

Book Reviews

JAVIER DeFELIPE and EDWARD G. JONES (eds), *Cajal's Degeneration and regeneration of the nervous system*, transl. Raoul M. May, History of Neuroscience No. 5, New York, Oxford University Press, 1991, pp. xvi, 769, illus., £60.00 (0-19-506516-6).

One of the most exciting parts of neuroscience is the rapidly growing field of developmental neurobiology. As in all scientific enterprises today, the increasing volume of literature means that most participants are content to peruse only material of the last two or three decades. However, in this particular area of research ideas and experimental data reported almost eighty years ago are of relevance to modern workers.

Santiago Ramón y Cajal (1852–1934) of Spain was the most eminent histologist of the nervous system since investigations began in earnest during the 1830s. It was he who, along with Wilhelm His (1831–1904) and August-Henri Forel (1848–1931), confirmed the individuality of nerve cells, as formulated in the neurone doctrine. This was, however, only a small part of his life's work, which ranged over all types of nervous tissue, including the retina. In 1913 and 1914 he published *Estudios sobre la degeneración y regeneración del sistema nervioso*, a classic book based on six years' work. In it he reported a remarkable series of observations and experiments on all aspects of the nerve regeneration process, using his own staining techniques amongst others and critical analyses of his findings. As was his custom, he made liberal reference to his contemporaries and pupils, and, as well as describing his laboratory results, he also recorded theoretical interpretations arising from them together with new ideas and hypotheses. It is here that the modern developmental neurobiologist finds material eighty years old but still relevant to today's research.

Cajal's axone outgrowth theory, *neurotropism*, favoured the role of extraneous trophic agents in stimulating axone growth and of highly specific interaction between particular axone terminals and their synaptic sites following nerve fibre damage or section. For some time this theory was not widely accepted, but recent investigations seem to confirm the original thesis. Thus, his basic theories of neurogenesis and nerve degeneration have provided valuable guides to subsequent workers, which has also been the case with other parts of Cajal's writings.

His book of 1913–14 had a limited distribution and was virtually unknown in Europe and North America before 1928, when this English translation with the author's appended notes appeared. Despite facsimile reprints in 1959 and 1968 it, likewise, was never widely available and this has induced the present editors to re-issue the English translation. In so doing they have produced one of the very best types of modern reprints. The text is untouched, but 160 pages have been added. These include: a brief discussion of the usefulness of the book to modern research; a list of textual *errata*; valuable extracts from Cajal's other works which relate to this topic; an account of his labours by his favourite pupil, J. Francisco Tello (1880–1958); and a bibliography of Cajal's references to the original text, corrected and amplified.

It is to be hoped that this book will induce future editors of reprints to include similar enrichments. In the meantime it will be of value to the modern neuroscientist as well as to the historian of this speciality.

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PETER J. BOWLER, *Charles Darwin: the man and his influence*, Blackwell Science Biographies, Oxford and Cambridge, Mass., Basil Blackwell, 1990, pp. xii, 250, illus., £19.95 (0-631-16818-4).

LUCILLE B. RITVO, *Darwin's influence on Freud: a tale of two sciences*, New Haven and London, Yale University Press, 1990, 8vo, pp. xii, 267, £19.95, \$35.0.

Although a long-time stalwart of the Darwin industry, Peter Bowler has travelled significantly less far in the direction of a social history of science than have most of his peers. The author of *Evolution: the history of an idea* (1984) displays an abiding commitment to a more traditional

historiography. Paradoxically, however, in works such as *The eclipse of Darwinism: anti-Darwinian theories in the decades around 1900* (1983), *The non-Darwinian revolution: reinterpreting a historical myth* (1988) and now, *Charles Darwin: the man and his influence*, the drift of Bowler's writing has been to work against the historical centrality of Darwin which Bowler's colleagues have done so much to reinforce. Bowler's Darwin never had the field to himself even during the heyday of naturalistic triumphalism in the 1860s and 70s. Whole swathes of Victorian evolutionary theory owed little to his direct influence. Objections to the haphazard and exclusively utilitarian workings of natural selection raised initially by theistic evolutionists like Asa Grey in the United States and St George Mivart in Britain were revived at the end of the century by supporters of Lamarckism and orthogenesis. By the 1900s Darwinian theory had gone into an "eclipse" compared with other versions of evolution, an eclipse from which it would emerge only in the 1930s and 40s with the "Modern Synthesis" of genetics and natural selection. The revolution which established the paradigm which continues to dominate developmental biology was "non-Darwinian", for its early stages owed more to Mendel than to Darwin. Ironically, the emergent science of genetics that would later be seen to have vindicated Darwin was founded by critics of Darwinian variation such as Hugo de Vries and William Bateson.

In his latest book, Bowler travels much further than hitherto down the road of socio-cultural contextualization. He argues that it was primarily for polemical and doctrinal purposes rather than its implications for their working practices that Darwin's peers, notably T. H. Huxley, found his work so important. Darwinian theory provided crucial naturalistic ballast to the secular meliorism of the vessel in which they sailed as both Victorian liberals and first-generation professionals outside the religious and scientific establishment. Scientists today, Bowler observes, value those aspects of *The origin of species*, particularly its biogeographical emphasis on the relation between environmental change and local adaptation, which most of Darwin's contemporaries found of little interest because of an apparent lack of ideological utility. Bowler's Darwin is thus simultaneously one of the great scientific makers of our modernity and an eminent Victorian whose "dusty rationalist lines" belong, in Graham Greene's memorable turn of phrase, with "nineteenth-century materialism . . . Herbert Spencer and the Thinkers' Library, alpaca jackets and bookshops on Ludgate Hill . . .".

