

Book Reviews

Selected Genetic Papers of J. B. S. Haldane. Edited by K. R. DRONAMRAJU. Garland Publishing, 1990. 542 pages. \$100.00. ISBN 0 8240 0473 6.

In 1963 the U.S. government relented and allowed J. B. S. Haldane to enter the country. Among the places he visited was Madison, Wisconsin, where I was an undergraduate hanging around the lab of Jim Crow. A number of us got to see Haldane and Sewall Wright in the same room; we hoped for pearls of wisdom. But while they were quite polite to each other, Wright simply continued to mumble, as always, about what he had said in his 1930 paper, and his 1942 paper, and so on, while Haldane concentrated entirely on making the worst possible puns. When a biochemist said that he and his students had been ‘extending the Haldane relations’ Haldane’s response was ‘so have I – been married, you know’ and he seemed very pleased with himself. Needless to say, we students were disappointed. But when he lectured, we found that he had been following closely the latest progress in breaking the genetic code.

It is all too easy to reduce Haldane to a collection of anecdotes, and to see him primarily in terms of the breadth of his interests. This interesting collection of many of his best papers on genetics contains at the end a complete bibliography of Haldane’s scientific papers. The diversity of interests is apparent, but what strikes me is how large a fraction of his work was on genetics.

Haldane’s view of the world has often been described as less subtle than that of Fisher or Wright, both of whom were more interested than Haldane was in gene interaction. John Maynard Smith once described Haldane to me as ‘the last of the old-time mechanists’. This is on display in Haldane’s (1963) unrepentant defense of ‘bean-bag genetics’ against Ernst Mayr’s attacks. Haldane’s belief in a world of simply interacting causes is apparent throughout this volume. It is a belief less popular than ever among evolutionists, and more popular than ever among molecular biologists.

Haldane did not contribute much to discussions of the Shifting Balance Theory of evolutionary change, nor did he work much on modification of dominance (like Wright, his knowledge of biochemistry made him sceptical of its importance). Wright, Fisher, Mayr, Dobzhansky and Simpson all advocated more complex views of the world than he did. From the point of

view of later work in evolutionary genetics, his views seem naïve. But looking at molecular genetics, one gets a shock. The world of molecular biology looks as if made for Haldane’s style of analysis. Again and again gene interaction systems and developmental systems have turned out to be far more simply connected than originally expected. The biochemical kinetics that Haldane contributed to, and that has gained new attention in genetics through the work of Kacser and Burns, allows far less room for interaction than evolutionary holists would like. Is this picture simply the result of a biased selection of phenomena, or will Haldane’s unfashionable view be vindicated? Will there be new generations of mechanists?

Haldane’s viewpoint is clearest in the simple and dramatic summaries he wrote for many of his papers. His literary and intellectual style reminds me of Russell and Orwell, arising from the same intellectual and political tradition. Like them he had a passion for explaining simple truths in a way accessible to everyone. (He would perhaps not have been pleased to see this collection priced out of the reach of the proletariat.)

The present collection has 45 of the most important genetic papers by Haldane, though it leaves out a number of the parts of his famous series ‘A mathematical theory of natural and artificial selection’. I missed particularly part II, in which Haldane shows for the first time that a new favourable mutant in a large population has a probability of survival that is approximately twice its selective advantage. But his papers on the cost of natural selection, on the mutational load, on rates of evolution, and on unisexual hybrid sterility are all here, as well as his papers making the first estimate of a human mutation rate and the first application of maximum likelihood to linkage estimation.

The collection is well produced with two exceptions. My copy is printed a bit too lightly, and the photocopies on which it is based occasionally show some curvature near the inner spine, a sign of respect for the bindings of the volumes from which they were reproduced. There are useful and interesting introductory statements from Joshua Lederberg, James Crow and the editor, and each of the book’s eight sections has a short statement introducing its contents. Dronamraju has indulged himself only once, by including a quite interesting paper on the 2000-year-old multivalued logic of the philosopher Bhadrabahu.

I learned something about Haldane and about the world every time I opened this book. You will too.

