The ether was distilled off at atmospheric pressure and the methyl bromoacetate transferred under high vacuum to a specially designed, stainless-steel micro-autoclave containing pure, dry potassium fluoride and a number of stainless steel balls (see ref. 2 for the macro-scale method). After sealing, the autoclave was placed in a heating block and vigorously shaken for 3½ hr. at 220°. The product was transferred *in vacuo* to a fractionation apparatus. For this purpose the high-vacuum method referred to by Sanders[3] was used, with a single fractionation. The lower-boiling fraction (n^{15}_D 1·3734–1·3700) contained 94–100 per cent of methyl fluoroacetate. The almost pure methyl fluoroacetate was titrated potentiometrically with sodium hydroxide solution in a cell attached to a pressure-equalized burette. Finally, the aqueous solution of sodium fluoroacetate was freeze-dried.

The yield of methyl bromoacetate from bromoacetic acid was 96 per cent or higher; and the yield of methyl fluoroacetate from methyl bromoacetate was 40–60 per cent. The hydrolysis by sodium hydroxide was quantitative.

In the preliminary investigation using non-radioactive material, the estimation of the fluoroacetate content of the material from the autoclave, and of that after fractionation, was most readily performed by refractive index measurement (methyl fluoroacetate n^{15}_D 1·3700; methyl bromoacetate n^{15}_D 1·4582). Fluorine estimations were also carried out. Neither of these methods was, however, readily applicable to a few milligrams of radioactive material. We have therefore measured the infra-red spectrum of the vapour of the radioactive methyl fluoroacetate produced by the above reaction, and have found it to correspond with that of artificially produced mixtures containing 95–99 per cent of methyl fluoroacetate.

A full account of the preparation and special techniques employed will be published elsewhere.

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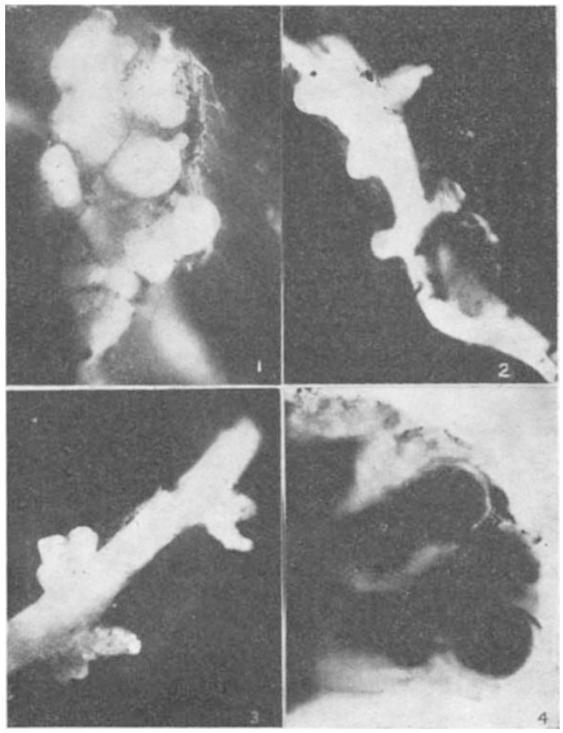
Distribution of Sex in *Cryptothallus*

Material of a saprophytic liverwort, thought to be that of *Cryptothallus* sp., was received from the Brookwood locality of Surrey in December 1950. The material consisted of a number of white thalli, with ascending margins, and sectioning showed clearly the presence of a fungus in the lower cells of the thallus and in the rhizoids.

Young sporophytes were first formed in January 1951, and seven of these were observed to have matured and dehisced by the end of March. The method of dehiscence of the capsule and the *p*H of the peat in which the material was growing (namely, *p*H 3·8) were found to be in agreement with the observations on *Cryptothallus* made by Williams[1].

Since sporophytes had already been found, it was obvious that some of the plants bore female branches. Examination of the material showed the presence of young female branches on thalli bearing the remains of the old sporogonia. Observations were continued, however, in order to ascertain whether the male branches were to be found also on these plants.



Cryptothallus sp.: (1) female plant showing branches and rhizoids; (2) young female plant; (3) male plant with antheridial branches photographed by reflected light, thus showing the antheridia as white spots at tip of branches; (4) tip of male branch showing antheridia (× 36)

By the end of June, two differing types of thallus could be distinguished: the slightly larger thalli with rounded lateral branches, bearing the female organs, and the narrower thalli with lateral branches divided into two or three lobes, in which the antheridia were embedded. These male plants bear a strong resemblance to those of *Aneura pinguis*, except for the lack of chlorophyll in the cells, and it would appear that *Cryptothallus* is dicœcious, since all observations point to the fact that the sex organs are segregated on separate plants.

Williams[1] has already observed the similarity in the origin and structure of the sporogonia with those of the genus *Aneura*. It is interesting, therefore, to note that the antheridia in the male inflorescence of *Cryptothallus* are arranged singly, in two rows, which again shows a similarity with this genus.

Time-lapse photography has shown that in mature male plants, mounted in water, the antherozoids escape in a slow stream from the antheridia. Each antherozoid appears to possess a spirally coiled body bearing two flagella, and closely resembles those of *Pellia* and *Aneura*.

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