much of the speculation in this field is bedevilled by the search for simple answers to questions of very great complexity. Consider, for example, questions of how changes in genome size affect the phenotype or whether some of the "extra" DNA is of a selfish variety. To my mind it is like asking what are the consequences of polyploidy upon growth and development of the phenotype and expecting a simple answer. In many species the consequences of polyploidy are, of course, lethal and even where tolerated the consequences to the cell and to the organism are by no means predictable other than in the most general terms. The same can be said in relation to the effects of B chromosomes. In many species their effects, on growth in general, are deleterious to the point of severely reducing the capacity for survival of individuals, particularly under conditions of stress. In other species, under similar conditions, only individuals carrying B's will survive. In the former, as R. N. Jones relates in this book, the B's are certainly selfish and maintained within populations despite their drastic effects upon fitness. In the latter case the B's confer advantage of a high order. While these cases relate to whole chromosomes and complements there are surely parallels enough at a molecular level to reinforce the need for caution against formulating generalised, simplistic questions about problems of such immense and varied complexity.

To return to the molecular, one such parallel is provided by observations showing, in some species, that heterochromatic blocks, comprised of highly repetitive DNA sequences, generate strong chiasma interference at meiosis. In others they do nothing of the kind. The question as to whether highly repetitive DNA sequences affect the phenotype is clearly not a particularly useful one in this instance, even if asked specifically in the context of chromosome behaviour at meiosis. For a start there is more than one answer which may, in turn, depend upon the particular DNA sequence, its location within the chromosomes, the genotype which bears it and the environment in which the observations are made. With such examples in mind one can but be sceptical about some of the arguments and speculations which abound in this subject. A case in point is that presented by the editor to the effect that change in genome size is achieved as an indirect but mutually adaptive response to selection for change in cell size. His argument, and the evidence which he adduces in its support, I find convincing enough. Yet I am by no means convinced that the opposite is not true also, that variation in cell size is to a large degree directly dependent on variation in genome size. I am not convinced either that the editor's argument resolves the long-standing C-value paradox, nor that the paradox along with other related puzzles will be disposed of at one stroke. It will take many.

I think it is time that we should approach the problems of genome size variation in terms less general and sweeping. This means recognising that the DNA sequences whose variation contributes to the evolution of genomes are of many kinds, with many consequences. They may be neutral, advantageous or deleterious in their effects. They may be selfish or unselfish and different things in different genotypes and different environments. This means, also, approaching the subject in a more modest vein and asking not what variation in genome size signifies in general terms, but what the variation in particular DNA sequences signifies in different genotypes, in different conditions. The answers will be many and varied, unspectacular perhaps but nearer the truth.

Having taken advantage of a reviewer's privilege of blowing off some steam of my own on the subject let me conclude by saying that I enjoyed the book and I recommend it.

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The principles and practice of electronmicroscopy. Ian M. Watt. Cambridge University Press, Cambridge. 1985. Pp. viii+303. Price £40.00, $49.50 US.

This book has been written for anyone whose work encounters electron microscopy, whether it be in technology, biology or medicine. Its purpose is to describe in simple terms the range of instrumentation and preparative techniques currently available. This is a valuable aim: there are increasing numbers of biologists, including geneticists, who are customers rather than operators in an EM unit and it is important for them to appreciate how their micrographs are produced and the limitations of the data they contain. There are also biologists who regularly operate an EM who may want, and need, to know more about what lies behind the flashing switches on the console. Ian Watt's book fills this niche neatly, lying between the general cell biology texts, many of which briefly discuss electron microscopy, and the more advanced and detailed research tomes such as the two multi-volume series on techniques edited by Glauert and Hayat. In such books it is not easy to find a simple and quick answer to a basic practical question.

