Chapter 15 lists inbred mouse strains with their coat colour and mutant genes, and chapter 16 (new) gives a very interesting discussion of the wild house mouse and its relatives, covering the systematics of the genus *Mus* and the geographical distribution of its different taxa, inbred strains of wild mice derived from the different species, and chromosomal variants of feral origin. Chapter 17 gives the strain distribution of polymorphic variants for alleles of 338 loci in 246 inbred strains. This is a selected subset from the Jackson Laboratory computerized database, which (believe it or not) contains information on 426 polymorphic loci in 569 inbred strains and substrains, the selected subset being restricted to strains typed for at least 20 loci and to loci typed in at least 15 strains. The resulting table covers 98 pages and should surely satisfy most of those who can make use of this enormous mass of data.

Details of the Recombinant Inbred or RI strains are given by Benjamin Taylor in chapter 18. Some 23 sets of RI strains are listed, with substrains of each original cross ranging in number from 3 to 26, all of which have been inbred for between 17 and 97 generations (presumably by sib matings). As an example, 26 substrains have been inbred for 63–88 generations from the C57BL/6J × DBA/2J cross to form the BXD series. These 26 inbred lines have been typed, with a few gaps, for 163 loci which differ in the two progenitor strains. The mind really boggles at this extraordinary achievement, and my amazement is not reduced by seeing from Table 18.1 that 10 of these sets of RI inbreds, including the BXD set, are held by Dr Benjamin Taylor at the Jackson Laboratory. It should be said that the tables given in this chapter list the strain distribution patterns, i.e. the sublines which carry the allele from each progenitor strain, for virtually all the loci and sublines in 16 of the RI series.

Chapter 19.1 deals with immunologically important loci, and presents tables containing over 800 congenic strains, about 500 of which carry the H-2 complex as their differential locus. 'Altogether over 500 H-2 haplotypes are listed. This, undoubtedly, is the largest collection of congenic strains and haplotypes of any vertebrate, if not of any animal species altogether', to quote Jan Klein, author of this chapter. Chapter 19.2 catalogues the mutant genes and carrier strains maintained at different laboratories; and finally chapter 20 lists the subline codes for holders and producers of inbred or other genetically defined mice. An index of 20 pages in three columns ends the book, since the many lists of references have their very appropriate places after loci, tables and chapters.

I hope that my condensed description of what this book contains will encourage many of our readers to order this book for their library and laboratory or personal shelves. It stands out as an awe-inspiring monument to the labours of geneticists of several persuasions working with mice over the last half-century, and we owe much gratitude to the mouse, which has changed from a pest with the ability to make many people jump on to the nearest table with a shriek into potentially one of the greatest benefactors of mankind. I even suggest that geneticists should organize to collect money for a large physical monument to the mouse, with perhaps smaller monuments to *Escherichia coli* and *Drosophila melanogaster*.

ERIC REEVE
Institute of Animal Genetics,
University of Edinburgh

The House Mouse: Atlas of Embryonic Development. By K. THEILER. Second printing, 1989. New York: Springer-Verlag. 178 pages. DM 168.00. ISBN 3 540 05940 7.

In Science, as in art, understanding is often a process of mapping one area of knowledge on to another. When '*The House Mouse*' was first published in 1972 it was the definitive anatomical description of the development of this mammal. That the book soon went out of print is no reflection on its quality; there was no best-selling competing text. Rather, it indicates a restricted market in a relatively inactive field. The advent of gene cloning has created a period of new activity, one of understanding in which anatomy is coupled to molecular genetics in an adventure which aims to discover the origins of anatomical structure in terms of the activity of specific genes. In this enterprise the developmental biologist is armed with a variety of techniques, notably transgenics, *in situ* hybridization and immunohistochemistry. He most certainly also needs a chart of mouse developmental anatomy. Hence the reprinting of Professor Theiler's book.

The book describes the development of a consistent series of hybrid embryos (from inbred C57BL/6 females crossed with CBA males) carefully grouped into 28 stages, each described in a brief chapter. Development is covered from the one-cell stage (1–20 h) to the postnatal period (to 24 days post partum, with a separate chapter on postnatal growth). Each chapter is headed with an informative name for the stage described, a stage number, gestation age, and an indication of the roughly equivalent stage of human development. The description of each stage is shared equally by text and illustrations. The book contains 202 references with an addendum of 10 pages of selected bibliography, and a good index. The only significant addition to the original printing is the considerable expansion of the bibliography.