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The Genetic Basis of Plant Physiological Processes. By JOHN KING. Oxford University Press. 1991. 413 pages. Price £40.00. ISBN 0 19 504857 1.

Why is it almost impossible to find a microbiology textbook which does not mention the use of mutants to dissect physiological phenomena, yet almost equally impossible to find a plant physiology text which does? In the preface to *The Genetic Basis of Plant Physiological Processes*, John King suggests that part of the reason may be that plant physiologists are unaware of the potential of genetic analysis, and he attempts to put this right by bringing together a vast number of examples where the use of mutants and genetic variants has contributed to an understanding of plant behaviour.

The book contains six chapters, dealing with a variety of processes from photosynthesis to hormone metabolism and development. Each consists of several case studies, in which large amounts of relevant data are presented and discussed concisely, but without areas of controversy being glossed over. It is therefore easily read and also a good source of reference. Although the author states that his objective is not to provide a complete account of plant physiological genetics, the coverage is broad, and shows a consistency which would not be found in a collection of reviews with the same scope. The brief introductions to each case study would in themselves make a useful physiology textbook.

I have one major criticism of the book. As a member of a generation which regards genetics as part of an analytical process which also includes gene isolation, and all the techniques that this makes possible, I found the impact which molecular genetics has already had on the subject neglected. Conversely, in addressing itself to a dying breed of pure physiologists, the book also understates the importance physiological genetics should have for molecular biology. As one example, it says little about how genes with a regulatory role, or which encode rate-limiting enzymes, might be identified genetically. This kind of information would be important for anyone wishing to manipulate a physiological or biochemical process by the introduction of transgenes. As it stands, the book appears to mark the end of a period of research, and not to herald the beginning of a new one. Perhaps this will make it an enduring classic.

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Catalog of Prenatally Diagnosed Conditions (second edition). By DAVID D. WEAVER. Johns Hopkins University Press. 1992. 415 pages. \$75.00. ISBN 0 8018 4415 0

Classification of medical disorders has always been a key to diagnosis, management and treatment. Amongst genetic and partly genetic diseases, where individual rarity and extreme heterogeneity are the rule, sorting out, ordering and naming the syndromes has been of immense importance in all subsequent studies of the cellular and molecular basis of the underlying pathology. The 'bible' for medical geneticists is Victor McKusick's *Mendelian Inheritance in Man*, now in its 10th edition, and an essential handbook of both normal and pathological variation where there is evidence for single locus control. Most genetic disorders can now be assigned an MIM number based on McKusick's classification.

The explosive growth in the science and technology of prenatal diagnosis has presented both clinical geneticists and obstetricians with a real problem in keeping abreast of their discipline. Can a particular condition be diagnosed *in utero*, and if so, how and with what degree of certainty? This question is frequently addressed to the genetic counsellor with a degree of urgency; indeed, it has to be said that there are occasions when it is asked with the patient already prepared for amniocentesis or chorionic villous biopsy. There is a crying need for an instant reference book, which will provide the initial answer to the question posed as well as a set of references to the relevant medical literature.

The first edition of David Weaver's book (1989) was an attempt to offer a comprehensive listing of disorders where prenatal diagnosis had been reported in the journals. He recorded 445 conditions and 1221 references. In the second edition there are 601 conditions, while the reference list has grown to 1848 citations. More importantly the text has been considerably enlarged, so that there is now reasonable comment on most disorders covered.

The catalogue is organized into major chapters on the big three of prenatal diagnosis – chromosome anomalies, congenital malformations and Mendelian conditions – with lesser sections on dermatological disorders, fetal infections, tumours and cysts, and others. Each condition is assigned a 'PD' number, though the rationale for these numbers is not made clear. It could be argued that matching PD and MIM numbers would have been helpful, particularly as McKusick's MIM system immediately indicates the mode of inheritance of the disorder. However, since a large majority of prenatally diagnosable conditions are not simply inherited, this would have been difficult though not impossible to achieve.

I have little doubt that Weaver's catalogue will find its place next to McKusick on the shelves in all modern medical genetic centres. It really is an invaluable reference book. It is pleasing to note that