Up to a frequency of about 128,000 cycles per second, the conductance of the yeast cell is very low compared with that of the suspending fluid. Over this range of frequencies, the impedance is derived from the surface of the cells (as well as from the suspending fluid) which acts as a complex impedance with a large capacitative component and a small phase angle. The drop in C and R at 128,000 cycles is considered to represent the point at which the impedance of the cell surface has been lowered sufficiently to allow an appreciable part of the current to pass into the cells. The nearly constant value of C at frequencies between 16,000 and 128,000 cycles is interesting. Within this range, C is also independent of the suspending fluid, as shown in Fig. 2, which shows C and R for 63 per cent suspensions of yeast in different concentrations of sodium chloride.

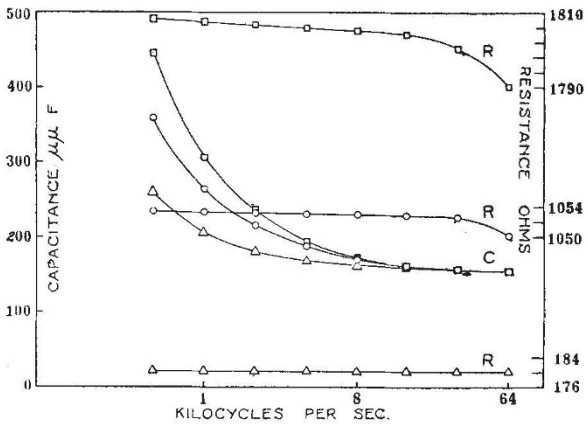

FIG. 2. Resistance (R) and capacitance (C) for 63 per cent suspensions of yeast in different concentrations of sodium chloride; R_1 is resistance of suspending fluid*.

□, 0·01 per cent sodium chloride, $R_1 = 513$ ohms.
○, 0·1 „ „ „ „ $R_2 = 299$ „
△, 1·0 „ „ „ „ $R_3 = 53$ „

* By the test of the electric conductance, the yeast cells are in equilibrium with 0·25 per cent sodium chloride. When the concentration of the suspending fluid is different from this, there is a slow change in the conductance of the suspending fluid.

In interpretation it may be assumed that, in this range of frequencies, the impedance at the surface of the yeast cell is derived from a poorly conducting membrane which acts as a static condenser. The increase of C and R at lower frequencies may be due to the polarisation of a slight conductance current through the membrane. Polarisation would be expected to occur if the permeability of the membrane were different for anions and for cations and the polarisation would be larger in the more dilute solutions.

The static capacitance per square centimetre of membrane can be calculated to be 0·6 μF at 16,000 cycles. Taking arbitrarily the dielectric constant of the membrane as 3, this capacitance would correspond to a thickness of 40×10^{-8} cm. This value is slightly larger than that found for the red blood corpuscle[2], although the difference scarcely exceeds the experimental error.

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Active Principle of the Amphibian Organisation Centre

IT has been shown (Waddington, Needham and Needham[1]) that the active principle of the amphibian organisation centre (the evocator) can be extracted with ether or petrol-ether from either larval or adult tissues. This has since been confirmed by Fischer and Wehmeier[2]. We have now proceeded some way with the purification of the crude extracts prepared from adult newts or calves' liver.

The fractions to be tested were emulsified in egg albumen which was then coagulated, and small lumps of the coagulum were implanted into the blastocœl of newt gastrulæ. The crude extract was first saponified and it was found that the unsaponifiable fraction, when implanted in the above manner, was capable of inducing neural tissue, either in the form of tubes or of large flat plates (palisade inductions). From the unsaponifiable material, a further fraction was separated by precipitation with digitonin, this reagent being then removed; the active material is present in the precipitate, and seems to be absent in the filtrate. Further purification is in progress.

Fischer and Wehmeier[3] obtained inductions by the implantation of glycogen, and claimed that glycogen is actually the active principle of the organisation centre. However, after the publication of Waddington, Needham and Needham's results, they undertook[2] a purification of their glycogen, and showed that it was possible to obtain inactive preparations. We have performed the converse experiment: starting with specimens of glycogen prepared by Pflüger's or Kerly's methods, we were able to extract active substances with ether. This shows that some, if not all, of the activity shown by Fischer and Wehmeier's specimens of glycogen is to be accounted for by the presence of impurities; and further, since the preparation of the glycogen involves boiling with alcoholic potash, it is also good evidence for the unsaponifiability of the evocator.

We have also made implantations of certain synthetic compounds belonging to the phenanthrene group, kindly supplied by Dr. J. W. Cook, of the Cancer Research Hospital. Most of the implants call forth only an undifferentiated cellular proliferation, like the sterols implanted last year (Needham, Waddington and Needham), but in a few cases, induction of neural tissue has occurred. Typical neural tubes have been induced by the two substances 9 : 10.dihydroxy-9 : 10.di-*n*-butyl-9 : 10.dihydro-1 : 2 : 5 : 6 dibenzanthracene and 1 : 9.dimethylphenanthrene. These are the first synthetic substances which have been shown to possess inducing powers. This behaviour seems to us additional evidence that the naturally occurring evocator belongs to some group of sterol-like compounds.

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