into *Xenopus* embryos. Larsen discusses gap junction population dynamics, and the roles of the gap junction in oocyte maturation and in secretory epithelia are the subject of contributions by Beers and Olsiewski and by Peterson respectively.

The book is completed by six papers on electrotonic synapses. Electrical interactions and synchronization of cortical neurones are discussed by Dudek and Snow. Llinas deals with the role of the electrical synapse in the mammalian central nervous system. Bennett *et al.* discuss the interaction of electrical and chemical synapses. The crayfish rectifying synapse is the subject of the paper by Giaume and Korn, and the effects of neurotransmitters on electrical synapses are presented by Neyton *et al.* and by Lasater and Dowling.

As one has come to expect of books published by Cold Spring Harbor Laboratory, the book is well produced if expensive. In my opinion it is a volume which no laboratory carrying out work in the area of gap junctions can afford to be without. Indeed, I had already bought a copy for use by my group before being offered my review copy. Would anyone like to make me an offer for a second-hand volume in mint condition?

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Frequencies of Hemoglobin Variants. By FRANK B. LIVINGSTONE. Oxford: Oxford University Press. 1985. 526 pages. £29.00. ISBN 0 19 503634 4.

Ever since the discovery by Pauling in 1946 that sickle cell anaemia was a disease that could be explained entirely in terms of a mutant protein, the haemoglobin (Hb) loci have been at the forefront of advances in human biochemical genetics. At the last count there were more than 400 known Hb variants, while amongst the alpha- or beta-thalassaemias (syndromes with deficient alpha- or beta-chain synthesis) some fifty to sixty separate point mutations have been described. If one includes the glucose-6-phosphate dehydrogenase (Gd) locus with its 250 known mutants, one has a set of red cell polymorphisms and rare variants which show remarkable heterogeneity. And yet the frequencies are all determined to a greater or lesser extent by heterozygote advantage in the face of the falciparum malaria parasite.

Interest in population and racial frequencies of the Hb and Gd variants comes mainly from anthropologists and others studying the migration patterns of ethnic groups. Thus, the frequency of *Hb S* genes amongst American blacks shows that they probably come from three major areas in Africa: Benin in Nigeria, Central Africa and Senegal. Hb E is found at high frequencies to the east of Calcutta, *Hb S* to the west; the border of these distributions corresponds to the major ethnic interface between Indo-European speakers to the west and Tibeto-Burman speakers to the east. The virtual absence of red cell variants amongst Amerindians confirms their migration from the Bering Strait into a malaria-free world.

The collecting and cataloguing of human genetic variants is a valuable but thankless activity. Mourant and his colleagues did it for the blood groups and other red cell and plasma polymorphisms. The second and (probably) last edition of *The Distribution of Human Blood Groups* appeared in 1976, and could not have made much profit for Oxford University Press. It is to this publisher's credit that they have again performed a service in supporting another huge compilation of essential genetic data.

The raw statistics of Frank Livingstone's book tell their own story. He has surveyed the Hb and Gd variants and the incidence of thalassaemia, ovalocytosis and Gd deficiency in 150 different ethnic and geographical groups around the world. There are over 8000 entries set out in dictionary-style, and no less than 2000 references. One imagines that it is all there. My only criticism is that he might well have followed Mourant's lead and imposed some meaning on the data by setting them out in maps or flow-charts of migration.

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Essential Medical Genetics. By J. M. CONNOR and M. A. FERGUSON-SMITH. Oxford: Blackwell Scientific Publications. 280 pages. 1984. £7.50. ISBN 0 632 01331 1.

There are at present some 40 genetic counselling centres in Britain (compared with 450 in the USA), and this number, though rising, appears to be still inadequate. In the West of Scotland the authors counsel about 1000 families annually from a population of 3 million, and consider that another 2000 families need genetic counselling, of whom 'a substantial number' do not receive it.

In the UK the Congenital Disabilities (Civil Liability) Act of 1976 means that legal action can be brought against a person whose breach of duty to parents results in a child being born disabled, abnormal or unhealthy; so medical practitioners need training in medical genetics – at least to the stage where they can recognise problems which need referral to a clinical geneticist, though preferably not to the stage where they consider they know all the answers themselves. Most medical and dental training now includes a course in medical genetics, and this book is designed for such students, based on the teaching and counselling experience of the authors in Glasgow.

