Genes in time and in space

R.J. Berry

Ecological Genetics. By David J. Merrell. Pp.500. UK ISBN 0-582-46349-1; US ISBN 0-8166-1019-3. (Longman/University of Minnesota Press: 1982.) £15, $25.

THIS is almost a very good book. Merrell has set out to write the sort of textbook which includes new ideas as well as regurgitated concepts and examples. In his case, the positive intention has been to consummate a union between population genetics and population ecology. As he says, this has been delayed for a number of reasons, not least because "population geneticists often assume a constant environment while population ecologists usually assume that all members of a population have identical genotypes". His explicit object is to bring together the results and concepts of ecologists and geneticists into one coherent whole.

This aim is well worthwhile: unexplained ecological variation may be largely due to genetic heterogeneity, whilst the models of geneticists need frequent tempering with muddy reality. Indeed, population biologists have caused problems for themselves because individuals, eminent and erudite though they may be, have repeatedly failed to see their organism — or population(s) — in all its relevant complexity: de Vries thought species arise through saltation (a misapprehension still being debated); the attitude of antagonists in the neutralism–selection debate of the 1970s could be predicted from their scientific background (the argument was really one between theoreticians and naturalists); life-table determination has often seemed to be an end in itself, although any life-table is dependent on environmental, biotic and genetic interactions; and so on.

Merrell has attempted to make sense of these many-sided confusions. He has not quite succeeded. One reason is that he is more familiar with *Drosophila* than the rest of the living world put together (although he has also worked with frogs), and he tends to use unadorned citations to illustrate his arguments, rather than developing relevant examples; another is his restricted choice of examples, in many cases referring to early work only. For example, *Cepaea nemoralis* is one of the few species where ecology has been fairly closely linked with genetics, but no paper more recent than 1968 is mentioned; no reference is made to speciation in *Partula*; and Hawaiian *Drosophila* is only noted in passing.

But perhaps the real reason for Merrell's failure is that ecological genetics itself may not yet have come of age; perhaps its components need to develop in their own right before they can be brought together. If so, Merrell's book may be a useful catalyst, as was Dobzhansky's *Genetics and the Origin of Species* to a previous generation. *Ecological Genetics* represents a noble attempt at synthesis. It could be improved fairly simply by including and expanding upon more biological examples; some sections are very good (such as those on dominance and competition), whilst others ramble somewhat and need shortening (the neutralism chapter is far too long, while the evolutionary implications of MacArthur and Wilson's theory of island biogeography are not explored); and the book needs up-dating (there are references to 1978, but the main literature survey stops at 1976).

As it stands, the first edition of *Ecological Genetics* should be skimmed through by population ecologists and geneticists *sensu stricto*; but properly revised the second edition could easily become required reading for that significant part of the biological community which acknowledges the existence of a world beyond the laboratory. □

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Chemistry at war

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A Higher Form of Killing. By Robert Harris and Jeremy Paxman. Pp.288. ISBN 0-7011-2585-3. (Chatto & Windus/Hill & Wang: 1982.) £9.95, $14.95.

CHEMICAL warfare is a subject which arouses fierce passions. Its apologists claim that it is both efficient and "humane"; it affects people but not objects, and it injures more than it kills. Victims of gas poisoning on the other hand, would probably prefer to quote evidence from an expert on the subject, Wilfred Owen:

Gas! Gas! Quick boys — An ecstasy of fumbling,
Fitting the clumsy helmets just in time;
But someone still was yelling out and stumbling,
And floundering like a man in fire or lime . . .
Dim, through the misty panes and thick green light,
As under a green sea, I saw him drowning.

One person who did not see gas warfare through Owen's eyes was Fritz Haber. The 1919 Nobel Prize winner in chemistry for his part in the Haber–Bosch process — the conversion of nitrogen to ammonia — Haber was also the pioneer of modern gas warfare. To him it was "a higher form of killing". This was how he described it in the acceptance speech in Stockholm after the war, and his phrase provides Robert Harris and Jeremy Paxman with their title.

Recent allegations about the use of chemical and biological warfare (CBW) and the history of the development of such weapons form the basis of their account. The book is not a comprehensive treatise on CBW — that would be impossible to write in a single volume — it is more of an outline of the subject, except where it deals with the development of CBW in Britain during the Second World War. Here the authors have retrieved previously classified material and they deal with British war preparations in absorbing detail.

Appropriately, Harris and Paxman begin with the use of poison gas — by the German army — near Ypres in April 1915. They describe the military consequences in some detail, but any lasting impression of the use of chemical warfare in the fields of France and Flanders must be of the appalling casualties these weapons caused. Officially, 180,983 British soldiers were gassed, of whom some 6,062 died. According to the authors, however, the statistics are far from complete. They omitted numbers of men gassed in 1915; gas casualties found by the enemy; any of the quarter-of-a-million British soldiers missing in action; any soldiers who were killed in action; or even gas casualties who died after being evacuated to Britain. As for the German and Russian records, these are probably equally unreliable. In view of this, any argument about the supposedly "humane" features of chemical weapons which uses statistics from the First World War to prove that the weapons injure, rather than kill, should be treated with some caution.

The Germans may have been the first to use gas, but the Allies were not slow to respond. As the war progressed more sophisticated chemical weapons emerged from the laboratories of both sides, thousands of scientists and soldiers being recruited to screen chemicals for the ideal weapon. After chlorine, came phosgene; mustard gas followed phosgene. Because the gas was not visible, most troops failed to even don their gas masks. By the following morning most were almost blind and in the ensuing days, many died, like other cases of gas poisoning, with lungs and throat stripped of any lining and heavily congested.

During the First World War, the disadvantages of chemical weapons — problems in deploying them and fear of retaliation in kind — had become apparent. Nonetheless, in 1940, it is clear that Winston Churchill saw them as adding

A second edition of T.G.R. Bower's *Development in Infancy* has just been published by W.H. Freeman. On its first appearance in 1974, Jerome Bruner judged the work to be "one of the major books on human development to be written during the last decade" (*Nature* **252**, 514; 1974). Prices of the new edition are hbk £14.80, $20; pbk £6.90, $9.95.