unfortunately it does not include a magic foolproof way of getting rid of them all.

With the main textbook comes a comb-bound book of protocols. This is a collection of techniques commonly used in *Drosophila* labs. It is probably more useful to a new lab than an established one as most people have a set of techniques with their own modifications to optimize procedures for the precise system they are studying.

The techniques cover chromosomes, molecular biology, tissue culture, developmental biology and transformation. The molecular biology section is very short, which is reasonable with so many manuals available on common molecular techniques which are rarely unique to *Drosophila*. But it is a point which potential purchasers should be aware of. It will not be sufficient to have just this collection of protocols as your laboratory manual for all areas of *Drosophila* research.

Sometimes there is more than one protocol for a given technique and some comment on the conditions when each might be more appropriately used would be helpful. I think it is doubtful, for some of these procedures such as preparing chromosomes, *in situ* hybridizations to embryos or dissociating imaginal disc cells, whether a 1- or 2-page protocol can really serve as more than a starting point, and nothing can substitute for a visit to an experienced lab routinely using the techniques where the 'tricks of the trade' can be learned. There are useful appendices of recipes for solutions and lists of suppliers; again some guidelines on when to use which recipe, e.g. Ringers, might be valuable.

In summary, everyone doing *Drosophila* research needs this book in their laboratory not just in the library. Many people teaching genetics and developmental biology in a more general context will also find it valuable.

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Locus Maps of Complex Genomes: Genetic Maps, 5th Edition. Edited by STEPHEN O'BRIEN. New York: Cold Spring Harbor Laboratory. 1990. Published in two forms: (1) Complete version of 1103 pages. Cloth-bound. $150. ISBN 0 87969 338 X. (2) As six paperback volumes with the following contents: *Book 1 – Viruses,* 185 pages. $27. ISBN 0 87969 342 8. *Book 2 – Bacteria, Protozoa and Algae.* 137 pages. $27. ISBN 0 87969 343 6. *Book 3 – Lower Eukaryotes.* 205 pages. $27. ISBN 0 87989 344 4. *Book 4 – Non-Human Vertebrates.* 179 pages. $27. ISBN 0 87969 345 2. *Book 5 – The Human Maps.* 261 pages. $27. ISBN 0 87969 346 0. *Book 6 – Plants.* 151 pages. ISBN 0 87969 347 9.

It is a great pleasure to welcome the new edition of *Genetic Maps*, still under the editorship of Stephen O'Brien, who has looked after the successive editions published in 1980, 1982, 1984, 1987 and (now) 1990. His preface makes it clear that the series is to continue, and I look forward to seeing the sixth edition displayed at the 1993 International Genetics Congress in Birmingham (UK). Each new edition is designed to make the previous one obsolete, and is not simply an appendix adding lists of new genes, RFLPs and references. This new edition of 1100 pages (360 more than the last) is available in two forms as described above, the complete cloth-bound volume being too bulky to be easily stolen from a library, while the paperback sections should survive a few years of rough treatment on the laboratory bench.

We now find about 150 organisms (given a little uncertainty about the number of different viruses), 200–250 maps, including in some cases nuclear genes, mitochondrial genes, cloned genes, restriction polymorphism and *in situ* hybridization data. New organisms include a Bacillus phage (ϕ29) whose complete DNA of 19285 bp has been sequenced, three fungi (*Magnaporthe grisea* – a blast fungus, *Phycomyces blakesleeanus* and *Schizophyllum commune*), two insects (*Anopheles quadrimaculatus* and *Nasonia vitrepennis*), the Mongolian gerbil, the fishes *Fundulus* and *Lepomis*, and the plants *Lactula sativa*, *Brassica oleracea*, *Pisum sativum* and *Secale cereale*.

In a few cases there has been no updating, e.g. Phage Lambda, *Proteus mirabilis*, *P. morganii*, *E. coli*. In contrast to the last of these, *Salmonella typhimurium* has 166 new genes added to the previous list of 587, indicating much recent activity; and I suspect the same may be true of *E. coli*, whose map here is dated 1984. T4 phage reports an increase from 60 to 85% of the genome sequenced, but no other T phages get a mention and readers may forget that they ever existed in the laboratory test-tube. Phage Mu should certainly have been included, but progress is shown for phages P1, P2, and P4 (whose complete DNA sequence of 11627 bp has been determined). DNA and RNA viruses are, of course, being very actively pursued, and the 100 pages on animal viruses contain a wealth of information as recent as could be included at the times of writing, too complex to be summarized here. It should be noted, however, that information on the animal RNA tumour viruses is restricted to the 24 restriction maps published in the previous edition. There is no mention of any plant viruses or other plant parasites – shouldn't this gap be filled?