The first 10 chapters (120 pages) cover the basic

https://doi.org/10.1017/S001667230002471X Published online by Cambridge University Press

principles of human genetics, with plenty of illustrations and tables, and should provide a very adequate introduction to genetics for those new to the subject. The rest of the book consists mainly of 10 chapters (126 pages) on clinical applications of medical genetics. This covers all the main conditions, with useful summaries, where knowledge is available, on their diagnosis, prognosis and genetics and a number of photographs. The scientific aspects of genetic counselling are discussed in some detail. Finally, there is a short and simple statistical appendix, a self-assessment section of about 260 statements to be classified as true or false by the student, with a key; a glossary, a page listing reference text books, and an index.

This book packs a great deal of information into its 280 pages, and should meet its purpose admirably. The price is commendably low, and, in view of the very wide interest in medical genetics, it deserves to find a place on the shelves of many biological libraries. Some readers will regret the lack of more detailed references, and non-geneticists may have difficulty in understanding some of the figures, where more labelling and more extended legends would make it unnecessary to consult the class demonstrator.

Examples are: Fig. 3.9 deserves an arrow to mark the fluorescent (misspelled in legend) Y chromatin, since there are possibly two or more spots visible; Fig. 3.14 leaves one free to deduce that the chromosome pair shown in position 2 contains two pairs of gorilla chromosomes, but these should be labelled and a reference to comparisons with other primate chromosomes would be worth while here. Fig. 4.11 does not show up the Barr body very clearly, and might be replaced by photographs of cells showing one and two Barr bodies, all labelled with arrows. These, along with occasional misprints, are minor points.

It should also be noted that there is nothing in this book of obvious relevance to dental practice (haemophilia, drug sensitivities?), and dental students may feel left out in the cold. The photograph illustrating haemophilia A is not very informative, because of its rather poor quality.

Finally, I must congratulate the authors on their deduction that Noah was a homozygote for generalized albimism (page 71). Whether their quotation from the Book of Enoch really applies to Noah, however, is questionable. Lacking carbon dating of Noah's Ark, we can guess that he probably lived (if an actual person, which is very questionable) 3000 years or more B.C. But the quotation about Noah must have come from either the Ethiopic Book of Enoch, written in the second and first centuries B.C., or the Slavonic Book of Enoch, written between 30 B.C. and 70 A.D.: both books are considered multi-authored, and of doubtful historical reliability. I suggest that one of these many authors saw (or fathered) an albino boy, was struck with his beauty and wrote him into the script. Moreover, on a more literal view of the Bible, Noah and the Ark must have formed a genetic bottleneck, so many albino children would have appeared among his descendants and would have been recorded in the Bible.

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The New Genetics and Clinical Practice. By J. WEATHERALL. Oxford: Oxford University Press. 206 pages. 1986. £8.95. ISBN 0 19 261489 4.

This is not just another textbook of medical genetics: it aims rather to alert us to the growing importance of genetically related human disease in the developed countries, and to review the successes, prospects and problems in applying the new techniques of molecular genetics to this major health area. Professor Weatherall expresses a sense of urgency because the rapid advances in human molecular genetics and molecular pathology are having insufficient impact on the clinical services, particularly in Britain. There are, of course, reasons for this lack of enthusiastic response, especially the chronic lack of funds, with too much of what there is being syphoned off into high technology medicine, a generally conservative attitude in the medical profession, and the problems which small overworked clinical departments have in keeping up with the new knowledge.

Weatherall's book makes an admirable attempt to deal with the last of these problems by providing a simply written and very well referenced review of the current state of the applied art of human molecular genetics. Successive chapters discuss 'the frequency and clinical spectrum of genetic diseases', 'how genes work and how they can be examined by the tools of the new genetics', 'the molecular pathology of single gene disorders', 'the molecular pathology of complex gene systems: immunology, cancer and metabolism', 'the prevention of genetic disease', 'the treatment of genetic disease', 'the implications of the new genetics for clinical practice in the future', and 'ethical issues and related problems arising from application of the new genetics to clinical practice'.

The chapter on the prevention of genetic disease points out that prenatal diagnosis, followed where necessary by pregnancy termination, is the only present method of dealing with chromosomal anomalies and single gene disorders. One problem is the relatively late stage of termination made possible by amniocentesis. Chorion villus sampling is a new method of obtaining foetal DNA early enough to make pregnancy termination possible within the first trimester: this has great promise if its good safety record in recent trials, still subject to argument, can be confirmed. Foetal diagnosis can lead to direct recognition of a few single gene disorders where the mutation changes a restriction site pattern, but much broader progress is coming from the discovery of increasing numbers of specific genetic markers in the form of RFLPs (restric-

https://doi.org/10.1017/S001667230002471X Published online by Cambridge University Press