

the implicit assumption that behaviour is more responsive than are other features of an animal to the action of natural selection. To give an example, it is a widely accepted ethological fact that many courtship and threat displays in which the participants suddenly face away from each other, serve the function of cutting off stimulating visual input and so allow the animals to control their motivational state. Another familiar example is the 'Fraser-Darling Effect': the idea that colonial nesting and communal displays function to enhance gonad growth through mutual stimulation. Both of these arguments imply that natural selection is not very good at designing animals with efficient physiological systems, so that it has to call on behavioural adaptations to sort things out. This is not to say that the cut-off hypothesis is wrong, but without careful thought it is all too easy for the ethologist to dream up glib functional explanations for behaviour by assuming that other features of the animal are not subject to natural selection as well.

In addition to the two general discussions of function, to which I have already referred, the book contains several more specific studies of the effect of natural selection on behaviour. Of special note are the papers by Liley and Seghers who show how predation pressure influences morphology and behaviour in guppies, Kruuk on the relationship between social organisation and feeding habits in carnivores, and Patterson's attempt to disentangle the factors influencing fighting in rook flocks. Baerends reviews the literature on the motivational and evolutionary origin of displays, and the overall impression is that little progress has been made since Tinbergen wrote his major paper on this subject in 1959. Although it does not seem to have filtered through to the ethological community, I think it likely that the recent game theory analysis of ritualised conflicts, by Maynard Smith and Parker, will provide a starting point for totally new insights into the nature of courtship and threat displays.

Without listing the contents in detail, I think it is fair to say that, although there are good discussions of various areas of important progress in ethology as a whole, the book does not reflect the exciting new developments—for example, in the quantitative analysis of function—which have arisen specifically out of the lines of research initiated by Tinbergen himself. Perhaps by including contributions from some of Tinbergen's recent students and collaborators, the volume could have given a better impression how his particular inspiration is as much as ever at the very forefront of ethological research.

## Description before analysis

Roger French

*The Great Instauration: Science, Medicine and Reform, 1626–1660.* By Charles Webster. Pp. xvi+630. (Duckworth: London, November 1975.) £13.50.

"THE history of science has predominantly assumed the character of an index of progress towards our present intellectual position". With these opening words, the author proceeds to justify an examination of science in seventeenth century England, and to criticise the growth of a rather whiggish internalism in historical accounts of the sciences. Now, one of the reasons for regarding history of science, and in particular, history of medicine, as an independent discipline, is because the evidence to which the historian first turns his attention is of the same nature as that presented to the figures he is studying—that is, textual evidence—whereas the historian-at-large is faced rather more often with written evidence of something that is not documentary, like a political action. The directness, continuity and the subject matter itself of the former lead naturally to a history-of-ideas approach, whereas the inferential nature

of the latter directs the attention to the historical circumstances of the object of study. Those with an interest in the history of science know that the historian of ideas can sometimes neglect every other historical factor, and that on the other hand a circumstantial history can degenerate into the merest sociology. By and large, history of medicine at least is underworked. We should resist the temptation to frame hypotheses and find causes in history before we are done with the texts that furnish us with the historical evidence. Description should precede analysis.

The study of seventeenth century English science has many pitfalls of this kind. Although his book is 'history-at-large', Webster falls into none of them. He makes us aware that historical circumstances in the sense used above can be intellectual, and the plan of his book is to reveal the progress of the *idea* that man can restore himself to the state of knowledge of, and command over, nature that he possessed before the Fall. In working out this idea, attention was given to education, to agriculture, to public health, and above all to Reform. Webster examines in considerable detail the social, political and religious groupings of the exponents of these ideas in a way that adds another dimension to the more usual and more technical accounts of the Baconians and Harveians of the English seventeenth century. So consistently is this approach followed that it disarms the critic who might expect a technical exposition of Harvey's work in a book with this title. Webster also reminds us that description should precede analysis in not attempting too great a correlation between the results of the internal and external approaches. It would be nice to know why Culpeper felt that his reforming zeal could best be served by translating the traditional, rather scholastic and largely discredited *Ars Medica* of Galen. Indeed, Culpeper's whole notion of medicine was Galenic, as was that of the College of Physicians whose monopoly he attacked. It would also be nice to know more precisely the relationships between the professional institutions of the physicians on one hand and on the other the internal changes in Galenism that led to its retention as a doctrine, or to its collapse. Webster's exploration of the intellectual and social context of the 'most intrinsically interesting' scientific developments, the examination of 'the worldview of a particular society' is pursued without the distortion caused by the spectacles of modern science, but with a wealth of detail that will make the book invaluable to historians of all shades and the natural authority for those working in the period. □

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