Gene lists on the great majority of organisms included have been updated to mid or late 1989. So there is plenty of stimulating new information for the

browser. One interesting aspect is the variety of symbolism used in naming genes, and here *Caenorhabditis elegans* scores particularly well since the types of genetic defect observed fall into about 80 types which can be distinguished by three-letter symbols. Examples are *let*, *mel*, *sem*, *msp* and *aex*, respectively, for lethals, maternal effect lethals, sex muscle, major sperm protein and expulsion-defective mutations. This results in a very simple gene list, with numbers after each gene symbol indicating different loci with the same phenotype. 530 genes were listed in the last edition of *Genetic Maps*, and this has increased to 830 in the present volume. Also, our curiosity about what is new is easy to satisfy because each new gene is starred. Most of these are lethals, whose basis will doubtless be under intense study since they represent essential genes. The newcomer to this branch of genetics will find the recent book, *The Nematode* Caenorhabditis elegans (edited by Wood *et al.* Cold Spring Harbor Laboratory, 1988), makes essential and compelling reading.

Next in the list comes the fruit fly, for which Sturtevant produced the first linear genetic map of any organism in 1913, consisting of five genes on the X chromosome. The number of genes known is now probably well over a thousand, and rapidly growing with the analysis of the genes controlling very early development. A very useful list of biochemical loci gives details of their effects, where known, as well as position and references. I was pleased to find the genes 'sevenless' (symbol *sev*) and 'bride of sevenless' (symbol *boss*) but the presumably even more recently named genes 'son of sevenless', 'sisterless' and 'capuchino', in a very recent issue of TIG, were not there.

Students of *Drosophila melanogaster* enjoy such poetic names for their new genes, and they certainly stick in the mind, e.g. disco, dunce, eagle, easter, ellipse and gooseberry, even if they don't give you a clue as to what the gene does. It will be noted that many of the old morphological marker genes have now entered the biochemical list. The *Drosophila* maps in this volume must obviously be studied with Michael Ashburner's Handbook (reviewed in this issue of *Genetical Research*) on the bench beside you.

The chapter on the mouse gives an alphabetical list of genetic loci, a map of the genes located on each chromosome together with those known only to be on that chromosome shown below it, a list of the DNA clones and probes (taking up 29 pages), and a map showing the location of these clones/probes on each chromosome, except that there are too many to fit into the X chromosome map or that for the *t* region of chromosome 17. Further tables and a map give details of retroviral and cancer-related genes. This mass of information is up to date to spring or summer 1989; and again it can be more easily digested with the help of *Genetic Variants and Strains of the Laboratory Mouse* (edited by M. F. Lyon and A. G. Searle, Oxford University Press, 1989). One can also link on to GBASE via Telenet to get the very latest information on mapping data and unmapped loci, mouse/human homologies, a map of the mouse genome with all known human homologies overlaid, maps tailored to your own individual requirements, etc.

The human genome data are if possible even more dramatic, with over 4800 genes identified at 15 September 1989; and I will simply mention the 'Oxford Grid', an ingenious diagram relating the homologous genes of man and mouse on different chromosomes, and the list and maps showing the morbid anatomy of the human genome, i.e. the disorders for which the mutation has been mapped to a specific site. About 550 of these are listed.

I have not said anything about plants, but recommend those listed to the reader's attention. The importance of continued genetic studies on these should be too obvious to need emphasis. In conclusion, one must congratulate all the contributors to these 1100 pages: many of them might easily have said: 'I have to concentrate on my own research'. The complete volume should be in every library and most active laboratories should have one or more of the paperback sections. Just to scan these pages makes one realize how thin our genetic information is when set against the magnificent variety of organisms which our species has not yet driven to extinction. If you want to know which is the smallest map in the book, it is that of the Mongolian gerbil, consisting of two pairs of linked genes.

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The Cattle of the Tropics. By JOHN P. MAULE. Edinburgh: can be ordered from The Senior Administrative Officer, Centre for Tropical Veterinary Medicine, Easter Bush, Roslin, Midlothian EH25 9RG, Scotland, U.K. 255 pages. £25.00 including postage. ISBN 0 907146 05 8.

The author of this volume is the former Director of the Commonwealth Bureau of Animal Breeding and Genetics, and is widely respected as a much-travelled expert on tropical livestock, particularly tropical cattle. He has now condensed his experience into a volume that will be a sound reference for students, and others, who wish to make sense of the vast amount of genetic variation that occurs in this class of livestock.

There are, we are told, some 740 million cattle in the tropics, though how anyone actually knows this is not clear to me. Those of us who are familiar with the temperate *Bos taurus* are frequently baffled by the array of breeds and their crosses that we see around. But when we move to the less familiar, not to say unfamiliar, *B. indicus*, *B. brachyceros*, *B. bibos*