

## Recipe for bad science?

John Maynard Smith

**Beyond Natural Selection.** By Robert Wesson. MIT Press: 1991. Pp.376. \$29.95, £24.95.

AFTER *Beyond Neo-Darwinism* (M.-W. Ho and P. T. Saunders, Academic Press, 1984), we have *Beyond Natural Selection*. Wesson's book has the advantage over that edited by Ho and Saunders of the coherence that comes from being the product of a single author, although coherence is perhaps not the first word that springs to mind on reading it. Essentially, Wesson's argument is that the orthodox account of evolution in terms of natural selection of random genetic variation is inadequate, and must be supplemented by such concepts as self-organization, the autonomy of the genome, and the inherent tendency of organisms to evolve greater complexity. To support this, he adduces a series of familiar arguments – the inadequacy of reductionism, the gaps in the fossil record, complex adaptations that would be useless unless complete, selectively neutral variation and the persistence of apparently maladaptive characters.

How good a job does Wesson do? I will consider his treatment of sex and of social behaviour: both these topics have been the subject of much recent research by orthodox darwinists, essentially because both do seem at first sight to present challenges to their theory. If natural selection favours those types that multiply most successfully, why should two cells fuse to form one (sex) and why should some individuals not reproduce at all (sterile castes in social insects)? Does Wesson understand this recent research? Has he anything better in the way of explanation to offer?

In the case of sex, the answer to both questions is no. The chapter on sex contains much fascinating information. Unfortunately, there is no sign that he has read or understood any of the recent work on the subject. There is no reference to the books by G. C. Williams, Graham Bell or myself, and little mention of the ideas contained in them. There is no mention of the recent debate about the role of parasites in the evolution of sex and in sexual selection, or of A. Kondrashov's ideas about recombination and deleterious mutation. Wesson does not understand population genetics arguments. For example, he writes that "it is not known why inbreeding should necessarily be harmful". In fact, almost everyone agrees that a major cause of inbreeding depression is homozygosity

for deleterious recessives: the only debate is about whether this is the only cause. His confusion about inbreeding means that he does not understand the theories that have been proposed to explain the evolution of mechanisms, such as distyly in plants, that prevent selfing. At the end of the chapter, he writes (correctly), "Sex is not necessary to permit genetic change", but then spoils it by adding, "it seems somehow to make it more possible for organisms to change usefully". I take it that by 'organisms' he means populations; organisms do not evolve. But the real damage is done by the word 'somehow'; we understand very well why, and in what circumstances, sex enables a population to evolve more rapidly. Wesson ends by saying, "one must look for nondarwinian factors", but fails to come up with any suggestions. In fact, a number of plausible mechanisms for the origin and maintenance of sex have now been proposed; the problem now is to decide on the relative importance of these processes.

The chapter on social behaviour is more interesting. Wesson does not understand Hamilton's argument about inclusive fitness. He explains it quite well, but then continues, "It is not explained why sharing genes by immediate inheritance is more important than sharing genes by distant inheritance . . . The more homogeneous the population, the less significant is the familial relatedness of individuals."

I think of this, with affection, as 'Tinkle's fallacy'. Don Tinkle worked, at one time, on a parthenogenetic lizard consisting of a single clone of genetically identical individuals. He once asked me whether I did not find it puzzling that, if he put two females together in a cage, one would kill the other: after all, they shared almost all their genes — it is also the seventh of Richard Dawkins' "twelve misunderstandings of kin selection" (*Z. Tierpsychol.* 51, 184–200, 1979). But after this, the chapter improves. Wesson points out the difficulties that arise because of multiply mated queens, and nests with several queens, and argues for the importance of social dominance. Fair enough, but there is nothing remotely nondarwinian about social dominance. He then discusses the analogy between insect colonies and multicellular individuals, but misses the point that cooperation between the differentiated cells of an individual is stable only because all the cells arise from a single egg cell, and hence (apart from somatic mutation and occasional chromosomal elimination) are genetically identical. He does not offer any new ideas about the evolution of animal societies.

It is indeed the absence of new ideas that is so infuriating. Wesson appeals to

the 'autonomy of the genome' and to 'self-organization'. I do not know what these terms mean. The autonomy of the genome defeats me. At first sight it is manifest nonsense: no genome would get far without cytoplasm or an environment. Self-organization is equally trivially true. Of course an organism must organize itself: there is no-one out there to do the job for it, unless you imagine God painstakingly putting it together. Wesson also has a habit of explaining complexity by saying that things have an inherent tendency to become complex. This is precisely what Darwin objected to in Lamarck. The objection is that it explains nothing: it is like saying that a man is fat because he had a tendency to obesity.

Wesson uses one argument that deserves more attention than I have space for here. According to the anthropic principle, if (as we know to be the case) there are organisms able to think about their own origins, then whatever was necessary for their evolution must have been the case, however unlikely. There is a certain insane logic in this argument, but, if accepted, it spells the end of all attempts at historical explanation, including any attempt to explain evolution, which was a unique series of historical events. I will have to return to this topic some other time.

It is clear why Wesson wants to refute darwinism. He quotes Jacob Monod's remark, "Man at last knows that he is alone in the unfeeling immensity out of which he emerged by chance", and continues, "If we had, in the name of truth, to believe that humanity is the insignificant by-product of random change, selected by chance and material conditions, we should accept this valiantly and intelligently, although the truth could be dangerous for civilization and our well-being." (In passing, I think it is much more dangerous that a man should believe that he is uniquely favoured by God). Later, Wesson writes, "If one consistently adhered to the Darwinist canon, the logical social ethic . . . would be to join with genetically kindred persons to get the better, reproductively, of all others, ultimately to replace them by whatever means available." Because he does not want to be either despairing or selfish, he needs, if at all possible, to show that Darwin was wrong. This seems to be a recipe for doing bad science.

As Monod himself pointed out, we cannot derive our values from science: indeed, we cannot even do science unless we come to it with some prior values, not least a love of the truth. □

John Maynard Smith is in the Department of Biology, The University of Sussex, Falmer, Brighton, Sussex BN1 9QG, UK.