

## Book Reviews

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*Galen's System of Physiology and Medicine*, by RUDOLPH E. SIEGEL, Basle, S. Karger, 1968, pp. xii, 419h, £9 16s. 0d.

The restoration of Galen to his rightful position in the history of medicine and science has been recognized as a very real need for some decades. In different ways contributions to this end have been made by such historians as Prendergast, Singer, and particularly Temkin. But, as Dr. Siegel says in his preface to this book, a systematic analysis of Galen's medical and physiological works has not yet appeared. This book is designed to meet that need. To condense the essence of Galen's views into less than 400 pages would be a tour de force. This feat is only partially performed here since Dr. Siegel has postponed dealing with Galen's physiology of the senses for another publication.

Galen, like Aristotle, became posthumously almost too successful. As a result appreciation of his achievements has passed down through history in exaggerated positive and negative phases. His great contributions having for many centuries suffered from the distortions of adulation, fell during the nineteenth century into the dark pit of reactionary denigration. For the English-speaking world the task of assessment has been rendered all the more difficult by the paucity of English translations of many of Galen's most important works.

At present, however, Galen is surely emerging from his slough of despond, and with the inevitable swing of opinion we have to be on our guard lest the impetus of enthusiasm carry us too far.

The title of the book would lead the reader to expect that it would open with an appreciation of Galen's physiology as presented by him in his works on the Natural Faculties and Use of the Parts. Instead, however, Dr. Siegel chooses to set out straight away to expound Galen's views on the heart. Here he at once presents controversial views, arguing that Galen understood cardiac systole and diastole, mediated by the heart as a muscle, and that his knowledge of the expulsion of blood into the lungs through the pulmonary arteries was equivalent to an appreciation of the pulmonary circulation. In spite of Galen's quoted statement that, 'the contracting thorax compresses the pulmonary arteries inside the lungs. Therefore they send the air they contain forward into the pulmonary veins . . .' Dr. Siegel not only denies that Galen asserted that the pulmonary veins contained air, but uses rough words to those who believed Galen to have asserted this, from Ibn-an Nafis in the thirteenth century to Singer in the twentieth. Even Harvey, who made a principle of 'respect for our predecessors and for antiquity at large' particularly Galen, and 'defended their conclusions to the extent that love of truth will allow,' is described as 'anti-Galenic'. That the drops of blood which Galen saw as passing through the lungs more as a result of the positive thoracic pressure of expiration than that of cardiac systole, confronted by fuliginous vapours moving in the opposite direction, in any quantitative sense constituted a pulmonary circulation must be considered very dubious to say the least. And those writers who have ignored it as such have had a more justifiable case than they are here allowed. Certainly Harvey himself, acutely aware of the essentially quantitative element of the problem of pulmonary circulation, did not see Galen as having described it. Dr. Siegel grossly underestimates both the

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experimental and quantitative sides of Harvey's investigations when he states that, 'only the erroneous interpretation of venous blood flow prevented Galen from anticipating Harvey's discovery of the circulation.'

It is perhaps worth following Harvey a little further for his own view of the size of the gap between his discovery and Galen's position, with regard to the transfer of blood from the veins through the lungs into the arteries. Harvey writes: 'There are perhaps some who, after my recalling of Galen's authoritative statements, or the reasonings of Colombo, may say that they are in agreement with me. The remaining matters, however, namely the amount and source of the blood which so crosses through from the veins to the arteries, though well worthy of consideration are so novel and hitherto unmentioned that, in speaking of them, I not only fear that I may suffer from the ill-will of a few, but dread lest all men turn against me.'

The 'misunderstandings' of Galen's position of which Dr. Siegel complains rest either on the poor translations of his texts, a potent factor particularly until Renaissance times, or on Galen's genuine ambiguity regarding the contents of the pulmonary veins.

Similar exaggeration of Galen's achievement in the rosy glow of historical hindsight is reflected by the comment that his works are, 'the repository of an astonishing number of ideas on which modern medicine is built.' Surely it is an historical fact that for at least 1,500 years, during which Galenic theory was practised, these ideas baulked rather than built the structure of modern medicine.

