

BOOK REVIEW

LAURENCE PICKEN: **The Organization of Cells and other Organisms** Clarendon Press: Oxford University Press, 629 pp., 84s.

THE appearance of a comprehensive treatise on biological structure, with a bibliography of some two thousand entries affording a good coverage of the major works on the subject, is an important event. It is important not only to histologists, cytologists, crystallographers and the like, whose work it directly sets out to expound, but also to all interested in general biology. For at this particular moment in the evolution of the subject, it is becoming clear that the integrating principles of the science will be expressed in molecular terms. By this one means that the several diverse branches of biology, such as biochemistry, embryology, genetics, etc., each devoted to the study of very different selections from the total of biological phenomena, are finding a common basis for discussion in terms of the interaction of the molecules, large and small, composing living systems. The unravelling of the structure of DNA, the concept of self-duplicating macromolecules, their role in transmitting the information required for protein synthesis and the nuclear-cytoplasmic apparatus for achieving these ends, are an illustration of this development.

There have always been biologists who considered that this was the proper aim of a generalized biology. They could however make little progress with the idea until recently, since the technical means for determining the structure of biological macromolecules was wanting. Today with the improvement of X-ray diffraction methods, of electron microscopy and refined chemical analysis, we are able at last to determine these structures and thus to address ourselves with confidence to the more ambitious project.

Unfortunately, for student and research worker alike, the literature of this subject is an enormous, rank, proliferating jungle through which previous investigators found no pathway other than that which they could hack out for themselves, with no sure guide to distinguish directions that petered out fruitlessly from those that led to our present position. One cannot say that any book is, or could be, an answer to this problem, which goes to the heart of the more general problem of organizing our expanding knowledge; but it is fair to say at least that no better guide exists than this book. As an introduction and as a survey of established achievement in the field, it can be recommended with the conviction that it is likely to provide the background needed to appreciate the theoretical biology of the immediate future.

A partial list of matters treated includes: viruses and bacteria, cell nuclei and chromosomes, cytoplasmic structures (3 chapters), the cell surface and extra-cellular materials, and the more general aspects of multicellular organization. The references will bring the reader up to the last year or two. When it is at all possible, the relation between structure and function is discussed, and it is this feature which renders the book particularly valuable to cell physiologists, biochemists and pharmacologists, who will wish ultimately to relate their data to structure. Readers of this Journal will find examples of attempts to identify the cellular sites of action of drugs and hormones and of the effect of these molecules on cellular elements. This type of investigation should come to the fore-front in the coming years.

A reader lacking familiarity with biophysical methods now common in structural studies may be inconvenienced by not finding these outlined in the text. Certainly such descriptions would have lengthened an already long book; on the other hand they would have made it more intelligible in terms of its own contents and, being given the author's lucid style, been probably better done than in the standard texts.

The present reviewer found useful the critical survey of the views of the classical cytologists and the efforts made to relate these to current theories. The original reports of earlier writers are often difficult for the modern reader because of differences in nomenclature and, not infrequently, their polemical tone. The observations remain valid, however, and, in many cases, not fully assimilated

into modern theory. It is indeed a pleasure, amidst our enthusiasm for recent triumphs, to find a writer who does not take the egregious stand that nothing more than ten years old need be cited.

A book on this subject by a single author has its limitations—we can scarcely expect one mind to assess with a uniformly critical insight all the work in such a vast field—nevertheless for the reader it has the overwhelming advantage that the style is uniform and that some integrative interpretation is inevitable. These virtues are apparent in Picken's work, which with its luminous style, its wisdom and verve springing from an immense background of learning, is as certain to please as it is to instruct.

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