

good supply of able students, the Institute is also well placed to experiment with studies which span conventional boundaries. But it would be still more exciting if it were to attempt to work out ways of giving technology a more purposeful place than it has at present in modern society. Why should not M.I.T. concern itself as much with the problems of urban technology as with those of reaching the Moon? Ideally, Mr. Johnson should set out to give M.I.T. the means of helping society to decide what uses to make of science and technology. His predecessors have accomplished a lot already, but a great deal remains to be done.

## MORE BUREAUCRATS

SO far as it goes, the report of the Civil Service Commissioners for 1965 is cheerful about the recruitment of scientists to the British Civil Service. Of the 107 candidates successful in the competition for entry into the Administrative Class—the members of which eventually come to inhabit what are called the corridors of power—no fewer than nine are said to be endowed with a scientific training. The Commissioners say that this was a “marked improvement” on previous years, but plainly there is a long way to go before present methods of recruitment will ensure that the mainstream of the Civil Service is adequately supplied with competent scientists. At the same time, there is continuing anxiety about the recruitment of capable scientists into the Scientific Class. Here the difficulty is not so much an absolute shortage of numbers as a shortage of candidates of really outstanding quality. This does not necessarily mean that the Government research establishments are starved of really able men, for the recruitment of professional scientists to the Civil Service usually entails a period of unestablished service which does not count in the Commissioners’ statistics. But evidently there is a lack of really able professionals willing to settle down in Government service. Even though the rapid growth of recent years is clearly part of the cause of the Commissioners’ anxiety, things could obviously be better than they are.

Here, as in many other parts of British public administration, the remedy is probably to be found in greater flexibility. Thus the recruitment of scientists to the Administrative Class would be enormously improved if only the Civil Service as a whole would make fuller use of the arrangements which now exist for the transfer of men and women from one class to another. In 1965 there were fewer than a dozen transfers of this kind, yet the Government laboratories are now well supplied with experienced administrators ready and able to spread their wings. Both classes—the Administrative and the Scientific—would be better off if there were a more ready interchange between them. In a very similar way, recruitment to the Scientific Class would be improved if it were easier than it is at present for professional civil servants to retain a sense of kinship with the scientific discipline to which they belong. There needs to be a greater traffic of people between the research establishments and the universities and industry. Sabbatical leave ought to be a necessity, not a luxury. And some of the humdrum customs of public service ought to be abolished. The irony is that British public laboratories have never before been so well stocked with exciting problems to be tackled.

## COMMONSENSICAL ENGLISHMEN

### The English Paracelsians

By Allen G. Debus. (Oldbourne History of Science Library.) Pp. 222+7 plates. (London: Oldbourne Book Co., Ltd., 1965.) 45s. net.

THE sixteenth century was rich in passionate personalities who delighted in being at the storm centre of controversy and whose life and work have aroused either adulation or distaste ever since their own day. Was Cardan, the astrologer-physician, a great mathematician or a fraudulent plagiarist? Was Giordano Bruno a Copernican martyr or a magician and pantheistic heretic, Paracelsus the founder of modern chemistry or an alchemist sunk in mystic and incomprehensible theory? It all depends on one’s temperament, and neither Paracelsus nor any of the others have ever lacked defenders. Those who find these mystic and magical aspects of the sixteenth century distasteful and of doubtful value in the history of modern thought can console themselves with the reflexion that the later contemporaries and successors of those followers of the Hermetic tradition (as Frances Yates has recently taught us to consider it) found their books difficult to understand and even nonsensical.

Mr. Debus belongs to the younger generation of historians of science, already in revolt against the rationalist views of his post-War predecessors; he would like to see in Paracelsus a dominant leader in the emergence of modern chemistry. Had he chosen to discuss the Continental Paracelsians of the period before 1650 he would have found, as he himself says, much detailed and solid evidence of Paracelsian influence. But circumstances have led him to write about Paracelsianism in England before 1640, and he is too good a scholar not to recognize that the English even then were too sceptical of high-flown mystic or metaphysical theory to be Paracelsians in any real sense, and, as here emerges, Paracelsian ideas were of negligible importance in Elizabethan and Jacobean England.

It must be remembered that then, as now, Paracelsus was a very inaccessible author. Few Englishmen could (or can) understand the curious mixture of Schweizdeutsch and Latin in which Paracelsus wrote, and most of his works have never been translated into English. (Only two small works were so translated in this period.) In addition, Paracelsus’s theory is difficult to understand; he expressed himself obscurely and is often inconsistent. Only two Englishmen ever seem to have been direct followers of Paracelsus: Bostocke and Fludd. (More refer to his theory only to insist they cannot understand it, and a few accepted a diluted version promulgated by later Continental Paracelsians.) Bostocke was an extremely obscure Elizabethan mainly remembered for his comparison of Copernicus and Paracelsus (which Mr. Debus makes less clear because he does not know the Elizabethan usage of ‘stars’ for ‘planets’). Robert Fludd, whom Mr. Debus has studied at some length, was the Jacobean expositor of a ‘Mosaic philosophy’, a blend of Renaissance science and speculative mysticism which was extensively attacked on the Continent, notably by Mersenne and Gassendi, but was virtually ignored in England. The mystic chemistry to be found in this period belongs to the older alchemical tradition of George Ripley and Thomas Norton; it was not until the 1650’s that English mystic chemistry received a new stimulus from the work of Van Helmont. It is to be hoped that Mr. Debus may give us an examination of English Helmontians, who are many and varied.

As *The English Paracelsians* amply demonstrates, English medical men and apothecaries accepted the ‘new’ chemical remedies and drugs for which Paracelsus had claimed so much without regarding them as necessarily Paracelsian. Partly this is because they recognized that chemical remedies were older than Paracelsus, and partly because they derived them from followers of Paracelsus in whom the pure Paracelsian doctrine was much diluted.