Ian Watt deals with the issues in a clear and crisp style and usually takes care to explain the profuse jargon in which electron microscopy is steeped. The book is well illustrated with high quality micrographs and line drawings. There are five chapters, beginning with an introduction to the basic optics of light and electron microscopes. The electron microscope family, *i.e.*, the two main types, the transmission EM (TEM) and Scanning EM (SEM), along with their derivatives and accessories are discussed in Chapter Two. The third chapter concerns the rudiments of specimen preparation and micrograph interpretation and specialised techniques are discussed in Chapter Four. Examples of the use of electron microscopy, including 12 different case studies are given in Chapter Five. In the appendix various practical and technical aspects are considered including vacuums, thin film preparation and the gen-

eration and analysis of X-rays in both TEM and SEM. There is an extensive bibliography which cites both the relevant literature and the names and addresses of manufacturers and agents. A useful, further reading list is included at the end of each chapter.

While the aims of the book are laudable, its practical value to biologists is somewhat limited. The basic problem is that the scope of the book is too wide. In a single volume of 300 pages, wide coverage of the subject does enable an integrated treatment across research boundaries, but the corollary is that each area can only be covered superficially. Material Science is actually well presented but the treatment of biological topics is rather weak. For example, on fixation, an obsessive subject for most biologists, we are merely told that "materials destined for thin sectioning are firstly fixed with a reagent such as osmium tetroxide or glutaraldehyde to preserve their structure". To be fair, other aspects are given more coverage, like thin sectioning, but generally the depth of treatment is insufficient to be of real value.

The attempted scope also affects the structure and layout of the book. For example, in Chapters Three, Four and Five, the integrated, multi-field approach has resulted in topics being covered repetitively but from slightly different angles. This is particularly true of specimen preparation and micrograph interpretation.

Another aspect of the layout is the excessive length of many of the figure legends, which often makes it difficult to grasp the salient features of the illustrations. Presumably this is an economy measure to reduce the amount of text. The arrangement of some of the figures is also annoying, in one example the legend filled over half a page and the 10 constituent micrographs were spread over five pages.

In summary, the aims of the book are laudable, biologists will find a great deal of useful background information on optics and instrumentation. However, with respect to biological applications specifically, especially specimen preparation and micrograph interpretation, the coverage is too superficial for the research worker. For the biologist, including the geneticist who wishes to deepen his knowledge and understanding of electron microscopy, the definitive tome must remain Geoffrey Meek's excellent "Practical Electron Microscopy for Biologists", even though the last edition was published in 1977 and is beginning to seem a little dated.

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Selected papers on population: 9: Calculating age without asking for it. Gilles Pison. INED-INSEE-ORSTOM—Ministère de la Coopération, Paris. 1985. Pp. 32. Price not quoted.

This short monograph examines some of the pitfalls in attempting to estimate the age and age structure of a specific population—the Fula Bande of Eastern Senegal. Many of the pitfalls would apply to any population in which vital registration is non-existent or insufficient.

Pison describes how an indirect method can be used to obtain individual ages as "near reality as possible". The historical calendar method of estimating age (based on the premise that an individual can fit his own life history around a series of known national dates) is rejected since humans do not always remember personal dates relative to national events. Pison found that it was much better to ask people to classify the important events happening in their own village and then use these dates as a guide.

Furthermore Pison was able to use two other classifications. The first classified all the occupants of a village by birth rank. The method assumes that everyone knows each other and older members are able to say which of two inhabitants was born first. (There are obvious disadvantages to this method since members born outside the village will be unclassifiable). The other method relies upon identifying circumcision groups. Since circumcision is such an important event in the life history of an individual, details of membership, etc. are recalled with considerable accuracy.

However the age at which parents choose to have their son circumcised depends upon customs and practices which vary between families and between villages. Consequently Pison had to assume a mean age at circumcision as well as the distribution of ages within these groups. Although some degree of imprecision remains, ages estimated using these two methods provide a considerable improvement over the more traditional methods. However as Pison admits it is extremely time consuming and there is a tacit assumption that the population retains its traditional structure.

In conclusion this paper will be extremely useful to research workers (such as demographers, nutritionists and epidemiologists) working in traditional societies where accurate ages are not known.

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