statistical) approach of quantitative genetics (for example, Falconer, 1960). The concept of heritability is not introduced until page 195. Unfortunately, the opportunity is missed to match the notation of the 2 approaches and show where they overlap.

Because so much of the material and methodology deals with pure breeding or inbred lines of plants and their crosses, the book will probably be of little interest to medical geneticists dealing with family pedigree data or data from different kinds of relatives. Its main asset will be that it can give a quick and simple insight into these alternative methods of genetic analysis of continuous traits.

C. SMITH

Guidelines for Research Involving Recombinant DNA Molecules

The research covered by these guidelines has provoked unprecedented public interest, and has already produced fascinating results in genetics. There is no doubt that the results are so exciting that work in this field will expand greatly and continue to be important for many years.

The guidelines cover experiments in which different segments of DNA (for example, a mammalian structural gene and a bacterial plasmid) are joined together by chemical methods and then have the ability to infect and replicate in some host cell (for example, Esch. coli). In this way large amounts of 'cloned' DNA can be prepared quickly and cheaply. There is also the possibility that in some cases the bacteria could produce the protein product of a mammalian gene (for example, a peptide hormone). Fears have been raised that either all or some of the experiments which could be carried out present a potential biohazard. This feeling has been increased by the indiscriminate use of the evocative term 'genetic engineering' to cover all such experiments. The National Institute of Health has tried to assess the potential hazard of a variety of manipulations, and the guidelines present detailed experimental procedures to deal with most situations, at least in laboratories dependent on NIH funding. The position is unusual in that, despite much guessing and speculating on the hazards, very few experimental data are available.

The guidelines categorise experiments according to the source and purity of DNA and the disablement, or inability to live outside an experimental environment, of the bacteria used for growth. They then specify a level of containment to match the estimated potential hazard. They recognise both physical (P numbers) and biological (EK numbers) containment and express their hope that better forms of biological containment will be developed.

Physical containment varies from minimal, where the main protection is use of good microbiological practices, to high, a specially constructed laboratory designed to contain micro-organisms that may cause serious epidemic disease. However, in addition to defining all levels of containment, the NIH guidelines state that certain experiments may not be initiated at the present time. These include cloning of DNA from oncogenic viruses or the deliberate formation of recombinant DNAs containing genes for the biosynthesis of potent toxins (for example, diphtheria toxins or snake venoms). An interesting section of the guidelines deals with 'Roles and responsibilities'. Much responsibility devolves onto the principal investigator and the institutional biohazard committee. As well as having technical expertise, the biohazard committee must be able to assess the acceptability of its decisions to the local community and its Minutes must be available for public inspection.

Extensive appendices provide supplementary information on physical containment and discussion of alternative vectors.

The details of the guidelines are constantly being brought up to date and the researcher involved in this field needs to be ever alert. Evidence of this may be seen in the criticism of the Californian workers who cloned the rat insulin gene (see Science, September 30). British research workers use a different set of guidelines (set out in the Williams report, HMSO), which are roughly comparable and which are administered by a Genetic Manipulation Advisory Group. Most other countries are using one or other of these sets of guidelines.

S. MALCOLM


The publication of a volume from Japan on this important topic raised hopes in the reviewer that this book might prove to be a valuable source of original experimental data and ideas from Japan in the field of genetics and epidemiology. Not only has one had the suspicion that much important Japanese work is neglected or entirely ignored in the Western literature,