why these combinations should be broken down by chilling or by cyanide, or how they could be stabilized by respiration.

There remains the possibility that the excess concentration of fixed base found in respiring cells does imply that the intracellular fluids are hypertonic, as was postulated in my earlier paper[2]. This would readily account for the abolition of the difference in concentration between the cells and their surroundings by cyanide or by chilling. Such a difference in concentration could not be produced by active transport of ions into the cells, for this would merely cause them to swell as a result of the entry of water to equalize osmotic pressure. Since the cells swell when their respiration is inhibited, active transport carried out at the expense of energy derived from respiration must on balance be directed outwards. Moreover, if the result is to leave a higher concentration inside the cells than outside them, there must be a net outward transport of water.

The magnitude of the excess concentration of fixed base inside respiring cells is not sufficient to prove the hypertonicity of the intracellular fluids; but the dependence of this excess concentration upon respiration does suggest that it might arise from active transport of water outwards across the cell membranes.

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[1] Peters, J. P., and van Slyke, D. D., "Quantitative Clinical Chemistry", 2, "Methods" (London: Baillière, Tindall and Cox, 1932).

[2] Robinson, J. R., *Proc. Roy. Soc.*, B, 137, 378 (1950).

[3] McCance, R. A., and Widdowson, E. M., "The Chemical Composition of Foods". M.R.C. Spec. Rep. 235, 2nd edit. (H.M.S.O., London, 1946).

Preservation of Cytological Material by Storage at or below — 10° C.

It may be of interest to other cytologists and cytotaxonomists to know that anthers and sporangia fixed in 3 : 1 absolute alcohol : glacial acetic acid, and 4 : 3 : 1 chloroform : absolute alcohol : glacial acetic acid, and stored in a deep-freeze 'Frigidaire' cabinet maintaining a temperature between — 10° and — 14° C., produce as good cytological preparations using the aceto-carmine squash technique after six months as freshly fixed material.

Good results have been obtained with *Primula*, *Listera*, various members of the Cyperaceæ (including *Carex*, *Scirpus* and *Schœnus*), Gramineæ, and several ferns. These were fixed for chromosome counts and morphology at meiosis in the pollen mother cells and spore mother cells respectively.

It is especially interesting that material should remain in good condition at — 10° C., as I have never succeeded in making satisfactory preparations from fixations kept in an ordinary refrigerator running at about 4° C. for more than five or six weeks.

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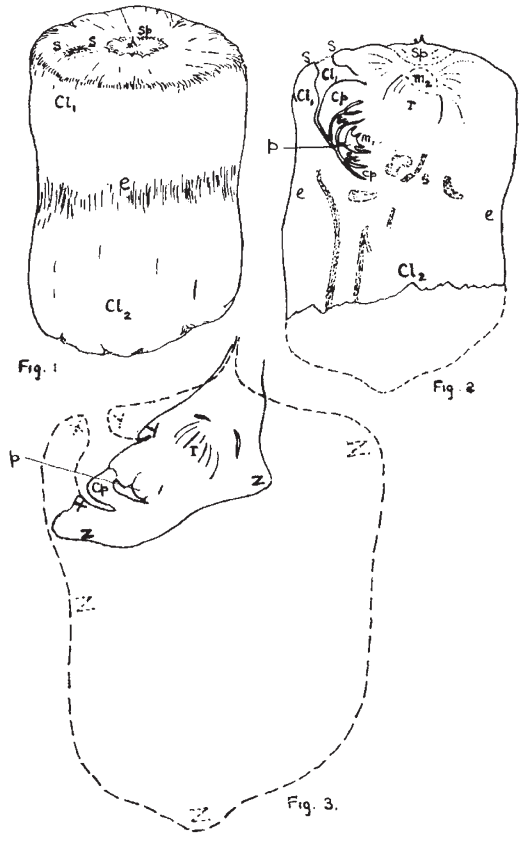
Embryo of the Coconut

Very little information is available, in the literature, on the embryo of coconut. The family Palmæ, to which the genus *Cocos* belongs, has not been studied embryologically[1].

The mature embryo is somewhat cylindrical in shape and is situated in the endosperm below the 'soft eye', where the sclerotic endocarp is thin. The bulk of the embryonic tissue (Figs. 1 and 2) is made up of the cotyledon, part of which (Cl_1) extends laterally over and envelops the plumule, and is marked off by a slight constriction (at e) from the rest, which functions as the haustorium (Cl_2). The region of incomplete fusion of the cotyledon edges above the plumule appears as a radial slit ($S-S$) on the surface of the embryo lying against the sclerotic layer. The entire cotyledon is traversed by vascular strands. The plumule (p) in section (Fig. 2) shows a central meristematic zone (m_1) surrounded by the scale-leaf primordia (Sc), which in turn are enclosed by the coleoptile (Cp). It occupies a position transverse to, and away from, the central axis of the embryo.

Lying at an angle slightly less than 45° to the central axis and opposite to the plumule is the radicle (r), deeply situated and with the apical mass of meristematic cells (m_2) directed towards the flat expanse of the suspensorial region (Sp). The latter appears as a dark circular patch of tissue on the surface of the embryo and tapers into the micropylar canal.



Figs. 1 and 2. Entire embryo and longitudinal section of embryo of *Cocos nucifera*. (× 6)
Fig. 3. Longitudinal section of *Cocos* embryo (dotted lines), referred to a similar section of embryo of *Poa annua* (continuous lines), after Johansen (ref. 1, Fig. 74, p. 269)