

list recent data. The contents of the first volume are concerned with the synthesis of the polypeptide chain, the structure and function of the ribosome, and the charging of tRNA. Most of the articles take a historical approach.

In spite of the restricted area discussed, the individual articles, although in the main well written, do not relate well to each other. But the two articles on protein synthesis, in particular, are brief and come close to achieving the aim of a critical evaluation of the state of play. The other articles are longer, some of them tending to take a more definitive stance instead of keeping strictly to one theme. Nevertheless, on the whole this volume is better written than most such reviews and readers would do well to keep an eye open for future volumes. BENJAMIN LEWIN

## Embryological Methods

*Methods in Mammalian Embryology*. Edited by Joseph C. Daniel jun. Pp. xv+532. (W. H. Freeman: San Francisco and Reading, July 1971.) £10.70.

MILESTONES in the development of mammalian embryology were the first sighting of mammalian eggs and pre-implantation embryos by Cruikshank in 1797 in the rabbit, and in 1890 Heape's successful transfer of fertilized rabbit eggs from one doe to another, which marked the initiation of experimental embryology in mammals. Fig. 1, based on the chronological distribution of references in Daniel's new *Methods in Mammalian Embryology*, illustrates graphically the steady rise in interest in the subject throughout the 1950s, leading to a formidable volume of work during the past decade. The decline in number of references since 1967 is an artefact: internal evidence suggests that most of the chapters were written before 1968, though some have been revised more recently.

It is intriguing to speculate why the subject took so long to get going, since few of the techniques involved require sophisticated modern equipment, and

most of the 1960s work could as well have been done in the 1920s. The most important single technical advance was probably the introduction of antibiotics during the Second World War. This democratized culture techniques of all kinds, and opened the way for *in vitro* culture and experimental manipulation of mammalian embryos on a large scale. Even more important, perhaps, was the question of social incentive. As advances in medical science led in many parts of the world to a rapid increase in population, the necessity of fertility control was belatedly recognized. At the same time the reduction in infantile mortality due to infections highlighted the significance of congenital malformations. Reproductive biology, including mammalian embryology, has in consequence become a well endowed and fashionable subject, no longer sequestered in some corner of a university zoology department.

*Methods in Mammalian Embryology* includes four chapters on eggs and spermatozoa, one on fertilization, eight on egg storage, culture and transfer, four on experimental manipulation, including micromanipulation, three on biochemical analysis, five on electron microscopy, autoradiography, histology, cytology and fluorescence techniques, four on organ and cell culture, and six on implantation and placentology. Although not entirely up to date, it gives a good all-round background, and each chapter is written by an expert who has used extensively, in many cases pioneered, the techniques that he describes. Tips range from the esoteric (Mintz's use of ant cocoons as mouse-egg containers for histology—"we have collected especially good quality sacs in sandy soil under stones and wood in New Jersey"; Blandau's impressive array of instrumentation for observing and photographing ovulation and egg transport *in vivo*) to the homely (Dickmann's demonstration that rat eggs can be transferred, if all else fails, in tap water; Enders's injunction to take care that flushings "land in the recipient container rather than on your lab coat").

There are some sections that could be drastically shortened, and some curious omissions. No mention is made of human embryos and the techniques such as amniocentesis, ultrasonic analysis, laparoscopy and foetoscopy, which are increasingly used in their study. Nothing is said about irradiation or about culture of pre-implantation embryos in any species other than the mouse. Particularly in the chapter on egg storage, there are many general statements, without reference to species, which may prove dangerously misleading.

The index is good. It seems deeply ungrateful to carp when editor and authors have in many ways done such an excellent job, but if the volume had

been half the size, half the price, and published two years earlier, it would have been more than twice as valuable.

A final word of warning. Although this book is a mine of useful information, it is no substitute for visiting a laboratory and seeing how things are actually done. ANNE McLAREN

## Regeneration

*Regeneration of Liver and Kidney*. (New England Journal of Medicine.) By Nancy L. R. Bucher and Ronald A. Malt. Pp. xiv+278 (Little Brown: Boston, Massachusetts; Churchill, Livingstone: Edinburgh, 1971.) £6.

IF a substantial portion of the liver of a rat or a mouse or a dog is surgically removed, the remaining fragment grows, rapidly at first and then more slowly, until it attains the approximate size of the original intact organ. Similarly if one kidney is removed, its partner grows to approximately twice its normal size. These parallel examples of compensatory growth or "regeneration" have been known for half a century, but the mechanisms involved are still very much a mystery. The *New England Journal of Medicine* recently published extensive reviews of liver regeneration by Dr Bucher and of kidney regeneration by Dr Malt. These have now been reorganized, expanded and brought up to date to form a short monograph. In the process the authors and their publisher have taken full advantage of the opportunities offered by publication in book form rather than in the cramped pages of a journal. The result is (like other volumes in the same series) attractive in format, typography and illustration. It contains a good deal of new material, and the old material seems to have been carefully revised. The style of the book is clear, concise and readable.

Though there is some difference of emphasis between the two parts of the book (kidney function being, for example, given more space than liver function), it is held together by the similarity in outlook of the two authors. Neither Dr Bucher nor Dr Malt has tried to provide a review of the sort which is a *catalogue raisonné* of everything which has been published in a given field. They have attempted instead to relate knowledge of regeneration in liver and kidney to the present understanding of protein and nucleic acid metabolism. Their introductory chapter is a summary, brief and austere but lucid and agreeably illustrated, of the relationship between chromosomes and protein synthesis. Of the 160-odd pages devoted to the liver problem, more than half are concerned with molecular biology in some way, and the same central theme is almost as dominant in the discussion of the

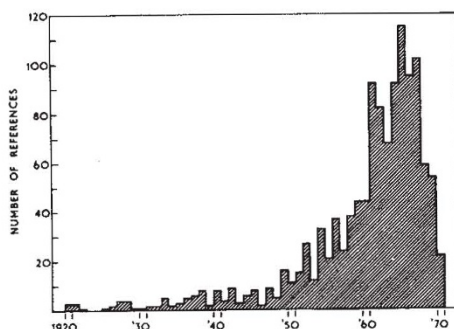


Fig. 1 Increasing interest in embryological methods, illustrated by the references given by Daniel in his book.