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Science, medicine and society in the Renaissance (essays to honour Walter Pagel), ed. by ALLEN G. DEBUS, London, Heinemann, 1972, 2 vols., pp. 275, 338, illus., £12.00.

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The very title of this book reflects the influence exerted by Walter Pagel on contemporary historians. Perhaps more than any other historian of this century he has emphasized both by precept and example the inadequacy of historical motifs narrowly conceived from the twentieth-century point of view. This breadth of insight may partly arise from the fact that he himself has a medical view of events whether scientific or medical, which has been reinforced by his long and distinguished career as a pathologist. He has therefore seen at first hand medicine expanding towards the basic sciences on the one hand and into the texture of society on the other.

In 1930 he entered the sphere of the history of medicine with a study of Van Helmont and his philosophy of medicine. This directed Pagel's historical vision towards the chemical insights of Paracelsus on the one hand and the mechanistic achievement of Harvey on the other. He saw both men's work as searching lights emerging from the fascinating luminosity of renaissance thought.

Bearing this in mind it is not surprising to find that the thirty-eight essays contained in this two-volume work can almost all be grouped under two headings. Those in the first volume deal with renaissance thought and Paracelsus; those in the second volume with Harvey's controversial contribution on the circulation, with considerations of some of his seventeenth-century contemporaries such as Francis Bacon, Descartes and his successor Newton, all approached from new angles, and freshly inscribed in what might be called a Pagelian context.

The first volume opens with an introductory essay by Allen G. Debus, in which he not only gracefully introduces the reader to Walter Pagel, but takes the opportunity of demonstrating the kind of gaps which inevitably occur in the history of medicine and science when it is seen foreshortened from the retrospective viewpoint of the twentieth century. In this connexion so recent and notable a historian of science as George Sarton comes under stringent criticism. This introduction prepares the reader for a less "simplistic" approach in the essays which follow. The titles of these essays are themselves so informative that many of them will be quoted here as reflecting the nature and quality of the revaluations which characterize the historical perspectives in this book.

The first essay concerns, "Mathematical technologies and the growth of the idea of technical progress in the sixteenth century". In pointing out that advances in mathematics facilitated the techniques of astrology as much as those of mechanics, A. G. Keller demonstrates how easy it has been to foist our twentieth-century outlook on to our seventeenth-century forbears. He amplifies his case with a rich fund of literary references to the religious context within which the technical advances took place; and stresses the nostalgic glances back to a golden age when men "lived on nuts and committed no sin". The reminder is not lost on us today. Nevertheless a new world was born based on the origins of modern science. "The sense of vision

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and the origins of modern science" is sketched out by David G. Lindberg and Nicholas H. Steneck in the form of a polemical counterblast to Ronchi's thesis on the "deep and convinced distrust that medieval philosophers had for sight in general and for observation with optical devices in particular". Lindberg and Steneck find Ronchi's failure to notice the work of Alhazen, Roger Bacon, Witelo and Pecham "ludicrous". Polemically speaking, so far so good, but the title of the paper leads one to expect more, and their failure to notice the contributions to science of the studies on perspective of the artist-scientists of the renaissance such as Leon Battista Alberti and Leonardo da Vinci lays them open to similar criticisms to those with which they arraign Ronchi.

With H. J. Sheppard's "The mythological tradition and seventeenth-century alchemy" the field of alchemy is approached through its myths and emblems which become fully fledged in such works as Michael Maiers' *Atalanta fugiens*, "in which the alchemical content is expressed in the form of emblems with accompanying epigrams set to music".

Apart from a diversion on the state of anatomy in sixteenth-century Spain from C. D. O'Malley and a refreshing clinical interlude on dropsy of the lung from Saul Jarcho, the remaining essays in this volume explore some of the many different facets of renaissance medicine with which Paracelsus was concerned. The controversy over the specificity of cathartic drugs is briefly classified by Owsei Temkin. Jerry Stannard's study of, "Botanical nomenclature in Gersdorff's *Feldtbuch der Wundartzney*", extends his previous investigations of renaissance herbals and points out the interesting similarity between those medicinal plants used by Gersdorff and Paracelsus, independently. Kurt Goldammer in his essay on, "Paracelsus, Osiander and theological Paracelsism in the middle of the sixteenth century", sheds fascinating light through a pseudo-Paracelsian work, on Paracelsus' necessarily "protestant" religious views, relating them to those of Osiander. This side of Paracelsus is further described in Fridolf Kudlien's discussion of the "Antisemitism of Paracelsus", in which he endorses Walter Pagel's conclusion that Paracelsus' invectives "have very little in common with modern sentiments". Leo Norpoth, too, draws attention to the, "as yet unregarded theological books of Paracelsus", in classifying him as a possible Mannerist. It is most interesting to note the increasing importance being attached to Paracelsus' religious views by this group of German historians.

