amplification at a centromere, the satellite is subject to dispersal along the chromosome and to loss of identity by sequence divergence — a race described with infectious enthusiasm. Mancino considers hybridization among the same newts as the best criterion of specific status and of karyotypic evolution. Kohno summarizes C-banding comparisons among Asiatic salamanders, related to *Hynobius* by their primitive karyotype. Brief reports make similar comparisons among Pelobatid toads, and *Rana* species from Spain, Greece and China (where they are known as stink frogs).

King traces the origins of Australian reptiles on the basis of karyotypic and immunological comparisons. He concludes gekkos and skinks were original residents of Gondwanaland, but other extant reptiles are more recent interlopers from Asia. Moritz examines the evolution of sex chromosomes in gekkos: some of which possess a temperature-dependent sex system of determination, genetic systems have appeared repeatedly in other species (XY or WZ with polymorphism) and one species shows both systems. At least one amphibian is also known to combine WZ sex chromosomes with similar temperature dependence. Olmo considers the impact of modern techniques on the relatively conservative katyotype of Lacertid lizards. His thoughtful assessment is fortified by two short reports on the same group which relate a satellite DNA to centromeric heterochromatin and trace changes in nucleolar organizer position. Becak reviews the sex chromosomes of snakes and reports on a polymorphism in *Bothrops* associated with intersexuality. There are additional reports on the karyotypes of colubrid snakes from Japan and of rattlesnakes on Mexican islands.

All that adds up to as wide a coverage as one could reasonably expect. There is something of interest for anyone who is not allergic to chromosomes, and it is much more enjoyable to trace the topical literature this way than to scan *Current Contents*. Only the most dedicated herpetologists and cytogeneticists are likely to require their own copies, I fear, but other biologists would find parts of this volume stimulating and all university libraries should be persuaded to acquire it.

Green and Sessions book contains 15 substantial articles, ranging from general reviews of all living amphibians, all anurans or the little that is known of caecilian karyotypes, to treatments of more restricted groupings of salamanders or the better known genera *Xenopus*, *Hyla* and *Triturus*. Other articles deal with topics which cross these systematic boundaries. This results in considerable repetition. Several articles seem dutiful rather than inspired. The best ones, however, both convey information and excite curiosity. Nardi compares karyotypes and some DNA sequences of *Hydromantes*, a salamander resident in Sardinia and the neighbouring mainland: its nearest relatives live in California. Mancino demonstrates how monoclonal antibodies can highlight particular loops of lampbrush chromosomes but the function of proteins they identify remains a mystery. Schmid surveys amphibian sex chromosomes including the OW/OO system of a New Zealand frog discovered by Green, who also considers it at greater length as a supernumerary chromosome. King provides an admirably critical discussion of how heterochromatin may have evolved in different lineages.

Several of the authors also contributed to Olmo's book, but usually consider different topics in this one. Desite some inevitable duplication, then, the two volumes generally complement each other. Both deserve a place in a reference collection.

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Human Chromosomes: A Manual of Basic Techniques. R. S. Verma and A. Babu, Pergamon Press, New York. 1989. Pp. 240. Price £31.95, Hardback, ISBN 0 08 035774 1. £15.95, Paperback, ISBN 0 08 036839 5.

It is commonly acknowledged that the best way to learn a new technique is to work in a laboratory where it is performed routinely. Alternatively an expert in the technique may be invited to work in your laboratory. Failing these possibilities you are left to consult papers in which the technique in question is described in full or to equip yourself with a good textbook.

The authors of this book state that their aim is to give a comprehensive account of all the basic techniques used in research on human chromosomes and in more detail than many journals would see fit to publish. The expansion of clinical cytogenetics in the last 20 years, however, makes this admirable intention something of a tall order and all to be accomplished in the space of 240 pages!

The book is primarily written as a laboratory manual for technicians and students of human cytogenetics but is also intended to serve as a reference book for postgraduates and others interested in this subject. In addition many of the techniques described apply to other, particularly mammalian, species.

A wide range of topics currently used in cytogenetic screening or in the process of being developed for clinical use, is covered. One chapter is devoted to the culture of various tissues such as skin and bone marrow as well as the most common source of human chromosomes, peripheral blood. Prenatal diagnosis using amniotic fluid or chorionic villus sampling is given a section. Banding techniques, still the mainstay of routine cytogenetic analysis, rate a chapter as does *in-situ* hybridization using gene probes and blotting techniques, Northern and Southern. Specialized techniques concerned with high resolution banding, sister chromatid exchange, fragile X and sex chromatin are also covered.

