

branching, the degree of branching varying considerably with the conditions of polymerization. Methods of measurement of branching have therefore been of paramount interest in characterizing ethylene polymers, and a considerable effort has been expended on these studies. In a detailed and elegant study, Willbourn (I.C.I. Plastics) summarized the preparation of model branched polymethylenes and calibration methods which have been used for developing methods of measuring the numbers and length of branches in polythene. The effect of branching on the degree of crystallinity, crystalline melting point, density, rate of oxidation and dynamic mechanical properties were illustrated and discussed. Gubler and Kovacs (Strasbourg) presented similar physical measurements on a range of commercial polythenes and made an interesting approach to an interpretation of these properties by considering the polymer as a mixture of *n*-paraffins. The orientation of crystallites

which occurs on stretching polyethylene and its dependence on the degree of crystallinity were discussed by R. S. Stein (Amherst), and Eppe, Fischer and Stuart (Mainz) presented results obtained by electron diffraction and electron microscopic studies on the morphological structure of polyethylene, polyamides and other polymers.

The importance of crystallization under stress in fibre-making was emphasized in a paper by Thompson (I.C.I. Fibres), who proposed a model visco-elastic theory to explain the observed results, and de Vries (Amheim) discussed an empirical relationship between draw ratio of synthetic fibres and birefringence.

During the conference a number of technical visits were arranged to commercial laboratories and works. A reception was held on the opening evening, and the conference concluded with a dinner held in the Portland Building of the University.

C. E. H. BAWN

COMPARATIVE ENDOCRINOLOGY

DURING May 25–29, nearly 150 scientists from many parts of the world met at the Cold Spring Harbor Biological Laboratories, Long Island, New York, to take part in the Columbia University Symposium on Comparative Endocrinology. The conference was organized by a committee headed by Prof. A. Gorbman, of the University of Columbia, and the choice of Cold Spring Harbor provided an ideal setting for its deliberations. The scientific programme was split up into a number of sections or main topics.

The first of these was concerned with endocrine factors in ecological adaptation. Prof. W. Hoar (British Columbia) reviewed the role of the endocrine system in permitting fish to survive and adapt themselves to seasonal changes, while his research associate, Miss B. Baggerman, gave neat and conclusive proof of the involvement of salinity preferences in the migratory behaviour of fish.

In his interesting account of mammalian adaptive mechanisms, Dr. J. J. Christian (Bethesda) reported on the relation between adrenal size and population growth in rodents. A gradual numerical increase in the population of mice in cages, without overcrowding, leads to a significant enlargement of the adrenal glands accompanied by lowered reproductive activity (for example, a reduction in litter size), and thus, by inference, to an adjustment of population size. Whether the two phenomena are causally connected is not clear, and it may be that the increased size of the adrenals serves merely as an indicator of population density.

The next session dealt with the endocrine basis of reproductive adaptations in the major groups of vertebrates. Prof. L. Gallien (Paris) described the unusual reproductive habits of *Nectophrenooides orientalis*, a viviparous African frog with a gestation period of nine months. Dr. M. R. Miller (Stanford), in the course of his review of reptilian reproduction, stressed the hazards of inferring endocrine function from morphological study alone. As an illustration he referred to the virtual absence of histologically demonstrable Leydig cells, apparently not associated with androgen deficiency, in certain types of lizard.

In a characteristic contribution, Prof. F. L. Hisaw (Harvard) developed a theory covering vertebrates in general, in which he stressed the ubiquitous, but

not necessarily biologically significant, occurrence of progesterone among chordates, and the gradual and independent evolution of luteal and placental function in different mammals, culminating with the largely autonomous placenta of primates.

Both the comparative morphology and physiology of the principal endocrine organs and endocrine function in developing vertebrates received considerable attention during the conference. Prof. E. Wolff (Paris) and Profs. A. Raynaud (Institut Pasteur) and L. J. Wells (Minnesota) reviewed the results of their, by now classical, experiments on somatic or endocrine growth and sexual development in mammalian embryos deprived of either the pituitary or gonads.

In the course of a comprehensive survey, Prof. A. Gorbman (Columbia) directed attention to the vagaries of thyroxine formation in lower vertebrates. Thus, certain types of fish and salamanders form thyroxine from labelled iodine administered to them only after protracted periods (lasting more than a month), while others may not do so at all. Interestingly enough, there is at least one type of frog in which the thyroid gland is completely absent but the larvæ of which none the less undergo metamorphosis.

The inadvisability of applying the results of experiments in mammals to lower animals was also emphasized by other contributors. Prof. B. Houssay (Buenos Aires) and Dr. M. R. Miller (Stanford) reviewed the effects of ablation of both the adenohypophysis and pancreas in different groups of vertebrates, and revealed the following interesting position: while the combined operation in mammals leads to the preparation universally known as the 'Houssay dog', there are important deviations from this situation in lower vertebrates. Thus, birds do not develop hyperglycaemia following removal of the pancreas. On the other hand, in the urodele amphibians (for example, *Triturus*) studied by Dr. Miller, the islet apparatus is of the purely β -cell type and pancreatectomy leads to severe hyperglycaemia. Hypophysectomy, however, does not cause the expected alleviation of the condition until after some months when all inter-renal tissue has atrophied. By contrast, the islets of lizards are of the α -type, and removal of the pancreas induces hypoglycaemia

instead of diabetes. Another point established by Dr. Miller is that lizards are highly sensitive to glucagon and insensitive to (mammalian) insulin, in this respect differing markedly from birds.