Wolfgang Schneider discusses at length the differentiation between 'Chemiatriy and iatrochemistry' finally allotting Paracelsus into the category of chemiatriist. Allen G. Debus draws attention to the many different opinions voiced by the participants in the great Paracelsian-Galenist debate of the late sixteenth and seventeenth centuries. The ultimate position he describes as, "The chemical compromise in early modern medicine", choosing Guintherius, Libavius and Sennert as representative opinions. In doing so he achieves the remarkable feat of endorsing his comment that, "this debate has been overly simplified" and at the same time clarifying and simplifying the issue.

The widespread European impact of Paracelsus is recalled by Wlodzimierz Hubicki in describing his effect upon Poland, so reaching Rheticus, whose name one associates more closely with Copernicus. And Henry Guerlac reminds us of the important part

played by that colourful character Guy de la Brosse in extending Paracelsus' influence to France.

F. N. L. Poynter with felicitous fluency demonstrates the impact of Paracelsus in England through two very little-known works of Nicholas Culpeper, who also might well be added to Debus' list of those who were, "not only for Galen and Hippocrates but knew how to correct and moderate the tyrannies of Paracelsus". That this was a typically English view was expressed in the contents of the *London Pharmacopoeia* of 1618. Poynter's exposition through Culpeper's books serves not only to illuminate English Paracelsian views of the seventeenth century but brings to notice two rare works, *A new method of physick*, and *Mr. Culpeper's treatise of aurum potable*, never before considered in any study of English Paracelsian literature.

With Ronald Sterne Wilkinson's descriptions of the clinical chemiatic activities of John Winthrop, Jr., Cotton Mathers' attribution of the title "Hermes Christianus" is made colourfully clear.

This first volume concludes with a meticulous account of "Galen's concept of bloodletting in relation to his ideas on pulmonary and peripheral blood flow", from the careful pen of Rudolph E. Siegel. His restatement of his interpretation of the galenic concept of the movement of the heart and blood concludes with a view which lies comfortably close to that of William Harvey. It is clear, too, that both Galen and Harvey agreed that bloodletting was a worthwhile procedure. In this however they were strenuously opposed by Van Helmont who, as Peter H. Niebyl describes, was inspired to suggest a controlled clinical trial of venesection on some 500 febrile "poor people" for a comparison of results as judged from the number of funerals in each group.

The second volume opens with a shrewd pen-portrait of Paul de Sorbait from Erna Lesky, which demonstrates that in late seventeenth-century Vienna, Harvey's views were "in" whilst Paracelsus' were "out". In view of this it is surprising to find the tourist Edward Browne describing Viennese views as "the old beaten way of Knowledge".

Paracelsus had set off a confused conflict regarding the relation of "dead" anatomy with chemical anatomy, and Audrey B. Davis describes the interesting attempts to resolve this in the light of the discovery of the circulation, by a group of English physicians, particularly Glisson, Power and Willis.

Cesalpino's "floating glimpses" of the circulation are amplified by Jerome J. Bylebyl, who ascribes the different views of Cesalpino and Harvey to quantitative considerations. One is prompted to ask, is this enough? There seems to be a tendency to underestimate the fact that Harvey devoted five chapters of his work to the subject of *De motu cordis*. It was this that elucidated the mechanical nature of cardiac motive power as well as raising the quantitative factor; both surely enhance the gap between Cesalpino and Harvey. Similar misconceptions about the *De motu cordis* part of Harvey's work underlay the antagonistic views raised by Primrose and Riolan, facts clearly brought out by Karl E. Rothsuh. And that Descartes should be added to this list is made crystal clear by Richard Toellner's contribution.

Charles B. Schmitt and Charles Webster are emphatic that there is much work still to be done to clarify the controversies which eddied round Harvey's discovery

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for nearly a century. They give as an example their own work on the many volumes of unpublished manuscripts of Marco Aurelio Severino which still lie in the Biblioteca Lancisiana and the glimpses given of Severino's biological approach to the problem of the circulation promise very interesting future communications.

The last ten essays in this volume deal with the work of Harvey's contemporaries and successors. Francis Bacon, J. R. Ravetz asserts, was greatly influenced by religious considerations as "an agent of Reform". This he finds endorsed by the study of Bacon's unpublished essays as well as Benjamin Farrington's interpretation of Bacon's motives. Such an impression is by no means incompatible with D. P. Walker's account of "Francis Bacon and Spiritus", which follows his concept up from units of perception not unlike Leibniz's monads to extra-sensory spiritual mediation.

A concept that troubled renaissance thought and theology from the time of Nicholas of Cusa onwards was that of the plurality of worlds in relation to man's nobility, discussed by Paolo Rossi. Rossi concludes that first Copernicus, then Kepler and Galileo, all abandoned the problem to the philosophers as "unresolvable". He points out that it still remains so.

