reviews

Caricature of Darwinism

R. C. Lewontin

The Selfish Gene. By Richard Dawkins. Pp. xi+224. (Oxford University; London, 1976.) £2.95.

POWERFUL theories that offer to explain large parts of the world of appearances carry, immanent within them, their own caricatures. Indeed, their liability to absurd reduction is precisely in proportion to their original generality and power. There are inevitably those who, dazzled by the great insights of others but understanding them only superficially, push these theories far beyond their valid domain of explanation. This has been the fate of the three powerful conceptual systems that have had such an immense impact on the life and thought of the nineteenth and twentieth centuries: Marxism, Freudianism and Darwinism. Marx's historical materialism has been vulgarised by an 'economism' that attempts to explain the last petty detail of social organisation and history by direct reference to 'material conditions'. Carried away by Freud's theories of the unconscious, and especially the transformations of behaviour described as repression, inversion and sublimation, facile 'psychologism' has searched for an explanation of the French Empire in Bonaparte's relationship with his parents.

The caricature of Darwinism which sees the wonderful workings of natural selection in every aspect of the living world and its artefacts, began immediately with the publication of the *Origin of Species*. The enthusiasm that led the early partisans of Darwin to see every difference in the morphology and physiology of organisms as adaptative, also led them into speculation no different from the baroque rationalisation of Paley's *Vestiges of Creation*. Evolutionary theory was rescued from its excesses by Huxley's ideas of allometric growth which enabled us to understand that many morphological features of organisms are simply epiphenomenal consequences of relative changes in different growth fields or in different dimensions, and by Sewall Wright's demonstration that precisely the same selective forces can lead different populations to quite different phenotypic compositions because of random processes operating in a field of multiple stable equilibria. Thus, we no longer feel called on to explain in an adapative mode why the Indian rhinoceros has one horn whereas the African rhinoceros has two.

For more than forty years evolutionary theory has remained free of a naive selectionism, but in recent times there has been a return to the extreme form of the adaptationist program, as evolutionists have rediscovered behaviour. Beginning with the undoubted truth that behaviour must, like morphology and physiology, be subject to the force of natural selection, the new Panglossians end with the old error that *all* describable behaviour must be the direct product of natural selection. The scientific manifestation of this trend can be seen in every issue of say, *The American Naturalist*, which is permeated by the language, if not the formal apparatus, of game theory, and in the development of the school of 'sociobiology', among whose more extraordinary productions is a recent highly praised dissertation explaining *fellatio* and *cunnilingus* among the upper middle classes as an adaptive response to constant resources. The popular manifestation of this new caricature of Darwinism reaches its most extreme form in *The Selfish Gene* by Richard Dawkins.

The Selfish Gene is the result of Dawkins' discovery of vulgar Darwinism. "We are survival machines—robot vehicles blindly programmed to preserve the selfish molecules known as genes. This is a truth which still fills me with astonishment" (preface). I too find Dawkins' description of the relationship between gene and organism rather astonishing. The theme of our passive manipulation by our gene captors is repeated over and over. "They swarm in huge colonies, safe inside gigantic lumbering robots, sealed off from the outside world communicating with it by tortuous indirect routes, *manipulating it by remote control*. They are in you and me; they created us *body and mind*; and their preservation is the ultimate rationale for our existence. They have come a long way, those replicators. Now they go by the name of genes, and we are their survival machines" (p21). "It leaps from body to body down the generations, *manipulating body after body* in its own way and for its own ends, abandoning a succession of mortal bodies before they sink into senility and death" (p36) (my italics throughout).

The form of reasoning that leads Dawkins, or, rather, the evolutionary theorists of whom Dawkins is the enthusiastic reporter, to this view of gene and organism is exemplified in the discussion of crowding and fertility. It is observed that in some animals overcrowding reduces the birth rate. Given this observation, Dawkins then asks "Why does natural selection favour females who reduce their birth rate when the population is overcrowded?" He then contrasts a population selection argument, unfavourably, with a "selfish gene" theory. But both arguments assume without proof that females reduce their birth rate for an adaptative reason, rather than regarding lower fertility as a mechanical concomittant of the altered endocrine function that results from excitement. They also assume that at some time in the evolutionary past the ancestors of these animals did *not* respond to crowding by lower fertility and that genetic variation of just the right sort conveniently arose to allow some animals to do so. Finally, they invent a plausible story to explain why lowered fertility is a 'good thing'. With a little ingenuity, of course, such stories can always be invented, but it is not clear whether we are dealing with science or high-table wit. The realisation that he is engaged in game playing after all comes briefly to Dawkins' consciousness in his discussion of R. L. Trivers's story of reciprocal altruism. "There is no end to the fascinating speculation which the idea of reciprocal altruism engenders when we apply it to our own species. Tempting as it is, I am no better at such speculation than the next man, and I leave the reader to entertain himself" (p202).

