problem under investigation at the present time is the development and differentiation of the notochord in various species. Aspects of this problem are, the formation of an external bounding sheath, whether the notochordal cells form a syncytium at any stage and the intra—or extra—cellular position of the large vacuoles which typify the notochord. All of these can be related to its role as a primitive supporting structure. Other problems in this field, at present under investigation here and elsewhere, include studies of the origin, from undifferentiated mesenchyme cell, of muscle cells and their myofibrils and of the cilia in the epithelial lining of the respiratory tract. The ultrastructure of normal cells throughout their life and physiological cycles, and the biophysical and biochemical processes with which they are associated, must be understood before any deviations from that normal can be evaluated.

It is possible to hint at only a few applications of the electron microscope to clinical problems. Already electron microscopy has opened up a wide field of study with regard to the structure and nature of bacteria and viruses. Here, additional techniques of specimen preparation are utilized, chief amongst them being the use of replicas, or casts, of whole organisms. The relationship between viruses and experimentally induced cancer has already been studied extensively. With regard to cancer in general, there is a growing appreciation of ultrastructural details which appear to characterise certain cancer cells. A few have been mentioned briefly in this article, for instance, the abnormal appearance of the cristae in mitochondria and the alteration in proportion of the components of the endoplasmic reticulum in hepatoma cells.

Future development in the field of electron microscopy will embrace technical improvements in the electron microscope itself, resulting in better resolution, and improvements in specimen preparation, such as the application of histochemical and cytochemical methods. These will, it is hoped, allow study of the cell and of its constituents at a molecular level. With knowledge of the normal ultrastructure of cells established, the way will then be open for studies upon experimentally altered cells. Of immediate interest here is the nature of changes in cell morphology and chemistry induced by the administration of drugs and hormones. Again, future research with the electron microscope will undoubtedly add greatly to our knowledge of nuclear-cytoplasmic interaction and of the mechanism of self perpetuation of the cell. Tremendous advances have been made in the brief decade which has followed the acceptance of the electron microscope as a research tool in the biological sciences. The next decade may well see an extension of its use to problems of routine diagnosis, prognosis and treatment evaluation.

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Suggested Reading.

1. V. E. Coslett. Practical Electron Microscopy. Butterworth. 1951.
2. C. E. Hall. Introduction to Electron Microscopy. McGraw-Hill. 1953.
3. H. E. Huxley. The contraction of muscle. In Scientific American, vol. 199. Nov. 1958.
4. F. S. Sjostrand. The ultrastructure of cells as revealed by the electron microscope. International Review of Cytology, vol. 5. 1956
5. R. W. G. Wyckoff. The World of the Electron Microscope. Yale University Press. 1958.
6. V. K. Zworykin et al. Electron Optics and the Electron Microscope. John Wiley & Sons. 1948.

BOOK PRIZES

The Dalhousie Medical Students' Society awarded the following prizes for the year 1959-1960, on the basis of academic standing, financial need and participation in Student Affairs:

Second Year—W. B. Kingston
Third Year—M. A. MacKinnon
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