Book Reviews

In the name of Eugenics: Genetics and the uses of human heredity. Daniel J. Kevles. Penguin Books Ltd, London. 1986. Pp. x+426. Price £4.95. ISBN 0 14 022698 2.

All geneticists would benefit from reading this excellent book. While giving an historical and richly documented account of the Eugenics movements in the U.K. and U.S.A. it also provides an extremely well written narrative of the history and progress of genetics with many flashes of insight. One of the attractive features of this work is the many fascinating glimpses of the lives and attributes of notable geneticists which it portrays. It is not just the scientific voyeur who may be entertained by these but also the much larger number who wish to understand how the development of scientific thought and theory is influenced by the personalities and idiosyncrasies of individuals particularly when these happen to be influential.

It is not immediately obvious what the description of Francis Galton clad in hunting pink and mounted on an ox carrying the rule of British Law into the tribal areas of Namibia tells us about Galton's attitude to Eugenics but it may not be irrelevant. However, the spartan attitude of Lionel Penrose as exemplified in the passage below is not out of keeping with his generally sceptical scientific nature on the one hand and his Quaker upbringing on the other: "Visitors to the Penrose household in midwinter would find the coal fires out and the family wearing overcoats against the chill. According to various familial explanations, he disliked burning excessive amounts of coal either because it overburdened the miners or because the warmth symbolised the comfort of the rich".

Kelves is an historian and an earlier book on U.S. Physicists won for him the National Historical Society Prize for 1979. In general his understanding of science as set out in the Eugenics volume is manifestly excellent (though the genetical explanations are, in places, slightly cumbersome). He writes with élan, sharply and yet with a concern for balance so important in an area so fraught with emotive opinion as eugenics. As inevitably the case in a book so rich in detail there are a few, (but very few) factual errors.

The eccentricities and errors of early human genetics and eugenics are well brought out in this book. Davenport's identification of the character of "inmate eroticism" in wayward girls (which he thought to be caused by a dominant gene) and the character of "thalassophilia" in naval officers (allegedly determined by a sex-linked recessive) are typical examples. Likewise the extent to which, at least in the U.S.A., eugenic thinking penetrated into many unrelated segments of society is well brought out. Thus, Scott Fitzgerald, better known for many other writings, composed while an undergraduate at

Princeton, a song entitled "Love or Eugenics" while in the 1920s "Fitter families" competitions were frequently featured in the programme of numerous state fairs in the U.S.A.

Some discussions of the eugenics movement have tended to suggest it has been driven by those on the right of the political spectrum. Views such as that expressed by R. A. Fisher "... opponents of Eugenics have been almost always Communists or fellow travellers. ..." may have helped to shape such attitudes. Kelves' account, however, shows clearly that in the heyday of the Eugenics movement concern for the biologically influential aspects of the quality of life was expressed by individuals from a very wide spectrum of political and religious views including Harold Laski and Bernard Shaw. He also points out that the Eugenics movement in Britain was, at its height in the thirties, concerned with environmental as well as with genetic quality.

The penultimate and final chapters, provocatively entitled "Varieties of Presumptuousness" and "Songs of Deicide" respectively, discuss the recent and contemporary context of eugenics. These chapters bring out very clearly the considerable shifts in thought that have taken place. Increasing knowledge of genetic diseases, their causes and methods for their detection has led, in many countries, to a significant level of selective abortion. Some see the advent of the availability of prenatal diagnosis as enabling the removal of zygotes with burdensome or distressing handicaps, others see it as a challenge in helping those so identified to lead a fuller life. The difficulties posed by advances in knowledge are summed up in a telling phrase: "the more masterful the genetic sciences have become, the more they have corroded the authority of moral custom in medical and reproductive behaviour".

The work of those with interests with eugenics is today wiser, more holistic and more concerned with understanding than in earlier days but the problem of defining what Kevles calls an "ethics of the use for ... genetical knowledge and biotechnical power" remains, as ever, an immensely challenging task.

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Introducing genetics. R. N. Jones and A. Karp. John Murray, London. 1986. Pp. x+325. Price £8.95 PB.

This is the kind of book the authors were "always looking for as sixth form students but were never able to find"; they have "tried to confine the amount of material to a minimum and to avoid overloading the student with an excess of information which is either too detailed or

simply non-essential" (Preface). In my opinion, the authors have overestimated the requirements of "A" and "S" level. They have helped to fill the yawning gap between over-concise accounts in the standard broad-coverage "A" level textbooks and the detailed specialist genetics texts suitable for undergraduates. The book is eminently suitable for the school library and as recommended reading for first year undergraduates but as an introductory text for the absolute beginner it has some shortcomings.