Dawkins is not content that his readers should amuse themselves with the clever games already produced by Hamilton, Trivers and Zahavi, but introduces, in his last chapter, his own patented variant. Allowing that the details of human culture are probably not coded in our genes (we are not such robots, after all, it seems), Dawkins suggests that ideas themselves are units of reproduction and natural

selection. He asserts, for example, that "The idea of hell-fire is, quite simply, *self-perpetuating*, because of its own deep psychological impact" (p212), although he does not tell us how its "deep psychological impact" provides a mechanism for its self-perpetuation. He shrugs off without analysis the much more plausible and clearly causal hypothesis that hell-fire is not *self*-perpetuating, but is perpetuated by some people because it gives them power over other people. In fact, both Dawkins' suggestion that ideas are replicating selected units and the sociologists' notion that the details of human social activity are coded in our genes and selected for maximum reproductive potential, arise from the same fallacious view of human society, which, in turn, is a reflection of their confusion between materialism and reductionism. Although it is true that human beings are material objects whose brains are the result of a developmental process under the influence of genes, it is not true that their *minds* can be understood when we understand their genes. In like manner, although human society is the product of the sensuous activity of material individuals, human society is not simply the collection of all individuals.

According to Richard Dawkins, "If superior creatures from space ever visit earth, the first question they will ask, in order to assess the level of our civilisation is 'Have they discovered evolution yet?'.". I think it more likely they will want to know whether we know the difference between properties of sets and properties of their members. □

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Compendium of physiology

Introduction to Physiology. Vol. 3. By H. Davson and M. B. Segal. Pp. x+656. (Academic: London; Grune and Stratton: New York, 1976.) £9.80.

THE appearance of the third volume of this series so shortly after the first two (for review see *Nature* **259**, 428; 1976) is a great tribute to the industry as well as the erudition of the authors. It is a pity, even so, that they have been outpaced by inflation and the cost per page has risen from about 13p to 15p.

This third volume is devoted mainly to the homeostatic control of the principal mass-transport systems of the mammal—the circulatory, respiratory, alimentary and urinary systems. There are also sections, in the Bernard tradition, on thermoregulation, the control of plasma electrolytes and blood sugar, and a concluding one on the internal environment of the central nervous system in which the writers are, of course, very much on their home ground. Each of these topics is covered in considerable depth and the bibliography which is appended to each section is copious including virtually all workers who have achieved prominence in their respective fields over the past 20 years as well as many whose contributions are less familiar.

What seems to be emerging is a compendium of contemporary physiology rather than an introduction to the subject. The various sections, although providing detailed and thoughtful surveys of current ideas, suffer somewhat from a lack of contour lines which might help the novitiate to distinguish the salient features in the detailed scenario which is presented. The text is complemented by frequent clear and apposite illustrations, although in one instance, at least, the figure contradicts what is written elsewhere and occasional pictures of apparatus hardly merit the space they occupy. In the text itself there are some confusing and inconsistent statements but these are rare and could well result from hasty proofreading. Also from time to time an idea is tantalisingly floated without being adequately developed.

Now that the half-way stage in its production has been reached, the question must arise as to what type of user is likely to gain most from this multi-volume treatise. My own impression is that it is too detailed to serve as a working source book for the average medical student who may, however, find it valuable for occasional consultation. On the other hand, Honours undergraduates in most UK universities would probably be encouraged to read original papers rather than rely on summaries, however well prepared. This leaves postgraduate students who, particularly on taught courses, could find their needs well catered for, and finally there is the harassed teacher who may be called on to give lectures or tutorials outside his own speciality. Persons in the last category should be heartily grateful to Drs Davson and Segal for having so diligently 'researched' such a wide range of important topics and having so skilfully blended and packaged the fruits of their labours.

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Isotachophoretic analysis

Isotachophoresis: Theory, Instrumentation and Applications. (Journal of Chromatography Library, Vol. 6.) By F. M. Everaerts, J. L. Beckers and T. P. E. M. Verheggen. Pp. xiv+418. (Elsevier Scientific: Amsterdam, Oxford and New York, 1976.) Dfl. 160; $61.50.

THIS is an important book. Its senior author, Dr F. M. Everaerts, was introduced to isotachophoresis some twelve years ago by his PhD supervisor, the legendary A. J. P. Martin. Since then Everaerts and his group have developed the technique from a laboratory curiosity to arguably the most versatile method available for the characterisation and determination of low to medium molecular weight electrolytes. It is a method which in my view is destined to become one of the standard tools of chemical analysis.

Essentially the book is a full report of the work done by Everaerts' group; as such the treatment of the subject is uneven. The theoretical section does not provide a good introduction to the subject. The long chapter describing a mathematical model of isotachophoresis seems out of place and adds little of practical value. The qualitative aspects of isotachophoresis, however, are adequately described and the chapter on ionic mobilities summarises the variables available for exploitation by the analyst.

The section on instrumentation is by far the best. It provides a clear account of the problem of detection and of presently available solutions to it. The descriptions of the apparatus are complete enough for anyone with sufficient skill to build an analyser for himself.

The applications section is the most disappointing of all. In spite of the wealth of experimental data presented, there are no comparisons made with rival, well established techniques. A careful perusal of the separations depicted in (say) Fig. 12.4 (p 303) and Fig 15.1 and 15.2 (pp 350–351) will convince any analyst of the value of the technique.

In spite of its shortcomings this book ought to be read by all analysts of electrolyte solutions. Scientific instrument manufacturers should also find it of considerable interest, and possibly very profitable.

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