

REVIEWS

CELL PROLIFERATION. Ed. by L. F. Lamerton and R. J. M. Fry. Blackwell, Oxford. 1963. Pp. 241. 42s.

This volume is a collection of twelve symposia papers supplemented by the edited versions of the informal discussions which followed the presentation of each paper. The aim of the symposium was to discuss the methods available for studying cell proliferation and also some of the results obtained using these methods on various types of tissues.

It should be stated at the outset that the bulk of the papers deal mainly with methods for studying cell population kinetics based on the detection, usually by autoradiography, of labelled precursors built into the DNA of the cell. This is not meant as a criticism since, following the original work of Howard and Pelc, the precise cytological marking of DNA-synthesising interphase cells has proved to be an immensely powerful tool in investigating the organisation and mode of growth of proliferating tissues.

The papers by Wimber, Steel and Koburg describe methods for determining cell cycle times which involve pulse labelling, continuous labelling, or double labelling with ^3H - and ^{14}C -thymidine. Results obtained using these different methods on the same tissue are usually in good agreement and can yield information not only on cell generation times, but also on the variation in rates of cell development through the mitotic cycle, the "sizes" of the interphase compartments G_1 , S and G_2 and on the proportion of the population which contribute to growth, etc. These various parameters of the cell cycle, and of cell population growth in general, are discussed lucidly by Quastler, who points out some of the complexities encountered in the kinetics of population growth in a real cell system as opposed to simple ideal or model systems.

Interference with the normal pattern of cell population growth and development following exposure to radiations is the main theme of the paper given by Lajtha, who reviews some of the results obtained from a number of different cell systems. On a more controversial level Pelc presents autoradiographic data, obtained from a variety of mammalian cell types and tissues, in support of his contention that in many tissues DNA may not be perfectly stable but may itself undergo renewal. The evidence presented was obtained from a study of H^3 -thymidine uptake into nuclei of cells which were believed to have finished mitotic or endomitotic development and it is suggested that this synthesis may be concerned with the renewal of gene loci in aged cells. That Pelc's interpretations were not wholly accepted is clear from the comments in the discussion following this paper and indeed some of the work on mouse seminal vesicles has been repeated by Gall and Johnson who find no support for the idea of "metabolic DNA". However, the association of DNA synthesis with puff formation in *Dipteran* salivary glands and the demonstration of a DNA turnover in the extrachromosomal body of oocyte nuclei of *Tipula* spp., suggest that a continued study into the possibility of DNA renewal may well prove profitable.

The use of DNA and RNA labels to mark cells in order to trace their movement within and between tissues is a technique of considerable importance especially in the hands of Gowan and McGregor. These authors

demonstrate that the bulk of the small lymphocytes passing from the nodes and lymph ducts to the blood are not, as was once thought, the results of cell proliferation in the lymph nodes, but are in the main cells which are recirculated from the blood. This topic of lymphocyte recycling is also discussed in the interesting paper of Cronkite *et al.* who describe their experiments on the extracorporeal irradiation of the blood of calves. Hæmopoietic cells also form the materials of study in the papers by Patt and Maloney, and Odartchenko *et al.* who deal with cell population kinetics in the granulocyte and erythrocyte series in the dog, as studied by following the development of cells labelled with H³-thymidine.

The last two papers in the book are concerned once more with mammalian cell systems. Mendelsohn presents an interesting and useful discussion on the kinetics of cell proliferation in tumours and Fry *et al.* describe the kinetics of proliferation in the epithelial cells of the small intestine.

The book is clearly very much of a mixture, but reads easily and contains a wealth of information including such tit-bits as the statement "Duodenum, jejunum, and ileum are derived from words meaning 'twelve fingers' breadth', 'empty' and to 'roll up or twist' respectively"! This mixture, however, would have been further enriched by contributions from workers using materials other than mammalian cells. It is to be regretted that a symposium on such a basic biological topic should not contain any discussions on cell proliferation patterns in the root and shoot meristems of plants; particularly since techniques utilising radioactive DNA precursors are being increasingly used in such studies. Despite this criticism the book should prove useful to all biologists interested in the kinetics of cell proliferation and the organisation of proliferating tissues, but it has little to offer to the geneticist or cytogeneticist.

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REPAIR FROM GENETIC RADIATION DAMAGE. Ed. by F. H. Sobels. Pergamon Press, Oxford. 1963. Pp. x+454. 105s.

Recent work on a wide range of organisms has shown that the amount of mutational damage induced by ionising radiation depends on much more than just the dose and physical properties of the radiation. Not only does the type of germ-cell irradiated and the stage in the mitotic or meiotic cycle have a profound effect, but there also seems to be a period between initiation and fixation of the mutational lesion during which some sort of repair process can take place. These topics of repair and differential radiosensitivity are being intensively studied in a number of laboratories and formed the subject of an international symposium organised by Professor Sobels and held at Leiden in August 1962. This book gives the 24 papers presented, with ensuing discussions.

Most of the papers on differential sensitivity were concerned with *Drosophila*, though events in the mouse, in various plant tissues and in some other organisms also received attention. All these forms showed a marked similarity in the basic pattern of sensitivity, with peaks at first meiotic metaphase and shortly after the completion of meiosis, for instance. There was much less agreement, however, on the probable reasons for the pattern found, though several lines of evidence suggested that oxygen tension differences play an important role. The papers generally were of a high standard; Kaufmann and Gay's contribution, on the uses of autoradiography