The approach is traditional, starting with cell division and life cycles followed by Mendelian inheritance, then molecular genetics, population genetics and evolution with the final chapter a useful introduction to recombinant DNA. If integration between the various areas had been made more explicitly and less by means of cross references, students would find the book easier to use. A traditional, historical approach tends to inculcate erroneous notions, for instance the first five chapters on inheritance firmly establish that each gene has two alleles of which one is dominant and the other recessive. Only after chapters on linkage and sex linkage are we told about incomplete dominance and multiple alleles.

An unfortunate complication for beginners is the use of several systems of genetic notation (where heterozygotes are represented for instance, Aa, vg/vg⁺, Th/+ , and MN). This is understandable in view of the fact that examination boards use more than one system and this book is designed to prepare pupils for "A" level examinations. Pupils at this stage tend to pay too much attention to gene symbols at the expense of learning principles. I believe that writers of "A" level books have a responsibility to educate examiners as well as pupils.

On the whole the authors show appreciation of students' difficulties with concepts and terminology and their definitions are accurate and useful. One or two terms (e.g., linkage and mutation) are given restricted definitions but are later used in a broader sense which could confuse a beginner. Other potential sources of confusion are accommodating statements like "... the sex chromosomes are *usually* different in structure and genetic organisation in the two sexes" (p. 94), "... the anticodon, which is complementary to one (*or more*) of the codons carried in mRNA" (p. 195) and "... in cases of incomplete dominance, and co-dominance, the heterozygote *may* also be distinguishable" (p. 128), all italics mine. The chapter on life cycles, in particular, is studded with misleading generalities and students already confuse nucleotides with bases without encouragement from textbooks (pp. 178-179).

Teachers are always on the lookout for suitable questions and problems. This book provides us with about 100 of them, taken from recent "A" and "S" level examination papers, grouped according to topic and following the relevant chapters. This source means that they tend to be repetitive and to use vocabulary or ideas which are not introduced until a later chapter of the book. Examination questions are designed to test a student's level of understanding at completion of a course and so are less appropriate as a learning aid for

those at a lower level of competence. However, they will enable students to familiarise themselves with the type of question and standard expected in an examination. Answers to the problems are not provided.

The book has a good glossary and index, chapter summaries and many helpful diagrams and photographs. University lecturers might confidently recommend it as preliminary reading for introductory genetics courses.

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An introduction to medical genetics (8th Edn.). J. A. Fraser Roberts and Marcus E. Pembrey. Oxford University Press, Oxford. 1984. Pp. xvi + 394. Price £11.95 PB.

This is the latest edition of a textbook which first appeared in 1940 and has since become a standard work. Like many other areas of the subject, human genetics and its medical applications has seen many changes since 1940, particularly so in the last 10 years when the techniques of somatic cell genetics and genetic engineering have opened up new ways of investigating the anatomy of the human genome from the level of the chromosome down to the nucleotide sequence of the gene. One example of this increase in our knowledge of the human genome is the number of genes mapped to chromosomes. Between 1920 and the mid-1950s, about 50 genes were mapped, mainly by classical methods involving pedigree studies. Since then at least 50 new genes have been added each year, and the total is now increasing rapidly. To these advances in the human genetic map must be added the exciting advances in our understanding of the molecular basis of inherited diseases, in particular the thalassaemias and other haemoglobinopathies. These developments have also led to improvements in the screening and detection of genetic disease, and to speculations about the future possibility of correcting genetic defects by replacing "bad" genes with "good" ones.

Although this is a valuable and scholarly text, it is not one which I would recommend to first year students, or to those students without some prior knowledge of genetics. This is not a criticism of the book, since it has never been intended as a treatise on basic genetics. Each chapter begins with a brief introduction to relevant genetic principles, and continues by expanding on clinical examples which illustrate these principles. The topics covered include examples of dominant, recessive and sex-linked inheritance, the genetics of blood groups and the molecular genetics of haemoglobins. Linkage and transmission genetics, chromosomal abnormalities and multi-factorial inheritance all receive full treatment, as does prenatal diagnosis and genetic counselling. The major addition is a chapter on genetic engineering and its implications for medicine, and an expansion of the section on the haemoglobinopathies, which are now being characterised at the molecular level.