerve cells, the following observations as to how the retinal rods are stimulated by the substance visual purple would seem to be of general interest. Their understanding requires knowledge of the fact that after a preceding period of adaptation to sunlight the size of the electrical response of the eye to a constant test light reproduces the curve of regeneration of visual purple (see, for example, [1,2,3]). When the quantity of visual purple, obtainable from an eye after increasingly longer periods of dark adaptation, increases, the size of the electrical response (its *b*-wave) likewise increases owing—one would have thought—directly to the larger amount of cell stimulant available.

Actually, however, parallel measurements of visual purple densities and size of the electrical response in dark-adapted excised frogs' eyes under strictly identical conditions show that, after 5–10 minutes of adaptation to the moderately strong monochromatic stimuli from a spectral source, the electrical response may be greatly reduced without any parallel diminution of the concentration of visual purple. With test lights from the short wave-lengths 0·500–0·430 μ, and adapting lights 0·450 and 0·580 or 0·560 μ, it is found that the long wave-lengths may cause a reduction of the electrical response by some 40–50 per cent and that, contrary to expectation, the short adapting wave-lengths have a much smaller effect on the response to the test light, sometimes even causing it to increase[4]. The total quantity of visual purple obtained from eyes in which the electrical response has been reduced by 1/3–1/4 by adaptation

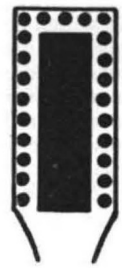

DIAGRAM ILLUSTRATING OUTER LIMB OF ROD WITH ACTIVE STIMULATING VISUAL PURPLE (FILLED CIRCLES) AND INACTIVE NON-STIMULATING STORE OF VISUAL PURPLE INSIDE THE CELL.

(digitonin extracts tested photo-electrically) is neither influenced by the adapting wave-length used, nor is it reduced compared with the amount of visual purple of completely dark-adapted control eyes. Our technique of measuring the density of visual purple of single retinas gives averages identical to within 7 per cent. Therefore less than 7 per cent of the total visual purple is *active* in mediating maximal electrical responses in dark-adapted eyes. The rest is a store of photosensitive material which is *inactive* from the point of view of excitation of the cell. However, this store must be large in order to enable the eye to react maximally[1,2,3].

These facts are simply accounted for on the hypothesis (see the tentative scheme of the accompanying figure) that the active visual purple is active because of its particular manner of distribution, say, at the surface of the outer limb of the rod cell, but that a high concentration of the non-stimulating store of inactive material inside the cell is necessary for keeping up the charge at the surface. Illumination may then be assumed to lead to a depolarization of the surface spreading electrotonically and giving rise to the *b*-wave of the electrical response of the retina.

RAGNAR GRANIT.
T. HOLMBERG.
M. ZEWI.

Physiology Institute,
University of Helsingfors.
July 25.

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Synthesis of Growth Factors by *Rhizobium trifolii*

A STUDY of the growth factor requirements of *Rhizobium trifolii* has indicated that, under suitable conditions, the organisms are able to synthesize all the organic substances essential for growth from a synthetic carbohydrate - mineral salts medium of