Hibernation of Adders

THE hibernation of adders and the mechanism of the process are very little understood. To all intents and purposes there is an apparently complete suspension of vital activity, but from the biological point of view this cannot be, as the nutrition of the body tissue must go on. Recently while engaged in dissecting an adder, I preserved a portion of the lung tissue and had it sectioned in the usual way. Microscopic examination of several sections showed extensive deposits of adipose tissue immediately surrounding the tracheal ring. Similar islets of fatty substance were seen round the bronchi and bronchioles, and there was an extension of this type of tissue round the terminal

FIG. 1.—Adder lung showing adipose tissue round tracheal cartilage. Photograph by N. Morrison.

alveoli and in the substance of the lung (see Fig. 1). This appeared to me to be unusual, as one does not find adipose tissue in the lung of animals.

There is a possibility that for hibernative purposes Nature is capable of converting the interstitial tissues of the lung into adipose tissue. A good supply of fat ensures for the hibernating animal two things, namely:

- (1) The possession of warmth for the organism.
- (2) A reserve supply of energy when all other centres are exhausted.

Fats are eminently suitable for the incalculably slow process of oxidation which goes on when respiration is almost suspended, during the process of hibernation. One can compare hibernation with a slow smouldering fire. It lasts as long as there is a combustible material. If that material is easily consumed, the fire will soon come to an end. If, on the other hand, the material is good fuel but burns slowly, the fire will keep going so long as Nature wants it. Fatty tissue serves Nature's purpose admirably in this direction, and my examination of the microscopic slides gave me the impression that the presence of so much fat in the pulmonary tissue was meant to give it the central control of hibernation.

N. MORRISON.

Behaviour in Invertebrates

A RECENT paper by Southern and Gardiner¹ on the diurnal migrations of the Crustacea of the plankton in Lough Derg shows once more that observations by different workers on the behaviour of the same species of plankton animals are in many cases not in agreement. I have previously shown² that the copepod *Calanus finmarchicus* apparently behaves differently at one time of the year from another; this difference is, in a way, only apparent, as we are comparing individuals that are not strictly compar-

able, namely, different broods which have grown and developed under different conditions. If we compare the behaviour of similar broods from year to year, they appear to be the same. Is not this a side of the problem that has been rather overlooked in the past?

In comparing the behaviour of short-lived species from place to place, the comparison must be made between comparable broods that have developed under the same conditions. I have recently been able to show that there are possibly five distinct broods of *Sagitta elegans* during the year in the waters of the English Channel off Plymouth. Each of these broods is born and develops under different conditions brought about by seasonal changes. It is only natural to expect, therefore, that the individuals of each brood will have their own type of behaviour and seek optimum conditions that are different for those of other broods.

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Marine Biological Association,
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¹ Southern, R., and Gardiner, A. C., *Proc. Roy. Irish Acad.*, vol. 40, section B, No. 11, pp. 121-159; 1932.

² *J. Mar. Biol. Assoc., N.S.*, vol. 15, No. 2, pp. 429-454; 1928.

Plato and the Modern Age

MR. W. G. LINN CASS, in his review of Mr. Lowes Dickinson's "After Two Thousand Years", remarks¹ that:

"The extraordinary increase in scientific knowledge has vastly extended the realm of thought and revealed heights and depths which almost make the mind reel in contemplation of the physical universe."

And again:

"... turning to the thinker himself we find that he, for his part, has to spend so much time merely in the acquisition of knowledge, of which a certain minimum is essential, that he has little real leisure for serious meditation on the majestic but increasingly mysterious panorama of life which now unfolds before him."

These propositions seem to me to confuse the thinker with his telescope and even to suggest that it assembled its own parts. As a mere question of fact there is nothing 'reeling' in the mind of Sir James Jeans, for example, and no conspicuous lack of leisure for comparatively serious meditation in the many readers and listeners-in before whom he has displayed some of the mysteries of the universe. But is there not a deeper fallacy? Does the increase in scientific knowledge and the increasingly mysterious panorama of life really affect the mind of man in the sense indicated by Mr. Linn Cass? If there were not this increase, the mind would decline in power. Its vigour is maintained at the same high level by the constant addition to the material of knowledge. The Hebrew star-gazer, who never held a telescope in his hand, wrote of 'the stars in their courses' with an astonishment not less than that of the astronomer of to-day. "We begin to see how insignificant our home in space really is", says the latter on page 117 of his book of that name; and the former said: "When I consider . . . the stars, . . . What is man, that thou art mindful of him?" Five billion years hence (if that is the correct figure) the new astronomer may be saying it again; and, haply, he will still refuse to be defeated by the contemplation of the physical universe, and will still contrive a foundation of faith on which to build his seat of knowledge among the stars.

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¹ NATURE, 129, 381, March 12, 1932.