Occurrence of a Species of *Halammohydra* on the Isles of Scilly

During the period March 24–28, 1959, collections of the interstitial fauna on several shores of the Isles of Scilly were made. On the very sheltered muddy sand shores of the islands of Tresco and St. Martin's, a small number of specimens of the coelenterate, *Halammohydra* Remane, were recorded, in the surface 5 cm. of sand. The samples were treated with formalin immediately after sampling and this rendered exact identification impossible.

Attempts by one of us (L. A. H.) to collect live specimens at Easter, April 9–23, 1960, were unsuccessful. It may be, therefore, that the earlier presence of the animals was accidental, the true habitat being in the sub-littoral. Alternatively, it may be that these animals exhibit a seasonal cycle and were much less frequent at the time of the 1960 sampling.

The specimens exhibit certain differences from any of the known species, the number of tentacles varying from 9 to 15. Swedmark[1] points out that regional differences occur in the various species.

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Slugs at Low Temperatures

Damage by slugs in gardens and farms is usually worst in late autumn and early spring. There are three reasons for this. First, some species are most numerous in winter[1]. Secondly, alternative foods are scarce, and crop plants such as germinating wheat or the young shoots from delphiniums are sometimes almost the only food available. Thirdly, slugs are active at temperatures which would put most cold-blooded animals into chill-coma.

Experiments have shown that different species of slugs have different chill-coma temperatures. *Agrolimax reticulatus*, which is incidentally a most important pest on farms, is particularly well adapted to life at low temperatures. It is not completely immobilized even at 0° C., and at 0·8° C. moves and feeds apparently normally. *Arion hortensis*, an important garden pest, seldom moves spontaneously or feeds below 5° C. *Milax budapestensis* is intermediate in its temperature relations to the other two species, for it is active at 5° C., but is inactive at 0·8° C.

Some years ago I showed that many insects[2], and also amphibians[3], change their chill-coma temperature by several degrees centigrade within 24 hr. when kept at different temperatures. Similar results for fish, though with a longer period of acclimatization, are well known. I fully expected that slugs would behave similarly.

However, *Agrolimax reticulatus* and *Arion hortensis* do not seem to show any low-temperature acclimatization at all. The chill-coma temperature seems to be quite unaffected if these slugs are kept for from 1 to 10 days at (*a*) 5° C. at (*b*) a temperature fluctuating between 0° C. and 10° C., and at (*c*) a constant temperature of 20° C. The explanation for this difference from insects, fish and amphibians has not been found, but slugs seem well adapted to life at low temperatures and do not readily lose this adaptation. The observations of Dainton[4] that dormant slugs become active, in the laboratory, when the temperature falls, is obviously relevant, but the behaviour of these animals under natural conditions in the field needs much further study.

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Trapped Primary Product of Photosynthesis in Green Plants

By use of a suitable method of flash photometry five types of absorption changes (types 0, 1, 2*a*, 2*b*, 3) have been observed during photosynthesis in green plant cells. Measurements under various physical and chemical conditions lead to the following assumptions on the related reactions[1].

The absorption change type 1 is caused by a photochemical reaction on chlorophyll Chl a_1. Probably a metastable state of chlorophyll Chl $a_1^{\bullet}$ ($\tau \approx 5 \times 10^{-5}$ sec.) is formed, which mediates an electron transfer between an electron-donator D and an electron-acceptor A :

$$D(\text{Chl } a_1)A \xrightarrow{h\nu} D(\text{Chl } a_1^{\bullet})A \longrightarrow D^{+}(\text{Chl } a_1)A^{-} \quad (1)$$

The absorption changes type 2 were first observed by Duysens[2] using a static measuring method with excitation of photosynthesis by steady light; equal absorption changes result from the application of flash photometry[1]. These absorption changes are characterized by two negative maxima ($\sim$ 420 mμ, 475 mμ) and one positive maximum at 515 mμ. The course of the decrease of absorption as a function of wave-length in the neighbourhood of 420 mμ is comparable with the course of an oxidation of cytochrome[2].

Kinetic experiments carried out by flash photometry led to the conclusion that the absorption changes type 2 ($\tau = 10^{-2}$ sec.) are involved in the primary reactions of photosynthesis[1]. Further we succeeded in splitting up the absorption changes type 2 into two reactions, designated as type 2*a* and type 2*b*, by extraction with cold petroleum ether[3,4]. After extraction the absorption changes at 475 mμ and 515 mμ (type 2*b*) disappear, while a negative absorption change with a shift to $\sim$ 425 mμ still can be seen. Due to the absence of type 2*b*, it is possible to detect a small positive absorption change near $\sim$ 530 mμ which is connected with that at $\sim$ 425 mμ (type 2*a*).

The results of our first measurements of absorption changes at low temperatures were reported at a meeting to discuss fast reactions in solution at Hahnenklee[5] (1959). The reaction type 1 (production of Chl $a^{\bullet}$) occurs at −150° C. in just the same way as at + 20° C. Therefore an electron transfer according to reaction (1) should also be possible at −150° C. The following observations on type 2*a* give evidence of this fact.

On illumination of spinach chromatophores at −150° C. the absorption changes; type 2*b* (475 mμ and 515 mμ) does not occur. The reaction type 2*a*, however, continues to occur at −150° C. On exposure to light, a decrease in absorption occurs at $\sim$ 425 mμ (Fig. 1). Coupled with this decrease at $\sim$ 425 mμ is a small increase at $\sim$ 530 mμ, coincident with the observations made after extraction with petroleum