

life. He emphatically rejected its supposed cooling action with the same arguments as those used later by Bathurst. It was also Helmont who developed gas-exchange as the true function of respiration: used-up venous blood – its residue – is converted into a “volatile salt” which is “blown away” by the air breathed in. That it can be so converted is due to a *magnale* – a celestial “conjugal associate” – a “ferment” – of air filling its pores and spaces; it is thus not the whole substance, but this content of air which is breathed and maintains life. In this Helmont is basically assisted by his discovery of *Gas* as object-specific exhalations different from such common, – non-specific – *volatilia* as air and water-vapour (see W. Pagel, *William Harvey's biological ideas*, Basle and New York, 1967, pp. 79, 194). From the account of Bathurst in the present book, Helmont's view of respiration should well have been significant. Helmont's concern with the colour-change and “thinning-out” – the salty-sulphurous nature – of arterial blood by virtue of pulse and air and the absence of any heat-focus and ebullition in the heart, are also topical. Already in 1647, Hermann Conring had ridiculed Kepler's idea of a fiery light-focus in the heart and reduced the Galenic heart-fire to “something mobile like fire” (*mobile igni simile*, in: *De calido innato signe animali*, Helmstadt, 1647, cap. XII, p. 120, XV, p. 149, *ignem vitalem non lucere*, p. 154: *Kepleriana indigna sunt, quae confutes, rhetori inania declamanti*). A major point of interest on the Helmontian side is the emphasis laid in the present book on Boyle's preoccupation with the physical rather than the chemical properties of air – the “spring of the air”, its “elater” or elasticity leading to his famous “law”. *Gas* – Helmont's “spirit so far unknown and called by a new name” (*Complexionum atque mision elemental figment.*, 14) was neglected, if considered at all, or played down as one of various forms of “factitious air”, for example by Boyle and by Glisson in his late work *On the stomach and gut* (1677). It remained to another century to rediscover it and give Helmont his due. It cannot be denied, however, that he was critical against Paracelsus' making even life as a whole dependent upon saltpetre which so much intrigued the Oxford group (“*saalem e nobis fluidum et intus presentem merum salpetri cagastrum vocat. Adeoque nedum carnes et cruorem sed et totum corpus cum vita esse salpetra et cagastrica persuadere conatur*”, in: *Tria prima Chymicorum*, 31). Helmont's *Gas* and *gases* thus shared oblivion and resurgence with the nitro-aerial particles and other concepts of Harvey's immediate successors waiting for iatromechanics and phlogiston to wane.

Finally, here we have a book which has added a new page and dimension to the history of physiology and indeed to the history of medicine, however little the momentous discoveries of the period influenced the medical practice of their day. Without them there would be no modern medicine and without the work under notice no way to understand its development in depth.

Walter Pagel

JOHN D. SPILLANE, *The doctrine of the nerves. Chapters in the history of neurology*, Oxford University Press, 1981, 4to, pp. xii, 467, illus., £25.00.

Dr. Spillane is a distinguished neurologist who has contributed importantly during the last few decades to the progress of clinical neurology. In his retirement he now turns to its history, aware of his possible shortcomings as a historian, but with com-

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mendable enthusiasm and praiseworthy humility. His object has been to present to his fellow neurologists, especially those entering the speciality, certain topics that he judges to be important, interesting, and handleable. It is, therefore, necessary to realize at once that Dr. Spillane's book is not a history of neurology. It is a survey of selected subjects arranged chronologically, from Galen to the end of the nineteenth century, despite suggestive section headings, such as 'The foundation of neurology', 'An age of transition: philosophy to science', 'The nervous system explored', and 'the flowering of neurology'. Thus, whereas the title is meaningless, the sub-title is an accurate description of the contents of the book.

To construct a historical treatise in this fashion leads to a variety of results. Thus all complicated, obscure, and linguistically difficult areas can be avoided, and the end-result becomes a much more readable presentation, with the author's fascination with his material transmitted to the reader. However, no general syntheses are necessary and no theme has to be pursued relentlessly, as with the portrayal of the origins and evolution of a concept. Moreover, in the presentation of an episode in the history of a technical discipline, the vital external influences moulding an idea need not be dealt with. The relationship between various developing notions, which should provide some impression of overall progress, can likewise be avoided.

The choice of Dr. Spillane's "chapters" has, as he admits, led to an individual approach, naturally enough, but also to imbalance and even distortion. His book is based mainly on men, rather than on concepts. Thus the studies of Galvani are given considerable space, but none of the nineteenth-century electrophysiologists is mentioned, so that his contribution, which is well surveyed, is presented as an unrelated event leading nowhere. In some cases, a person is discussed because of his curious nature, not his historical relevance. Swedenborg is an example of this: a man who may have been a visionary, but who had no influence on the history of neurology. On the whole, German-writing neuro-scientists and neurologists have been grossly neglected, and the French- and English-writers given more consideration than they deserve. Finally, little attempt is made to explore the close links between medical neurology and neuro-surgery and psychiatry.

Nevertheless, taking into account the obvious hazards of Dr. Spillane's method of dealing with the history of clinical neurology, he has produced an excellent book within the confines he has imposed. He has an attractive style, and has documented his text accurately and fully, obviously with a detailed knowledge of the secondary literature. His choice of illustrations is felicitous and, although some are well known, many are not. Dr. Spillane must, therefore, be commended for producing an elegant book which can be recommended to those seeking an understanding of some of the origins of present-day neurological practice, providing they are aware of its limitations.

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RICHARD S. WESTFALL, *Never at rest. A biography of Isaac Newton*, Cambridge University Press, 1980, 8vo, pp. xviii, 908, illus., £25.00.

Perhaps because of the sheer bulk of his manuscript material, the broad scope of his