A section on meiotic tissue gives methods for obtaining pachytene, metaphase I and II chromosomes from testicular biopsies and a brief discussion on making preparations of these stages from ovarian material. A part of this section deals with the examination of synaptonemal complexes by both microspreading and three-dimensional reconstruction

from electron microscope serial sections. It was the most disappointing. These are research methods and it is difficult to do them justice in the space of five pages. It is not clear why they were included while direct chromosomal analysis of spermatozoa and flow cytometry were not.

In general the techniques are clearly explained under a series of headings and the procedure given in easy to follow steps. The authors have deliberately omitted theoretical information but helpful hints are given and where appropriate the mechanism of a test is discussed. This pattern is not consistent throughout the book, however, largely because where the authors are not sufficiently familiar with a technique they have co-opted other contributors. The book is illustrated with photographs which reproduce well enough but the addition of diagrams in some cases would have made the techniques easier to follow.

Two chapters which explain the nomenclature and interpretation of human karyotypes and chromosomal syndromes and give the background to the International System for Human Cytogenetic Nomenclature (ISCN) should be helpful to anyone who, like me, is mystified by the technical jargon used in human cytogenetics. In addition to the list of abbreviations a glossary would have been useful for the beginner, for we are left to infer the meaning of such terms as 'marker chromosome'.

One strength of the book lies in the references. Each technique is attributed to its sources and a full list of references is given at the end of each chapter, thus original papers can be traced easily.

My complaints about the book are mainly concerned with its production. Some are personal preferences, none detract from the information given. In short, the book needs further editing, reorganizing sections to reduce the number of subsections (consequently avoiding figures labelled with up to seven digit numbers) and to remove mistakes in, for example, spelling and cross referencing.

Despite some shortcomings, this book collects together information which would be time consuming to find elsewhere. It even gives the correct recipe for 2 × SSC, which is more than I can say for one of its rivals. So if you intend to work with human chromosomes or have ever had cause to wonder what DIPI or DAPI mean this would be a good book to consult and would make a useful addition to a laboratory's reference collection.

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Genetic Variants and Strains of the Laboratory Mouse. (2nd edn). Mary F. Lyon and Antony G. Searle (eds). Oxford University Press, Oxford. 1989. Pp. 876. Price £90.00, Hardback, ISBN 3 437 11268 6.

Heredity has failed to find a qualified reviewer for this book, perhaps because all contacts had contributed to it or been consulted in its preparation. Like the first edition of 1981, it is a distillation of collective wisdom and subject to an international committee on standardized genetic nomenclature for mice. This edition supplants the previous one, of course, by an expansion of old sections and the addition of extra ones. It includes information otherwise only available from the 40-year run of *Mouse News Letter* and several Jackson Laboratory databases.

Almost half the book catalogues some 1500 loci, displays linkage maps for 965 of them and assigns about 200 others to particular chromosomes. Both the rules for classifying loci and the basis of the linkage maps are carefully explained. A new chapter compares these linkage groups to human ones. There is a striking homology for X chromosomes, although the linkage pattern has been disrupted repeatedly. The standard karyotype is described in considerable detail, with descriptions of numerical and structural chromosome variants. Short additional sections deal with DNA polymorphisms, highly repeated sequences, retroviruses, the *t* complex and histocompatibility complexes. There are lists of inbred and polymorphic strains and an exemplary article on the wild members of the genus. The book ends with a 20-page index and contains a prodigious number of references.

In short, this is the mouse geneticist's bible — the Queen Mary version. Any criticism would be anathema and quite foolish, for the scolarship and intellectual rigour which have rendered a Babel of data into a single compendium must incite admiration. All those who keep a mouse colony will need at least one working copy and perhaps a second one inscribed with the laboratory genealogy. Then the names of apostates and heretics may be struck out as a warning to younger acolytes, who will be expected to memorize short sections each Sunday. Outsiders such as myself can only marvel at the strength of mouse genetics and applaud its achievements so impressively summarized here.

Even an outsider may wonder if the linkage maps really reflect the physical distance between loci, as is commonly assumed on the basis that recombination is essentially a random event. That assumption is qualified here for centric regions which may be underestimated. The correspondence between G-band and linkage maps for interchange and inversion break-points is best described as erratic. Furthermore, most of the autosomes show clusters of loci with higher recombination values for females than for males (rarely the reverse). Such clusters tend to occupy the middle section of the linkage map. Some may be errors, of course, and the difference seldom exceeds 10 cM, but the pattern derived from independent tests seems much too consistent to be dismissed as an accident. Perhaps recombination is more frequent at the ends of chromosomes than in their central regions and this distortion may be greater in males than in females.

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