Each chapter describes the external features of the embryo and the progressive development of its organ systems with frequent, useful comparisons with human development. One of the best features of the book is that the anatomical descriptions are related to individual embryos. Each chapter lists, with their age, those specimens in the series that fall within the described stage. The reader is thereby equipped to

assess the spread of developmental stage that he, or she, can expect to find in embryos examined at a particular time of gestation. While the major features of development of the main organ systems are described, the emphasis of the text is on stage-specific characteristics. Thus, the reader who uses the book for the purpose of identification or understanding, in order to map the expression of specific genes or analyse the anatomical effects of a mutation, will quickly find it wanting in detail. With a little work one can piece together an adequate picture of the development of some organs. In this the reader is aided by good line drawings representing reconstructions of the heart, or gut, etc., at several stages over their formative periods. However, coverage of organogenesis is patchy. A few well-chosen diagrams explaining the morphogenesis of the major organ systems would have illuminated much of the anatomical landscape.

The uneven coverage of the text is reflected in the illustrations. The general progress of development is beautifully documented by an excellent series of low-magnification photographs of living embryos and histological sections through whole embryos. However, the detailed histological photographs which supplement these general views provide an incomplete picture of organogenesis. The illustrations are more sparsely labelled than one would like in a book destined to lie open beside the microscope while the reader struggles with the identity of some gene-expressing tissue. Almost all of the sections illustrated are parasagittal. Representative sections in the transverse and frontal planes would have been invaluable to any reader who wants to visualize the embryo in three dimensions. The advanced stages of skeletal development are better documented in this respect, with excellent photographs of cleared whole mounts. The integration of text and figures is generally good, but in places is made awkward by inconsistent nomenclature.

The intrepid biologist requires three things of his chart of the mouse embryo: a definitive description of the stages of development, a map to find his way around histological sections, and an integrated description of embryonic development and organogenesis in the mouse. The book fulfils the first of these functions excellently and the second adequately, but for the third function this slim volume is rather disappointing. Understanding the molecular-genetic basis of mammalian development will require a thorough documentation of the anatomical phenotype. In this context, 'The House Mouse' is an indispensable atlas. Oh, for an Ordinance Survey map!

DUNCAN DAVIDSON
MRC Human Genetics Unit,
Western General Hospital,
Edinburgh EH4 2XU

Garrod's Inborn Factors in Disease. By C. R. SCRIVER and B. CHILDS. Oxford Monographs in Medical Genetics No. 16. Oxford University Press. 1989. 247 pages, £25.00. ISBN 0 19 261574 2.

There can be few names in human genetics more revered than that of Archibald Garrod. He was responsible for introducing the concepts of inborn errors of metabolism, biochemical individuality and 'diathesis' or genetic predisposition. These ideas were elaborated in his two books *Inborn Errors of Metabolism*, based on the Croonian lectures given at the Royal College of Physicians and published in 1908, and *Inborn Factors in Disease*, published in 1931 after he retired. The former has been available for some years through Harris's 1963 edition. But the latter, perhaps a more valuable work, is now reproduced for the first time.

It is preceded by a brief essay by Joshua Lederberg which places the book in perspective, followed by a prologue in which Charles Scriver and Barton Childs, both themselves eminent human geneticists, dissect the importance of Garrod's contributions. It seems clear that though held in high regard by the medical profession during his life (he succeeded Osler as Regius Professor of Physic at Oxford, he was knighted and elected a Fellow of the Royal Society), the scientific value of his contributions seems largely to have gone unrecognized at the time. Several reasons for this are discussed. Physicians were much more concerned with the overwhelming problems of untreatable infectious diseases, geneticists were often still obsessed by the Galtonian–Mendelian dialogue, and biochemists were not accustomed to thinking along the lines of biochemical individuality, and in any event did not have the techniques for investigating such matters in depth. His brilliant insights were neither testable nor apparently appealing to investigators of his time. How often this is true in the history of science!

Finally, the book concludes with an epilogue in which Scriver and Childs consider our current ideas on genetic predisposition which indicates just how far we have travelled since Garrod's day.

This is a book which should be widely read: for the authors' thought-provoking essays; for the historical importance of Garrod's ideas; and for the clarity of his writings, which provide a fine model for scientific writers of today.

ALAN EMERY
Medical School,
University of Edinburgh