BOOK REVIEWS

REPRODUCTIVE STIMULI

Effects of External Stimuli on Reproduction

Edited by G. E. W. Wolstenholme and Maeve O'Connor. Pp. x+107. (Ciba Foundation Study Group, No. 26.) (London: J. and A. Churchill, Ltd., 1967.) 18*s*.

IN this small book, containing the seven papers read at a one day meeting held in honour of Professor B. Zondek, we are confronted with important physiological and ecological problems. The identification of the external stimuli which have an effect on the reproductive system will suggest the internal pathways and interrelationships involved in the arousal or suppression of activity in the endocrine organs concerned with reproduction. Thus day-length appears to control the onset and cessation of breeding in some mammals, implying that a physiological link exists between the eye and the adenohypophysis, although the anatomical pathway remains to be discovered.

The recognition of those features of the external environment which influence reproduction is also basic to any understanding of population dynamics. There has been for some years evidence that in certain species reproductive potential is related inversely to population size, although no convincing physiological explanation of this phenomenon has yet been offered.

It is clear from the first five papers that the three distance receptors (eye, ear, nose) are involved in reproductive processes. In Professor Zondek and I. Tamari's paper it is shown that noise frequently repeated over some days can enhance gonadotrophin secretion in the rabbit and rat, although the noise was probably a stressful stimulus. Furthermore, the rabbits submitted to such noise may have fresh corpora lutea in their ovaries.

A. Árvay reports similar effects in rats exposed to noise and intense light ("neural traumatization"). These stimuli also caused marked adverse effects (stillbirths, post-natal mortality, abnormalities of development) when applied before or during pairing of males and females or during pregnancy.

It has long been known that the onset of heat in the ferret, occurring naturally in the spring, can be brought forward by exposing animals during autumn or winter to additional light. But B. T. Donovan suggests that such treatment when continued for a long time may prevent the onset of heat. He has some evidence which suggests that exposing such animals to short days for eight weeks can remove this inhibition induced by long days.

There has been a persistent belief among some biologists that ferrets possess an internal clock which can regulate the annual occurrence of heat. Little really conclusive evidence in support of such a view is available. On the contrary, D. H. Thorpe here illustrates convincingly that ferrets behave as if they certainly lack such an inherent timepiece. For example, in conditions of continuous illumination, maintained for up to six years, oestrus occurred frequently but showed no regularity.

H. M. Bruce has provided an excellent review of the effects of olfactory stimuli on reproduction in mammals. Her own contribution to this subject, with A. S. Parkes, has been of great interest and importance, but she has lucidly brought together a much wider range of effects, organizing them under three headings: immediate reaction; delayed response; and permanent effect.

The paper by R. Deanesly and M. Allanson on the breeding season of the mole has a distinct ecological flavour. They are concerned with the causation of observed regional differences (North Wales compared with Southern England) in the date of onset of breeding. These observations, for which the authors suggest several alternative explanations, inevitably raise the problem of the external factor(s) which determines the onset or cessation of breeding in moles wherever they may live in Britain. Some ecological aspects of reproduction in mammals are dealt with also by H. G. Lloyd, who has found that in the rabbit reproductive potential appears to change with population density.

Donovan makes the important point that in neuroendocrine processes, as exemplified by the photoperiodism of, say, the ferret, the stimulation and the response thereto are processes extending over weeks. This distinguishes them from what is ordinarily regarded as a reflex, and he asks "what time consuming processes intervene?" Clearly the slow response of gonads and reproductive tract to pituitary changes, once these have begun, is part of the answer. But there appears also to be central nervous system inertia. The observation of the response of individual neurones to external stimuli (for example, a neurone in the supraoptic nucleus responding to light, cited by B. A. Cross, page 102) has value in revealing a pathway from the receptor to the effector organ. But understanding the slow response of the reproductive system to changing external conditions must involve as well the analysis of the behaviour of populations of neurones. It would seem a necessary accompaniment to such studies to define accurately the external stimuli which arouse or suppress this neuroendocrine system. Certainly, as Donovan comments on page 70, we need to know more about the changes in the eyes, brain and pituitary gland of, say, the ferret, but his statement that investigations of day length effects necessarily " . . . will introduce complications rather than simplifying matters" seems disputable. Indeed, in this book Thorpe has shown how with patience the manipulation of the light environment can in fact simplify explanations by (in this case) making an internal clock an unnecessary postulate for any explanation of the annual onset of oestrus in ferrets.

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CHALLENGE OF ECHINODERMS

Physiology of Echinodermata

Edited by Richard A. Boolootian. Pp. xviii+822. (New York and London: Interscience Publishers, a Division of John Wiley and Sons, 1966.) 360*s*.

IN some respects the echinoderms have simpler physiological mechanisms than those of other coelomate animals. They have little power of ionic or osmotic regulation and are largely confined to the marine habitat; they use the coelomic fluid as a transport medium more directly than do other coelomates. Yet anatomically they have departed very radically from the main coelomate evolutionary trends; the secondary pentamerous symmetry, involving external and internal structures, the unique water-vascular system and other peculiar systems set them apart from all other coelomate groups. The functions of these unusual structures excited the interest of many earlier workers, and by the turn of the century Cuénot, Hamann, Romanes, von Uexküll and others had investigated many organs and systems. Some of this work was inferential, but much has been confirmed by later researches. While there appears to have been less interest in