Similar species differences were also indicated by Dr. S. I. Segal (New York) in the course of a stimulating account which ranged far and wide over the comparative aspects of gonadotrophic action and gonadal function in mammals and birds.

It was no more than a logical step to proceed from this point to a consideration of biochemical variations of hormones among vertebrates, which formed the subject of the next session. Dr. I. I. Geschwind (Berkeley) gave a detailed review of variations in such protein and polypeptide hormones as oxytocin and vasopressin, or the melanophore-stimulating principle of the anterior pituitary, as well as of the methods available for their study. Investigations of this kind may be expected to provide an explanation of the fact that a given hormone preparation such as somatotrophin from one mammalian group may be ineffective in another, or why one hormone (for example, prolactin) may induce wholly different responses in different species.

Neuro-endocrine reflex and co-ordinating mechanisms were the topics of another session. Prof. G. W. Harris (London) discussed the hypothalamic control of thyroid-stimulating hormone secretion, and there were separate accounts of the hormonal requirements for ovulation in amphibia (Dr. C. Y. Chang and Prof. E. Witschi, Iowa), birds (Prof. A. V. Nalbandov, Illinois) and mammals (Dr. J. W. Everett, Duke). The last-named reported in detail on the ability of pituitary autografts to the kidney to become vascularized and resume their functional activity when transplanted near the median eminence of rats. These animals, he indicated, not only resumed oestrous cycles of roughly normal duration but also ovulated, and some, when mated with males, became pregnant. By contrast, transplantation of these grafts to the temporal lobe did not restore cycles.

In a similar context, Dr. K. G. Wingstrand (Copenhagen) referred to experiments in which the adeno-hypophysis of toads was grafted on the site from which the median eminence had been previously extirpated, and after some weeks resumed its function. This seemed to prove that the anterior lobe must be activated by substances originating in some hypothalamic area other than the median eminence, and that the latter is only a release organ.

Neurosecretion and its role in neuro-endocrine integration were discussed by Profs. E. and B. Scharrer (New York). In their view, many vital processes are not controlled exclusively by either nervous or hormonal mechanisms, but by both. Neither works as a closed system; the neuro-secretory cells provide a hormonal link between nervous centres and endocrine glands, whereby their activities are intimately interrelated.

A novel and attractive feature of the conference was a further session devoted to vertebrate organs of an unusual nature or incompletely established endocrine status, such as the ultimobranchial body, Stannius corpuscle, etc. Dr. F. Baker (Columbia), in reviewing the renal thyroid of fishes, described a condition of hyperplasia and aberrant distribution of thyroid follicles of fish kept in water with a low-iodine content. Thyroid masses, developed as a result of such compensatory hypertrophy, may be found in such ectopic sites as the eye, heart and brain, but this can be prevented by transferring the animals to a high-iodine environment.

During the same session, Prof. E. J. W. Barrington (Nottingham) gave a most stimulating and beautifully illustrated account of his bio- and histo-chemical studies on iodine binding in the endostyle of protochordates. He not only showed convincingly that this, indeed, occurs (for example, in amphioxus and tunicates), but also pointed out some interesting theoretical implications of his findings. For example, since iodine binding in amphioxus is associated with the production of an alimentary type of mucus, elaboration of thyroglobulin (which followed phylogenetically later) may have been the outcome of cytochemical evolution, perhaps as an ecological adaptation by chordates to life in fresh water. With regard to the origin of the iodination process, it is of interest that iodine binding also occurs in the surface layer of the tunic of tunicates, possibly as a random binding to scleroprotein. Since, however, the tunic surface is being continually worn away, it is conceivable that the iodination products might, by ingestion, have become incorporated by the animals, at some stage of evolution, into their biochemical processes. This, in turn, may have established the need for a more concentrated and efficient iodination process, and thus have initiated the iodinating function of the endostyle, itself the forerunner of the vertebrate thyroid gland. Although speculative at present, these conclusions may be given a firmer basis by future research.

The increasing use now being made of electron microscopy in the investigation of ultra-structural detail was very evident during the conference. A considerable proportion of contributors had included electron microphotographs, some of the best being those of Dr. J. D. Green (Los Angeles) and Sir Francis Knowles (Marlborough College). The standard of illustrations, in general, was remarkably high. There were many admirable colour slides—few perhaps finer than those shown by Prof. Barrington and Drs. Miller and Knowles. The superb colour film of the rat's ovary during the process of ovulation prepared by Prof. R. J. Blandau (Washington) must also be mentioned in this connexion.

The official proceedings of the entire conference will be issued as a separate volume, publication of which is confidently predicted before the end of the year.

P. ECKSTEIN

GLASGOW UNIVERSITY EXPEDITION TO NORTH RONA AND SULA SGEIR

AN expedition to the remote, uninhabited Scottish islands of North Rona and Sula Sgeir (45 miles north-west of Cape Wrath) took place during June 23–July 23. Arrangements for the expedition were made

largely by four members of the University of Glasgow, D. E. Baird, I. O. Macdonald, R. S. Wyburn and S. B. Donald. The other six members of the expedition were Miss Helen C. Nisbet and R. A. Gailey