Lucille B. Ritvo, meanwhile, tells *A tale of two sciences* in which this Victorian Darwin played a crucial part in the formulation of the young Freud's thinking. She acknowledges that the premise of the earlier part of her book, that Freud was already actively engaged with matters Darwinian during his *Gymnasium* years (1865–73), is necessarily circumstantial, there being no evidence of the schoolboy Freud having owned, read, or written anything about Darwin. None the less, later references by Freud to how he was "strongly attracted to Darwin's theories" at a time when, as Ritvo points out, Haeckel's *Darwinismus* was all the talk of German culture both high and low, make such an engagement highly probable. So too does the fact that the same period saw the German publication of *The variation of animals and plants under domestication* (1868) and *The descent of man* (1872), two of the three of Darwin's works—the other being *The expression of the emotions in man and animals*—which Freud was to both quote and draw on in his psychoanalytical writings. Freud also provides another example of someone coming of age intellectually in the late nineteenth century who regarded himself as a Darwinian on grounds that were essentially Lamarckian; in Freud's case the inheritance of acquired characteristics or "use-inheritance" which he used as a bridge between individual analysis and group psychology.

Earlier accounts of Freud's intellectual make-up by Siegfried Bernfeld and Frank J. Sulloway placed in the foreground the Helmholtz school and Ernst Brücke's physiology. With her emphasis instead on the role of the Professor of Zoology in the Vienna Medical School, Carl Claus, Ritvo breaks new ground. Between 1873 and 1876, while Freud was studying under him, Claus was preparing the third edition of his highly influential *Grundzüge der Zoologie* (1868), the first Darwinian textbook of zoology, which went into ten editions before his death in 1899. Ritvo sees Claus as giving Freud a thorough grounding in an evolutionary biology that married neo-Lamarckian use-inheritance to the gradualism of Darwinian descent and which would be

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fundamental to Freud's later work. She also stresses the importance of Freud's six-month stint in 1883 as junior houseman in Theodor Meynert's Institute of Cerebral Anatomy. In his teaching at that time, and in his *Psychiatrie* (1884), Meynert placed great weight on the first and third principles of Darwin's *Expression of the emotions* which Freud was to apply in *Studies on hysteria* (1893–95). Brücke, the third of Freud's great Vienna teachers, is downgraded from his primacy as scientific mentor of Freud in favour of Claus. Ritvo presents Brücke as a physiologist neither particularly averse to, nor particularly interested in Darwin. Brücke's importance for Freud, she argues, is that his Institute provided a suitable environment in which Freud, in the best Darwinian way, could adapt and evolve as a scientist.

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MICHAEL BURLEIGH and WOLFGANG WIPPERMANN, *The racial state: Germany 1933–1945*, Cambridge University Press, 1991, pp. xvi, 286, illus., £45, \$29.95 (hardback, 0–521–39114–8), £12.95 (paperback, 0–521–39802–9).

The central historiographical issue for historians of modern Germany is probably the question of uniqueness. Was the historical trajectory leading to the Holocaust distinctive, or does it share most features in common with that of other industrialized nations? In the case of the Third Reich, some historians have argued that National Socialism brought about structural changes in German society which were similar to “modernizing” trends elsewhere, while others have insisted that the regime was distinctively racist and reactionary. Burleigh and Wippermann declare themselves firmly in the latter camp. Their aim in this book is to demonstrate that those Nazi social policies which superficially appear to have been “modern” were in fact prompted by racist and altogether unmodern aims.

In Part I the authors discuss the historiographical literature which has dealt with the “uniqueness” question, summarize the history of racist theory and eugenics in Germany, and outline the Party and state agencies involved with Nazi racial policy after 1933. The chapters comprising Part II sketch in depressing detail the ways in which three social groups were systematically persecuted: Jews, gypsies, and those individuals thought to be hereditarily unfit (homosexuals, the mentally ill and “anti-socials”). Part III shifts away from Nazi racial policy in order to reveal the racist-eugenic strand running through even general social policy (e.g., towards youth and women).

The book is well-written and richly illustrated, and although its discussion of the German eugenics movement is neither extensive nor especially novel, it offers a useful account of Nazi racial policies and their impact upon everyday life in the Third Reich. The book's main thesis, however, is strangely undeveloped. Although the authors wish to refute the claim that Nazism was a “modernizing” force, their failure to define what they mean by “modern” undermines their attempt to show convincingly that Nazi policies were thoroughly *unmodern*. Alternatively, they might have begun by outlining those competing historical accounts which they reject, indicating which Nazi social policies are alleged by others to have been “modern”, and then showing that such policies were instead inherently racist and reactionary. This route, too, is not pursued. Although they often seem reluctant to acknowledge it, the authors, in fact, show that the Third Reich was both a “racial state” *and* a modernizing one. While the *aims* behind various Nazi policies were racial-eugenic, the actual policies often resembled those in democratic countries (e.g., welfare measures, meritocratic procedures in industry, equal educational opportunity). Nevertheless, if one discounts the (modernizing) consequences of Nazi social policy and focuses merely upon the (eugenic) aims behind it, are the authors justified in claiming that the Nazi state was “a singular regime without precedent or parallel”? I would be happier with this conclusion, had the authors demonstrated that the aims informing comparable social policy in other countries were quite distinct from the Nazis'. Had they attempted to do this, however, the authors might have discovered that eugenic concerns also shaped “modern” legislation elsewhere, not least in the Scandinavian welfare states.

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