

each of these 24 sections according to various disease categories (e.g., lymphoma, leukaemia, carcinoma etc.).

The leukaemias are classified by the French-American-British (FAB) system and the banded karyotypes are described by use of a modification of the short form of the international system of chromosome nomenclature (ISCN). These minor modifications are explained in the section on "use of the catalogue". The already well documented Ph¹ chromosome (*t(9:22)*) is excluded from the list but all other clonal aberrations have been recorded. A reference is provided for each entry.

Cytogenetic data plays an increasing role in the diagnosis, prognosis and treatment of cancer, and is being accumulated at an overwhelming rate. It is therefore extremely difficult to extract complete and balanced data from the vast disseminated literature on cancer cytogenetics.

This catalogue is a comprehensive source of detailed information on chromosome involvement during cancerous processes. It is arranged in a simple systematic manner and provides an excellent means of rapid literature review, allowing all previous reports of a particular chromosome abnormality to be identified easily. This book is an essential laboratory reference text, highly recommended to all cytogenetic laboratories engaged in both clinical diagnosis and research.

The information listed will also prove valuable to molecular geneticists and others who are working on oncogenes. The catalogue facilitates assessment of the concordance between the growing numbers of cellular oncogenes and the nonrandom involvement of certain chromosome breakpoints in human cancer.

The only slight constructive criticism that I can make is that a short summary at the end of each chapter would have been welcomed. This could perhaps highlight those chromosomes frequently participating in certain cancers and the short sections of proposed text would have broken the unavoidable monotony of the tabular material.

Finally I must pay tribute to the effort and stamina of the author in achieving this marathon task.

DR JESSIE L. WATT
Medical Genetics
Department of Genetics
Aberdeen University

The mathematical theory of quantitative genetics.
M. G. Bulmer. Oxford University Press, Oxford.
Paperback edition, 1985. Pp. x + 255. Price £12.50.

This is a reprint, in paperback, of Dr Bulmer's excellent book first published in 1980. There are a few minor amendments and a very welcome reduction in price.

As the title indicates, the book is about the mathematical theory. The level of mathematics required to understand it is rather high. Matrix algebra is used

frequently and the notation of set theory in places, besides many mathematical procedures that are not the normal tools of genetics. I found it hard going. There are, however, helpful synopses to introduce each chapter saying what the problems to be developed in it are. And, when mathematical conclusions are reached, their meanings are usually stated in words, and often exemplified by real data.

The theory is developed with an impressive combination of conciseness and rigour which I am sure will delight those able to think in the language of mathematics. Dr Bulmer is not content to gloss over assumptions that are commonly made in less rigorous treatments, for example that distributions are normal and regressions linear. When such assumptions are necessary they are proved to be true, or if not true the error introduced is assessed. An assumption commonly made is that of linkage equilibrium, or at least that the effects of disequilibrium are usually negligible. Linkage disequilibrium is a recurrent theme throughout the book. Its consequences are particularly important in connection with selection, a subject developed by Dr Bulmer in 1974 and 1976. The reduced variance in selected parents generates linkage disequilibrium and reduces the genetic variance in the progeny which in turn reduces the response in the next generation. The effect on the response is shown to be by no means negligible.

Selection is dealt with very fully in three chapters. The forms of selection examined are truncation, stabilising, disruptive, frequency dependent, density dependent, and selection for different optima in different niches. The changes of mean and of variance are deduced, and whether the mean remains stable when selection is relaxed. The question of when genetic variation is maintained by selection alone or in combination with mutation, and the circumstances in which competition between species is expected to lead to character displacement, are particularly relevant to those interested in natural populations and evolution. Many of the results deduced by theory are illustrated and confirmed by computer simulations. It is perhaps noteworthy that the chapter on Natural Selection does not mention Fisher's "Fundamental Theorem", an omission which does not seem in the least to impair the chapter. The chapter on Selection Indices becomes more practical. It considers the various ways of maximising genetic improvement, particularly of farm animals, and deduces the optimal allocation of resources.

There are problems at the end of each chapter with answers at the end of the book. There is an author index and a rather inadequate subject index occupying just one page.

D. S. FALCONER
Department of Genetics
University of Edinburgh