The recently appreciated importance of the religious vector in relation to the thought of great scientists of the past emerges very vividly in P. M. Rattansi's essay on Newton's *Alchemical studies*. This fascinating excursion into only recently explored regions of Newton's writings reveals how Newton extended his thinking from the mechanical aspects of natural phenomena to "vegetable" action, and so to a macro-cosmic concept of life. "This earth resembles a great animal", is an astonishing declaration to twentieth-century scientists separated from Newton by some three centuries of differentiation, but it would not have astonished his contemporaries. Combined with his conviction that both the Bible and alchemy held occult implicit knowledge which it was his goal to make explicit, it becomes readily comprehensible though inevitably controversial. Richard S. Westfall goes further, suggesting that Newton, even in such physical concepts as those expressed in his *Hypothesis of light*, was perpetuating "hermetic modes of thought"; and takes the view that the mechanical and hermetic views were not incompatible. Evidently Newton agreed.

Newton's curious neglect of Kepler's achievements is described by I. Bernard Cohen in the additional light of a note found in Newton's own copy of the *Principia* in which he distinguishes his own definition of the "force of inertia" from Kepler's. Cohen attributes the note to Newton's reaction to a statement by Leibniz which "exhibits a monument of confusion" on the subject, and omits any mention of Newton. It would seem that though Newton could reconcile hermetic and mechanistic outlooks, he could not reconcile himself with Leibniz.

The last four contributions elucidate a variety of seventeenth-century problems. Robert F. Multhauf traces knowledge of the constitution of saltpetre from Chinese beginnings to the efforts of Becher and Stahl, explaining their inevitable shortcomings in terms of contemporary chemical ideas. Hugh Trevor-Roper deftly crystallizes out of solution the identities of two Paracelsian French physicians dissolved by historians into one "Sieur de la Riviere". The whole expert analysis carries a warning on the ease with which historians can fall seriatim into a pit of error. Joseph Needham charmingly presents a "Chinese puzzle" with regard to Klapproth's paper on, "On the chemical

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knowledge of the Chinese in the eighth century" which still remains a puzzle. Carlo Castellani makes a detailed comparison of the investigations of Bonnet and Buffon on the problem of generation, concluding that Buffon's approach was the sounder.

The last item, a full bibliography of the writings of Walter Pagel compiled by Marianne Winder reminds the reader that this selection of essays, so skilfully woven by their editor, Allen Debus, round Walter Pagel's central motifs, not only supplies rich food for thought on his influence on contemporary historians but also constitutes an invitation to its readers to refresh themselves with cybernetic enjoyment on the works of Walter Pagel himself.

A catalogue of Western manuscripts on medicine and science in the Wellcome Historical Medical Library, Part II: MSS written after A.D. 1650, by S. A. J. MOORAT, 2 vols., London, Wellcome Institute of the History of Medicine, 1972, pp. 1480, £30.00.

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With the steady progress in cataloguing, the seemingly infinite and incalculable treasures of the Wellcome Library are assuming finite and workable dimensions. It is only just over a decade that the catalogues of the illustrious collection of printed books and of Western manuscripts before 1650 were published, to be followed after about five years by part I of the catalogue of books 1641 to 1850 (A–E), and the Arabic manuscripts. With the work under notice the manuscripts are all accounted for and all we have still to expect are part II of the printed books 1641–1850 and the Americana. While it is true that the most interesting and exciting items are contained in the first published catalogues covering the Middle Ages and the Renaissance up to 1641 and 1650 respectively, the second volume of the manuscripts is no anticlimax. This is immediately shown by a glimpse at the indices. There are no less or rather more than ten of them. In these the items are listed by date (42 pp.), by languages (42 pp., Catalan to Swedish), by illustrations, portraits and special bindings (9 pp.), by owners and libraries (16 pp., including the famous collections of I.D.de Chorinsky, Jul. Kohn, T. J. Pettigrew, Sir Thomas Phillipps), by bookplates and ex libris (5 pp.), by lectures (26 pp.) including a list of the places where they were given) and by a most elaborate subject index (127 pp.). This is followed by a short list of some 6000 autographed letters (50 pp.) of which a few may be named: Ampère, Auenbrugger, Carl Ernst von Baer, S. S. K. von Basch, Behring, Beireis, Berzelius, Billroth, Marcus Elieser Bloch, Blumenbach, Boerhaave, Boscovich, Bordeu, Bonnet, Calmette, Carus, Conring, Corvisart, Dalton, Daremberg, Dieffenbach, Dupuytren, Dutrochet, Eddington, Ehrenberg, Einstein, Edinger, Esmarch, Fabroni, Flamsteed, Fleming, Flourens, Fontana, Freud, Gauss, Graefe, John Hunter, Hahnemann, Helmholtz, Jenner, Kussmaul, Langenbeck, Leibniz, Littré, Lister, Lind, Liebig, Marat, Newton, Nightingale (500 letters!), Max Nordau, Oken, Pavlov, Paget, Pepys, Pirquet, Remak, Ross, Rudolphi, Rutherford, Spallanzani, Treviranus, Virchow, Wepfer, Withering, Wöhler, Windischmann, Villemin, Willis. In the *corpus* of the manuscripts alchemical miscellanies, mostly of the eighteenth century, weigh heavily, but not infrequently include odd and obscure items not otherwise available.