

---

 Book review
 

---

**Fincham, John R.S.: Genetics.** Bristol, London, Boston: Wrieth PSG 1983. xvii + 643 pp., several figs., several tabs. Soft bound £ 12.50.

Professor Fincham's aim in writing this textbook of genetics "has been to provide a picture of the current state of genetics for the student or other scientifically interested reader with no previous knowledge of the subject". The result of his work is a book containing 19 chapters with more than 100 special paragraphs. Each chapter starts with an introduction to the topic dealt with and finishes with a summary, perspectives and selected further references. With the help of questions and problems referred to the text every reader can control whether he is able to solve genetical problems. The correct answers are given at the end of the book. The author preferred a comparative approach to show current concepts and the rationale behind them. Therefore, he starts with cells, DNA and chromosomes. The first two chapters deal with the mitotic cycle completed by a description of staining, labelling and banding techniques as well as the life cycle of eukaryotes. Excellent photographs, e.g., of dividing cells, synaptonemal complexes with interchanges, a clearly analyzable diplotene, diakinesis bivalents with chiasmata in differentially stained chromatids support the text. Fungi are the principle material used to describe chromosomal segregation in eukaryotes. In this connection the author also considers gene conversion and postmeiotic segregation. Linkage, recombination and genetic mapping in eukaryotes are not only explained with the help of the "standard object" *Drosophila*, but also in fungi, *Antirrhinum*, maize and yeast. Crossing-over models by Holliday and Meselson/Radding are described in connection with the mechanism of eukaryotic recombination. In the chapter dealing with chromosome variations there is an interesting photograph of the pachytene stage of meiosis in a *Neurospora crassa* ascus heterozygous for an inversion. Complex heterozygosity in *Oenothera* and trisomic analysis in tomato is also found here. The chapter on extrachromosomal

heredity in eukaryotes comprises results of *Paramecium* research, mitochondrial DNA of fungi, yeast, man and plants, chloroplast DNA in higher plants and *Chlamydomonas* and plasmids and symbionts. The inclusion of recent results on human and plant mitochondrial DNA is a little too brief. Analysis of continuous variation presents statistical methods and among other things chromosome assay in *Drosophila*. Parasexual analysis for example brings an interesting application to animal and human cells (hybrid cells, mitotic crossing-over), chromosome-mediated gene transfer in mammalian cells and transformation of cells with free DNA. The chapters concerning bacteria and bacterial plasmids, bacteria and bacteriophages are in close connection with genetic engineering (cloning vehicles,  $\lambda$  vectors). Sources of mutations, repair mechanisms, chemical mutagenesis and in vitro site-directed mutagenesis are considered to be leading to gene function investigated by mutation (hunting for mutants, mutant polypeptides, suppression by tRNA, operons). The chapter on genes as DNA sequences summarizes "R-loop" mapping, codon usage, control of transcription, attenuation and signals for excision of introns. Genome architecture and evolution are comprehensively shown by *E. coli*, T4,  $\lambda$ ,  $\Phi$ X 174, MS2, SV 40, *Drosophila*, birds, mammals, mitochondrial genomes, repetitive and movable sequences such as "copia" and "selfish" DNA. Mating-type switch in yeast, the immune system, cancer and viruses, position effect and methylation are some selected examples for mechanisms of cellular differentiation. Population, evolution and human genetics and its application stand at the end of the textbook.

A large number of pictures, schemes and drawings support the understanding of the great amount of problems handled in the text. At the beginning of the preface the author comments: "Writing a general book on a popular and rapidly expanding subject like genetics belongs to the same category of human folly as trying to cross the Atlantic in a rowboat." He did not capsizze.  
M. Lindenhahn, Halle/S