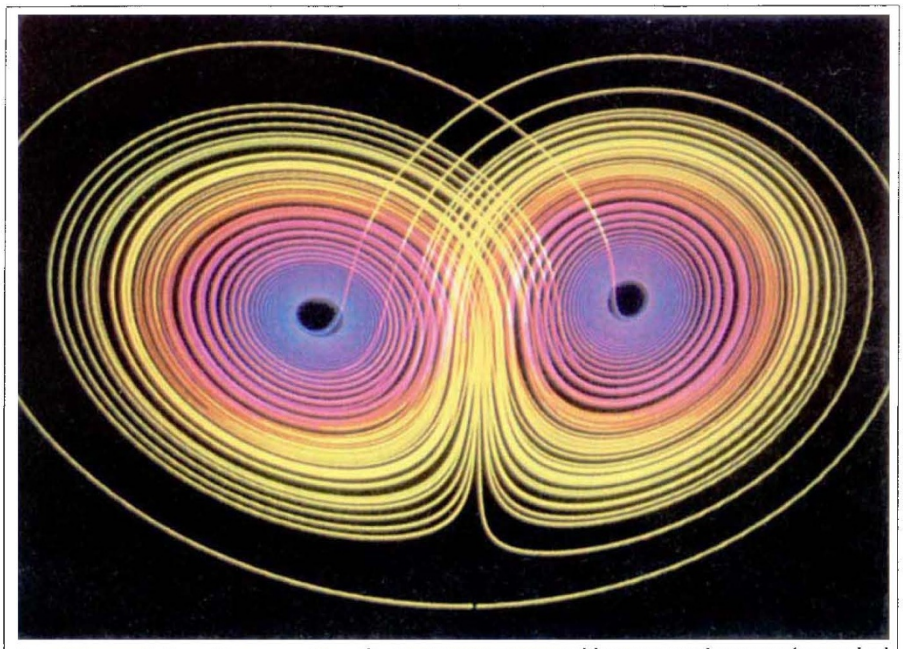
Romancing the brain

W. R. Albury

Nineteenth-Century Origins of Neuroscientific Concepts. By Edwin Clarke and L. S. Jacyna. *University of California Press: 1987. Pp.593. $65, £36.35.*
Medicine, Mind, and the Double Brain. By Anne Harrington. *Princeton University Press: 1987. Pp.336. $39.50, £22.10.*



In solving a set of nonlinear equations for convection, one would expect steady state to be reached eventually. Edward Lorenz found otherwise. Three equations with three variables described the motion of the system. Using the three variables to specify the location of a point in three-dimensional space, the evolution of the system with time can be plotted, resulting in the Lorenz attractor (above) — an image of chaos. The picture is taken from Chaos: Making a New Science *by James Gleick, published in Britain by Heinemann on 1st June, price £12.95. For review see* Nature *330, 293; 1987.*

One of the knottier problems of the history of science is to determine the extent to which past ideas, including those now considered thoroughly discredited, have contributed to shaping the present theoretical framework of scientific disciplines. The two books under review, although different in their approach and emphasis, provide interesting illustrations of this problem as it applies to the neurosciences. Clarke and Jacyna's study is the broader of the two and concentrates principally on the first half of the nineteenth century. Harrington's book is concerned with a single topic (albeit one with many ramifications) and deals chiefly with the period from 1860 to the end of the century.

Clarke and Jacyna hold that by 1850 most of the fundamental principles of modern neuroscience had been established, and in their view a key influence in the development of most of them was the romantic biology of *Naturphilosophie* in Germany and 'transcendental anatomy' in France, as well as an eclectic mixture of the two in Britain. With its stress on the unity of nature and the method of analogical reasoning, early-nineteenth-century romantic biology produced a wide range of speculative theories which later biologists would regard as wild flights of fancy. But in addition, Clarke and Jacyna suggest, this romantic philosophy of nature provided a basis for key neuroscientific ideas which have continued to be accepted by mainstream biology long after their origins had been forgotten. For example, the romantic doctrine of the unity of the organic system contributed to the extension of Marshall Hall's concept of reflex action from the spinal cord to the brain. As Clarke and Jacyna point out, however, "whereas later authors such as [Hughlings] Jackson justified their conviction in this uniformity by reference to the theory of evolution, it is important to remember that the roots of the initial breakdown of the barrier between spinal and cerebral action lay in an older biological system" (p. 147).

The authors detail the intellectual milieu of neuroscience in the early nineteenth century (including a number of other cultural tendencies besides romantic biology) and argue for a close relationship between scientific developments and their wider intellectual context. In addition to the concept of the reflex, the formation of ideas on the gross anatomy of the cerebrospinal axis, the histology of the nerve cell, the role of electricity in neural transmission, the localization of brain function and the special role of the autonomic nervous system are all discussed. The level of scholarship exhibited by the book is impressive, with over 200 pages being devoted to notes and bibliography. The only obvious lapse in presentation is the failure to provide adequate diagrams to illustrate the various structural and functional aspects of the nervous system that the authors discuss.

In searching for the "origins of neuroscientific concepts", Clarke and Jacyna commit themselves to the project of evaluating nineteenth-century writings in the light of modern neuroscientific doctrines, to identify concepts from those earlier writings which appear to have retained a place in currently accepted knowledge. The problem with their historiographical approach can be illustrated by their own comments on the allegation, made in 1837, that Marshall Hall had plagiarized a book published in 1784 by Jiri Prochaska. Clarke and Jacyna explain the occurrence of this allegation, in part, "by suggesting that with the help of [Hall's] research the work of Prochaska could be viewed in a new light and thus came to appear as similar — even as an anticipation — of Hall's" (p. 119). In the absence of any explicit discussion of methodological safeguards, one cannot help wondering how many of Clarke and Jacyna's "nineteenth-century origins of neuroscientific concepts" might also be artefactual resemblances produced by using modern neuroscience to view the work of the earlier writers "in a new light". Nevertheless, whatever the doubts that one might entertain about this aspect of Clarke and Jacyna's historiography, their book represents a notable achievement of scholarly synthesis and exposition.

Harrington's study is in all senses slighter than Clarke and Jacyna's, but it

---

• Published by Raven, shortly after the two volumes reviewed above, was Mary A.B. Brazier's *A History of Neurophysiology in the 19th Century*. The book is a sequel to her earlier work of 1984, which covered the seventeenth and eighteenth centuries.

Neurophysiology expanded dramatically in the 1800s, so the author's biographical approach becomes rather selective. Nevertheless, her choice of some 60 key figures in the discipline is exemplary, ranging from the relatively familiar (Prochaska, Magendie, Bell, Flourens, Bernard, Hall, Cajal, Jackson and Ferrier, for example) to the inappropriately remote (Eusebio Valli, Leopold Nobili, Ernst Fleischl von Marxow, Bronislav Verigo). The chapters themselves are thematically arranged around topics such as electrophysiology, cerebral localization and neuromicroscopy, and the full bibliographies and many illustrations enhance the usefulness of this well-produced volume. W.F. Bynum