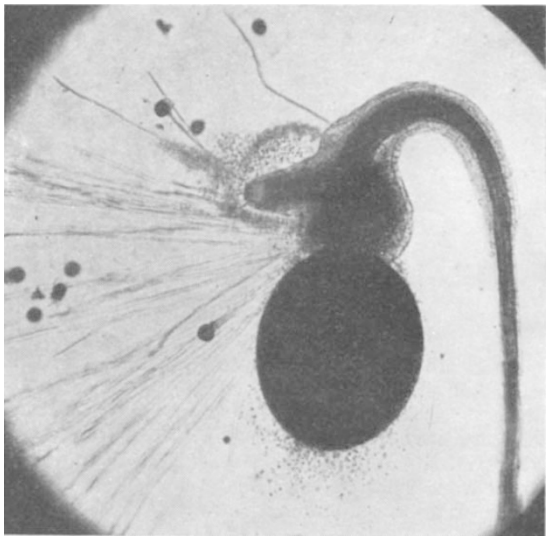

Marsilea fournieri. Macrospores and microspores four days after opening of sporocarps. Macrospore bears three-day embryo. Other details in text. (× 36)

tion[8], although such treatment is not necessary merely for the study of viability.

In both species, germination of the sporocarps followed the usual pattern, and the development of the micro- and macro-spores continued with characteristic rapidity, liberation of spermatozoids and fertilization being completed within twenty-four hours. Embryo development started at once, and examination forty-eight hours after the initial opening of the sporocarp revealed a distinct embryo with the first leaf pushing out the prothallial covering as a conical projection.

The accompanying photograph illustrates a three-day embryo of *M. fournieri*. The first leaf, on the right, has broken through the sheath formed from the prothallial tissue, while the first root, on the left, is still enclosed. A characteristic tuft of rhizoids, developed after fertilization, springs from the prothallus on one side only, and intermingled with the rhizoids are several germinated microspores. The original mucilaginous investment of the macrospore is revealed by the exceedingly numerous trapped spermatozoids. A three-day embryo of *M. vestita* is very similar. *M. fournieri* was selected for illustration since this is possibly the first account of the embryo of this species. The first leaf of *M. fournieri* is rather flattened as compared with the cotyledons of *M. drummondii* and *M. vestita*; but the shape is still approximately acicular and the leaf terminates in a delicate colourless prolongation as in the other two species.

The long dry period in storage of the sporocarps has thus had no apparent effect on development, which is still proceeding quite normally. As in more recently collected sporocarps, almost every spore has produced an embryo, and in this respect there has been no deterioration with age.

From these results it would seem that germination should still be possible at a considerably greater age, and reports of tests on other older collections will be awaited with interest. Alternatively, I should be pleased to carry out tests on any sporocarps sent in for this purpose. It should be remembered, however, that negative results are not necessarily conclusive, as even recently collected sporocarps have frequently failed to liberate viable spores in spite of their mature external appearance.

I am indebted to Mr. Ernest Ashby for taking the photograph.

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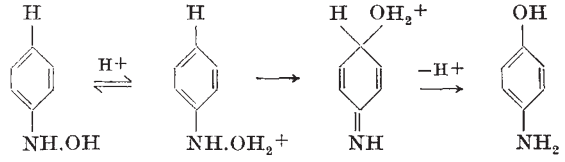
Dec. 12.

[1] Libby, W. F., *Science*, **114**, 291 (1951).
[2] *Nature*, **168**, 905 (1951).
[3] Ohga, I., *Amer. J. Bot.*, **13**, 754 (1926).
[4] Hartt, C. E., *Bot. Gaz.*, **79**, 427 (1925).
[5] Okada, Y., *Sci. Rep. Tohoku Imp. Univ.*, Biol., **4**, 127 (1929).
[6] Braun, A., *Monatsber. Berl. Akad.*, 653 (1870).
[7] Chamberlain, C. J., "Methods in Plant Histology", 4th ed., 266 (1924).
[8] Allsopp, A., *Nature*, **168**, 301 (1951).

A New View of the Arylhydroxylamine Rearrangement

In a recent communication under the above title, Heller, Hughes and Ingold[1] have discussed an anionotropic mechanism for the acid-catalysed rearrangement of phenylhydroxylamine to *p*-aminophenol, the essential feature of which is the migration of the hydroxyl group *with* its full electron octet and which involves the following steps: (i) conversion of the hydroxylamine into its conjugate acid, (ii) intermolecular migration of the hydroxyl group in the form of a water molecule, (iii) prototropic isomerization of the resulting iminoquinol and loss of a proton to give the aminophenol. This mechanism is identical in substance with that which I have previously put forward and expressed in the following formulæ[2]:



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[1] *Nature*, **168**, 909 (1951).
[2] *Quart. Rev. Chem. Soc.*, **4**, 423 (1950).

Dr. Braude's published statement on the matter is short enough to be quoted: "It is very probable, however, that the acid-catalysed rearrangement of phenylhydroxylamine, and allied reactions, proceeds by way of successive pentad anionotropic and prototropic changes in the C : C.C : C.N skeleton, as originally suggested by Bamberger. The rearrangement may occur in two steps, the migrating group becoming first attached to the orthocarbon atom." At a later point he entertains the possibility that the rearrangement is intramolecular. This will make his position clear. We did not refer to it before, because we could accept it only in such a very partial way.

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