

Council in the U.S.A. It was asked to review the use, preservation and management of global genetic resources nationally and internationally, to recommend research and development needs and to present a global strategy. The subcommittee was chaired by H. A. Fitzhugh, and the other members were E. L. Henson, J. Hodges, D. R. Notter, D. Plasse, L. L. Setshwaelo, T. E. Wagner and J. E. Womack (a good mix of those who are on the conservation circuit and those who are not). The report was published in 1993 but, judging by the references, was drafted two years earlier. It comprises a lengthy summary, a main section which reviews the arguments, describes genetic and new reproductive methodology, and discusses national and international programmes. There are also appendices including useful lists of breed numbers in different species and more specialized reviews on methodology and disease transfer risks with sperm and embryos. Whilst the presentation is all very clear, it is spoilt by the inclusion of poorly printed photographs, which look as if they had been conserved for half a century when in fact they are recent. It is a very thorough review of the topic although, as one might expect from a committee, rather turgid in style. Most of what is said can be found in many other places, but the slow state of advance of value of conservation in terms of hard evidence makes that inevitable. The committee argues very strongly and cogently for the value of and need for livestock conservation, recommending 'Mechanisms must be put in place to ensure that genetic diversity of the major livestock species is maintained to support improvements in production efficiency and to accommodate future changes in selection goals.' It will be interesting to see what comes of it.

WILLIAM G. HILL

*Institute of Cell, Animal and Population Biology
University of Edinburgh*

Locus Maps of Complex Genomes: Genetic Maps, 6th Edition. Edited by STEPHEN J. O'BRIEN. New York: Cold Spring Harbor Laboratory Press 1993. Published in two forms: (1) Complete version of 1532 pages, Cloth \$175. ISBN 087969 414 9. (2) As six paperback volumes with the following contents: *Book 1 – Virus*, 195 pages with 59 maps. \$35. ISBN 0 87969 415 7. *Book 2 – Bacteria, Protozoa and Algae*, 181 pages with 27 maps. \$35. ISBN 0 87969 416 5. *Book 3 – Lower Eukaryotes*, 285 pages. \$40 ISBN 0 87969 417 3. *Book 4 – Nonhuman Vertebrates*, 332 pages with 33 maps. \$40. ISBN 0 87969 418 1. *Book 5 – The Human Maps*, 267 pages with 10 maps. \$40. ISBN 0 87969 419 X. *Book 6 – Plants*, 272 pages with 26 maps. \$40. ISBN 0 87969 414 9.

The 6th edition of *Genetic Maps* contains some 40% more information than the 5th edition of 1990, judging by the relative number of pages (1532 compared with 1103), but is printed on thinner paper

which takes up about 20% less shelf space (70 versus 90 mm) which is a significant improvement. Publishing the edition both as a single volume for libraries and in six separate paperback sections at a cheap price for such a massive amount of information means that each research group should be able to afford to have the relevant section on its own shelves.

Reviewing previous editions of this masterwork, which Stephen O'Brien edited in 1980, 1982, 1984, 1987 and 1990, one can only marvel at the Editor's persuasive ability in extracting ever more elaborate scripts for successive editions from an ever increasing number of busy authors. The new edition has added a number of new organisms: I note Coliphage 196, Bovine herpesvirus-1, and Alcelaphine herpesvirus in Book 1 (Viruses), *Bacillus megaterium* and *B. stearrowthermophilus*, *Chlamydomonas eugametos*, *C. moewusi* and *Prototheca wickerhamii* in Book 2 (Bacteria, Algae and Protozoa), *Aspergillus niger*, *Cochliobolus heterosporus*, and *Drosophila buzzatii* among Lower Eukaryotes (Book 3). New among the Non-Human Vertebrates (Book 4) are the Silver Fox, *Xenopus laevis*; and the latest human-mouse comparative map with a figure by chromosomes and a table giving human locus symbol, gene name and location, alongside mouse locus and chromosome, bovine and cat chromosomes. Book 6 (Plants) has added the apple, rice, alfalfa, peanut, potato, cowpea and mungbean. No organism has been discarded and the smallest gene map still belongs to *Meriones unguiculatus* with 4 genes forming 2 linkage groups. There are probably about 170 organisms covered, with 189 genetic maps of different kinds, and the records for most of the species now take us to mid or late 1992, making them often the most up-to-date records available. Work on some organisms is progressing very rapidly: thus the linkage map of *Arabidopsis thaliana* has increased from 93 to 140 from 1989 to 1992, and the DNA sequences of 23 of these loci have now been published. The advance for *Caenorhabditis elegans* has been equally dramatic, an increase from 830 to 982 genes in the current linkage map.

Book 5, on the Human Genome, includes a list of 740 mutations under the classification 'Morbid Anatomy' which have been mapped, compared with about 550 in the previous edition. That is an impressive enough total, and at this rate of increase many more 'morbid mutations' for us to worry about are waiting to show themselves. At mid-1992, the current volume tells us that 10410 loci in the human genome had been mapped, including 2328 genes and pseudogenes, 84 chromosomal breakpoints, 113 fragile sites and 7885 anonymous DNA segments. These are all shown in figures beside each chromosome, and the 2328 genes and pseudogenes are then listed in order by chromosome, with symbol, location and marker name. Among other tables are a listing of Polymorphic PCR-detectable markers of *Homo sapiens*, including lo-

cation, symbol, variation type, heterozygosity, number of alleles and primer name and sequence; a list of chromosome aberrations observed as the sole anomaly in neoplasia, human fragile sites, genes pertinent to human endocrinology with a separate listing of those causing endocrine disorders, and finally, details of mitochondrial DNA.

This 6th edition clearly lives up to our expectations from studying previous editions, and should form an

important part of every geneticist's education. The editor has in this edition made it much easier to find one's way among the organisms by printing the name of the relevant organism at the foot of each of the 1500 pages, and the authors have included some useful textual details with their tables and figures.

ERIC REEVE

*Institute of Cell, Animal and Population Biology
University of Edinburgh*