

duction of limb deformities in man has generally been regarded as its most significant teratogenic action. The clarity and brilliance which Kalter shows in his account of hypervitaminosis A as a teratogen make one wish that his brief had been less restricted. I hope that he will proceed with his studies and produce the definitive textbook of mammalian teratology.

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PRIMITIVE NERVOUS SYSTEMS

Primitive Nervous Systems

By Thomas L. Lentz. Pp. viii+148. (Yale University Press: New Haven and London, September 1968.) \$7.50; 67s. 6d.

THIS little book is a clear and accurate account of the cytology and cytochemistry of cells called nervous in sponges, hydra and typical flatworms. Much of the original work in this field has been carried out in recent years by the author himself.

The origin of the nervous system, however, and the action of the nerve cells of the most primitive animals that we now know are two exciting topics that still call for imaginative and deep thought; correct reporting alone is not enough.

In sponges, some cells resemble neurons cytologically, but the author shows good judgment in saying that behavioural and physiological evidence of a nervous system is lacking. The author reaches this conclusion because he accepts a definition of the nervous system in terms of function, that is to say, neurons conduct an excited state from receptor sites to effector sites, but almost the whole of the book describes cells that are considered nervous on cytological evidence. For hydra there is no real experimental evidence that the classical net of neurons conducts excitation: it may be wholly secretory in function for all that we know (of course, the mental sloppiness is embedded deep in all the literature and I am not guiltless in this respect).

Another fundamentally insecure foundation of the book is "the idea of the primitive nerve cell" which "had all the basic properties required by a nerve cell". "By subsequent specialization . . . the primitive nerve cell could give rise to the different types of neurons". Consideration shows that this mythical ancestral all-rounder does not contribute to the real historical discussion of whether sensory or conducting cells came first, whether it was conduction or secretion that first led to the evolution of elongated axons, or whether sensory cells ever directly influence effectors.

Fundamental errors, then, do not stand out; they underlie the whole fabric. Some of this might have become clear if there had been a discussion of ctenophores and of conducting epithelia.

"The most primitive metazoan groups . . . are most likely to reveal the characteristics we seek," says the author, but he does not mention the ctenophores, which fall just where most needed, on a similar level of organization to hydra. Ctenophores have yielded a great deal of evidence of conduction of one sort or another in uncentralized pathways with inhibition, sensory cells, control of effectors, and cell-to-cell conduction. Second, most of the exciting new functional studies of primitive coordination have been on cell-to-cell conduction in epithelia of an extraordinary variety of animals including hydroids. Hydra itself seems to behave like a single bag-shaped excitable membrane. It seems likely, from its widespread nature, that cell-to-cell conduction preceded and still goes on alongside nervous conduction in many primitive situations. This book ignores that whole field. Interesting topics, also omitted, are the place of inhibition in primitive systems (perhaps the need for inhibition provided the selective advantage for chemical trans-

mission) and whether chemical synapses can be symmetrical and functionally two-way. Another fundamental consideration, entirely omitted, is the possible mechanisms by which a collection of nerve cells that form connexions apparently indiscriminately with each other, as in hydra, sort themselves out into distinct conducting pathways in the flatworm, and even in some other coelenterates.

A point that catches my eye is the delightful sentence, "There is some evidence that planaria are capable of learning" (page 71); almost a British understatement. But the high price per page means that one dare scarcely recommend it for the library. There are no half-tone plates, although the cytological topic demands them, and plenty of electron micrographs are now available. The whole book could easily be copied for less than half its new price, if reproduction, in any form, were not prohibited. Such pressures have been known to break down prohibitions.

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SOUTHERN SKULLS

The Skull of the South African Negro

A Biometrical and Morphological Study. By Hertha de Villiers. Pp. xvii+342. (Witwatersrand University Press: Johannesburg, 1968.) n.p.

COMPARATIVE osteological studies on human populations went into a decline at the start of the Second World War. With changing and expanding views on what is worth investigating in terms of the skeletal biology of earlier as well as recent groups, there is now a real need for new reviews of skeletal variability in various parts of the world (both "primitive" and "civilized" peoples). This study, by a senior anatomist in Johannesburg, goes some of the way to providing a detailed survey of southern African groups. It does not set out to compare all African populations, neither does it consider in detail the earlier human remains from this area. This would certainly be worth while at some later date, as also would a similar treatment of the post-cranial skeleton. But this is not to point to defects in the present study, which was specifically to investigate recent skulls of South African Negroes, and in particular those in the Dart collection of the University of Witwatersrand. In the foreword, by Professor Dart himself, the history of this important collection is given. Initiated in the mid-1920s, a now impressive series was developed from cadavers of known sex, "stated age", race and tribe. The samples thus available for study include Cape Nguni, Natal Nguni, Sotho, and Shangaana-Tonga. The detailed analysis of this material, together with comparative series, certainly provides an outstanding contribution to the study of African peoples, the only work coming near to this in amount being on early Egyptian skulls of various periods.

Unlike most previous studies on crania, this attempts to be far more progressive in combining the evidence of morphometric variation and discontinuous (non-metrical) traits, and the possible genetic implications of such variation. The combination of all these data provides assessments of population distance which are likely to be more meaningful than would be possible from more restricted treatment of cranial data.

In all, seventy-five metrical and sixty-five non-metrical characters of the skull are recorded and analysed with regard to their tribal, sexual and total distributions. In the case of the non-metrical features, Dr de Villiers has also contributed to the methodology of recording some characters, and it is good that this type of work is supported by numerous illustrations of a high standard. The chapters are well ordered, and before general comparisons are undertaken in the later chapters (13 onwards), separate attention is given to the metrical and non-metrical variation of the different components of the skull (vault, face, palate and mandible). The only section which might