Galen's achievements were indeed so great that these excessive estimates in the end do him more harm than good. What must lead Dr. Siegel to make them is his keen appreciation of the intuitive rightness of many of Galen's concepts. Chief amongst these, indeed, is Galen's amazing insight into many of the properties of oxygen which he allots to the 'vital spirit'. Galen in fact consistently showed keen intuitive insight into the nature of the chemical as opposed to the physical side of physiology. His violent reaction from the mechanistic outlook of Erasistratus seems to have made him underestimate the mechanical factors of physiology. Even in relation to the physiology of respiration he is weak here as compared with his chemical insight, a contrast beautifully brought out by Dr. Siegel in the sections devoted to respiration and combustion.

Galen's antagonism to Erasistratus' mechanical views, and his acceptance of the proto-chemistry of the Hippocratic humours is reflected in his outburst; 'Has Erasistratus not read the book, *On the Nature of Man*, any more than the rest of Hippocrates' writings, that he so carelessly passes over the consideration of the humours.'

This key point in Galen's position is made very clear by Dr. Siegel in the following words on page 135; 'The atomic doctrine of Democritus and the Epicureans led to the assumption of material exchanges, whereas Galen followed the doctrine of the Aristotelian school and the Stoics, who spoke of the transfer of qualities during metabolic processes in the body. When Galen tried to apply these two opposing interpretations of nature to an explanation of the phenomena of combustion and respiration, he found that the atomic doctrine could not give an adequate answer to many questions. Therefore, he did not pursue the atomic trend of thought. On the

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other hand the doctrine of the transfer of qualities during combustion and respiration led Galen to an answer which appeared quite satisfactory to him as a philosopher and scientist . . . The atomic doctrine was to lead to modern chemistry, whereas the doctrine of the qualities favored the rise of the 'science' of alchemy.' It should be noted that, in Galen's own time, the atomic doctrine was the source of the hated Erasistratean views.

It was the elusive 'Jabir', some five hundred years later who used the quality 'dry' to describe those exhalations of the earth which were converted into 'sulphur', the 'moist' exhalations being the source of 'mercury'. Thus the qualities entered on that long alchemical path which eventually led them to chemistry. This section is therefore appropriately concluded by a consideration of the relation between Galen's concepts and those of Stahl, Boyle, Mayow and Lavoisier.

The final section of the book deals with the applications of Galen's humoral doctrine to health and disease, and clarifies the logic of his classification of diseases. Here Dr. Siegel emphasizes the complementary aspects of humoral and morphological concepts of pathology. The basic soundness of Galen's humoral views (which were after all Hippocratic in origin) is brought out by showing them as anticipations of those of Claude Bernard and even Virchow.

In the application of these pathological principles to clinical medicine, i.e. in combining Galen's concept of humoral dyscrasias with the clinical manifestations of local pathology as described by Galen in his *De Locis Affectis*, some brilliant diagnoses are revealed. Galen's description, for example, of haemolytic jaundice following snake bite is so accurate as to be unmistakable, as is his description of the anthrax pustule. Dr. Siegel carefully distinguishes between the accurate clinical description, recognisable to us today, and the pathological interpretation of the syndrome.

This is a controversial book. Few will read it without being stimulated or irritated by the section on cardiovascular physiology which would appear to present Dr. Siegel's personal viewpoint. There is something of Galen's own style in his strong advocacy of his point of view. Readers will have to make up their own minds as to the validity of the case he has presented.

In contrast the sections of the book dealing with the clinical aspects of Galen's works convey an impression of impartial and informative balance which renders them unquestionably of great assistance in the appreciation of Galen's achievements.

K. D. KEELE

*The Essential Writings of Erasmus Darwin*, chosen and edited with a linking commentary by DESMOND KING-HELE, London, McGibbon & Kee, 1968, pp. 223, illus., 45s.

Anybody who has tried to read Erasmus Darwin's *Zoonomia* or his *Botanic Garden* will be familiar with the *longeurs* of those extraordinary compositions and be prepared to turn with relief to the brief selections of important passages which are offered here. Darwin was a man of wide ranging interests and diverse talents, not all of which were expended in his practice of medicine. His speculations included the idea of evolution which was taken up and demonstrated scientifically by his