manns). Although the bulk of the book is concerned with mammalian cells, two chapters do deal, albeit too briefly, with yeast cells (Bollon and Silverstein) and plant protoplasts (Binding and Nehls). There is also a good, concise chapter on the future perspectives in somatic cell genetics by Slate and Ruddle. It is the final chapter, but could equally well have begun the book, since it beautifully summarises and relates one to another all the components that form the bulk of the book. Those people who normally have a tendancy to cheat and read the end of a book first will be rewarded in this case!

There are many more topics dealt with in the 36 chapters which comprise the book; too many to list here. It is a very comprehensive and useful coverage, but one which, taken overall, is more of a guide to the kinds of methods available than a source of practical instructions of how to do them. It is the sort of book for a library rather than a working text for the laboratory bench, although I expect one or two chapters may find their way to the bright lights of copying machines to be transformed into everyday recipe sheets. It often seems that methodology is an end in itself; that what is important is to have the latest techniques working and then to look around for some problem on which to use them. 'Techniques in Somatic Cell Genetics' should be welcomed because, in bringing together such a diverse collection of methods, the reader is treated to a range of experimental possibilities. Perhaps this will allow more scope for thought about what questions are important and, secondly, how they may be amenable to solution. 'Techniques in Somatic Cell Genetics' is a hybrid book, but then we all know what hybrid cells have done for somatic cell genetics.

CHRISTOPHER BOSTOCK
*M.R.C. Mammalian Genome Unit*
*University of Edinburgh*

*Neuronal Development*. Edited by NICHOLAS C. SPITZER. Plenum Press, New York and London. $45.00.

This is an excellent collection of review articles by leading American developmental neurobiologists on aspects of neuronal development. It is noteworthy in this field how ingenious use has been made of the special characteristics of a wide range of animal groups favourable to the investigation of particular problems. Here, each article concentrates on one or other of these, which in only one case is mammalian; the other 10 articles are concerned with work on the leech (1), *Daphnia* (1), insects (3), amphibians (1) and the chick (4). The problems they confront are fundamental, centred upon the question of how a system which must become so complex and precisely ordered can yet be arrived at through the interaction of intrinsic and extrinsic factors which permit flexibility and modification in its development.

G. S. Stent and colleagues discuss the significance of cell lineage and describe their elegant work on the nervous system in the leech, whose development they have studied using a new fluorescent-tracer technique. K. Barald describes the application of monoclonal-antibody-marker techniques in studies on the ciliary ganglion of the chick. C. S. Goodman follows the differentiation of the progeny of two identifiable neuronal precursor cells in the early embryo of the grass-hopper, and their specialization in different segments of the late embryo. P. C. Letournean discusses the control of axon growth by cell-stratum adhesion and chemotactic responses in chick sensory neurons studied *in vitro*. J. S. Edwards is also concerned with axon growth, and specifically with the factors which guide afferent fibres to the central nervous system in the cricket. M. S. Flaster and colleagues describe the very interesting connections between the ommatidial cells of the eye and the laminar cells of the optic ganglion in the parthenogenetic water

flea, *Daphnia*. D. K. Berg writes on *in vitro* chick studies on neuronal cell death–an important factor in the reorganization of the nervous system in its early development. A second phase of reorganization comes later with the elimination of synapses and D. C. Van Essen describes this process in the mammalian neuromuscular junction.

Geneticists will probably find the most interesting article to be that by J. Palka on the genetic manipulation of sensory pathways in *Drosophila*. Here, the case for using the genetic approach to developmental problems is made with great conviction. The use of homeotic mutants – those in which developmental pathways are switched to those appropriate to another part of the body – is fascinatingly reviewed, and the theory of developmental compartments which has arisen from their study. The most challenging article is by M. Jacobson, on the origins of the nervous system in amphibians. Most embryologists have been taught that it arises first in the gastrula stage, through the inductive action of the archenteron roof – the primary organizer – on the overlying ectoderm. Jacobson believes that this classical hypothesis is ill-founded, and that Spemann's hypothesis is based on the misinterpretation of his experimental results through reliance on inadequate fate-maps and subsequent confusion between host and graft tissue. He proposes an alternative hypothesis, inspired by the *Drosophila* compartment theory, involving a much earlier determination of the nervous system, based on the formation of small populations of precursor cells through interaction between the chromosomes and regionally localized constituents of the egg cytoplasm. This article, and many of the others, will be of interest not only to specialists in its neuronal aspects but to all who are concerned with the most fundamental problems of embryonic development.

D. A. EDE
*Department of Zoology*
*University of Glasgow*