(all?) sporulation genes – this contrasts with the single sigma factor so far identified in *E. coli*.

Streptomyces grows as a complex substrate mycelium in the soil and puts up aerial hyphae under poor conditions. These hyphae form chains of spores, helped by cannibalisation of the original mycelium and the excretion of antibiotics. These antibiotics can be reasonably described as the product of physiological differentiation, since their biosynthesis is induced by the conditions which lead to spore formation. Of particular interest is accumulating evidence that genes coding for resistance determinants to the various antibiotics are closely linked to the antibiotic production genes. Surprisingly, only 12 loci specific for sporulation in *Streptomyces* have so far been identified, but some of these may possibly consist of groups of genes.

Myxobacteria share the same ecological niche in soil, where they feed on bacteria, as the cellular slime moulds, and show a remarkable degree of parallel evolution, and the chapters on the two groups need to be read together. The myxobacteria degrade insoluble organic molecules in the soil by producing extracellular enzymes, and they have therefore developed ways of keeping their cells together in multicellular masses because of the much greater efficiency of feeding this allows on a protein substrate – they have been described as 'feeding like a pack of microbial wolves'. The development of their fruiting bodies seems also designed to produce large cell masses when the spores germinate.

The other bacterial topics dealt with are motility and chemotaxis in *E. coli*, Streptococcal sex pheromones and the developmental genetics of *Rhizobium*-Legume symbiosis. One could argue that only the last of these is strictly a developmental topic, but it is useful to have up-to-date reviews on all three subjects, written with developmental aspects in mind. The eukaryotic microbes are covered by excellent articles on development in *Dictyostelium* and yeast. In the case of the former, growing cells contain about 4500 discrete mRNA species, and these are joined by 2500 to 3000 new species of mRNA at the time of formation of cellular aggregates – this brings out the much greater complexity of the *Dictyostelium* genome than those of the prokaryotes mentioned above, which could muster less than half as many mRNA species. I would have welcomed a comparable article on the acellular slime mould, *Physarum*, which was included in the Cold Spring Harbor meeting but omitted from this volume. It has several times as large a genome as *Dictyostelium*, and an intriguingly different life history (Students of *Physarum* have described *Dictyostelium* as a 'fake' slime mould, e.g. H. W. Sauer in his book 'Developmental Biology of *Physarum*,' Cambridge University Press, 1982, which is an excellent study of this organism, though not up-to-date on its genetics).

The new techniques of molecular genetics have already made important contributions to the many developmental topics discussed in this monograph. I think it will widen the horizons of most readers, and it deserves a place in every library where geneticists may browse. It may well encourage some of them to join the small bands of enthusiastic research workers that one of the authors refers to.

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Mutations in Man. Edited by G. OBE. Berlin: Springer-Verlag. 1984. 327 pages. DM116. U.S. $45.50. ISBN 3 540 13113 2.

To date there has been no unambiguous demonstration of the induction of human germ-line mutations and, until it has been demonstrated, there will continue to be uncertainty over the reality of the risk to the human germ cells from environmental mutagens. However, somatic cell mutations are induced in human cells and the link between mutagenesis and carcinogenesis is firmly established. If only for this reason it

is important to try and understand the mechanisms of mutagenesis, to evaluate the significance of various types of mutational change and to develop ways of detecting and limiting mutagenesic exposure of the human population. Later, if and when germ cell mutagenesis is demonstrated, our efforts along these lines will be more than justified.

'Mutations in Man' is a collection of papers which summarise various aspects of the study of mutagenesis in respect of man. The authors achieve this with varying degrees of success. Among the topics covered are DNA adducts and their biological relevance, the repair of DNA lesions, the structure and organisation of the human genome, the effects and monitoring of point mutations in the human population and human nondisjunction. Of particular interest is the contribution of Evans on the organisation of the Human Genome. Strictly this is not mutagenesis, of course, but it presents the framework within which discussion of human mutagenesis must take place. Also worthy of comment are the contributions by Vogel on gene mutations and their effects (this includes some of the interesting recent molecular studies and avoids becoming simply a catalogue), and the careful chapter by Natarajan which deals with the possible causes of chromosomal aberration, their frequencies in the human population and relationships between aberrations and human disorders.

Inevitably in a volume motivated by interest in possible effects of environmental agents several chapters deal with particular instances of the effects of mutagenic agents in the environment. Gebhart presents data on chromosome aberration in the lymphocytes of patients undergoing chemotherapy and Obe and colleagues deal with studies on mutagenicity of cigarette smoke. The editor has, however, thankfully resisted the temptation to include yet another detailed discussion on the evaluation of short-term tests. The topic of testing and inference is not ignored but it is dealt with in more general terms by Sobels in a chapter dealing with the achievements in the field of environmental mutagenesis. These include the improved identification of premutational lesions, better methods of dose estimation and a better understanding of carcinogen-mutagen relationships. Sobels also deals with risk assessment and reminds us of his ingenious 'parallelogram' approach still as yet largely untried. Mutagenic hazards to man are hard to assess and the book ends with a summary of present methodology and thinking in the field of risk estimation using small mammals as the test organisms. Although much of this has been published before it is useful to have it brought together here.

One or two chapters are disappointingly sparse in content and some contain little which can be said to be directly related to man, but the book as a whole is a useful addition to the literature on Mutagenesis.

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On Being the Right Size and other essays. By J. B. S. HALDANE. Edited by JOHN MAYNARD SMITH. Oxford University Press. 1985. 191 pages. £4.95. ISBN 0 19 286045 3.

Popular scientific writing has in general an even shorter active life than most serious articles published in scientific journals – both are rapidly overtaken by progress. It is, therefore, a unique event for a selection of popular scientific essays, mainly published before the last world war, to be reissued now; and this is even more remarkable since many of these essays are coloured by a political bias which the author made no attempt to disguise. That the author was J. B. S. Haldane will, I suspect, be a sufficient lure to send all those who knew him or his work hurrying off to the nearest bookshop for this little paperback.

Haldane was undoubtedly a master essayist, and surely *the* master of the popular