

tially a religious philosophy aimed at the unification of all Nature in a single scheme under Divine guidance: there is a causal chain of descent from God to matter. As the author points out, this is compatible with Christian theology, but it is equally compatible with Muslim theology; allowing for Muslim disbelief in the Trinity and in the divinity of Christ, it is possible to trace quite clearly the continuity of alchemical philosophy from the Brethren of Purity to Thomas Vaughan.

Dr. Sherwood Taylor makes the further point that, owing to its religious basis, alchemy would have no truck with black magic. This is an interesting suggestion, and it is to be hoped that the author will expand it in a further book or paper; the dividing line between alchemists and magicians was surely not always very well defined.

While I have directed attention to what seem to me to be the important contributions to alchemical studies made in the book, it should be added that the main story is a beautifully written and well illustrated account of alchemy from the earliest times: quite the best account yet given in such compass. It will interest all who are curious about man's interpretations of Nature and its relations to the Deity, and, if it be the history of an error, the error was one extremely tenacious of life. It is, indeed, not dead even in this twentieth century: I remember seeing a practising alchemist of the old school, Al-Hajj Abdul-Muhyi Arab (once Mufti of the Shah Jehan Mosque at Woking), absorbedly bending over a heated ladle which was always going to, but never did, deliver a golden stream of transmuted lead.

E. J. HOLMYARD

## PHYSICAL CONCEPTS, NEW AND OLD

### The Scientific Adventure

Essays in the History and Philosophy of Science. By Prof. Herbert Dingle. Pp. ix+372. (London: Sir Isaac Pitman and Sons, Ltd., 1952.) 30s. net.

THE author of this collection of essays and lectures presides over one of the most interesting and progressive academic 'schools' in Great Britain—that of the history and philosophy of science in the University of London. Thus it is appropriate that he should divide his book into two sections, one historical and one philosophical. As he is at pains to point out, however, he is more specifically in his element when concerned with the latter than with the former. Nevertheless, of the past he has much of consequence to say.

Although composed for a wide variety of occasions, there is a certain thread of continuity running through these pages, a strand of astronomy, astrophysics and cosmology deftly intertwined with their associated epistemological correlates. Amidst much of importance, there should be little difficulty in recognizing that Chapters 1, 9 and 19 (the last) are outstanding in their respective fields. To these, therefore, in general, this review will be restricted. But before getting to grips, one notices how true to type they are. The first, being frankly historical, leaves us to draw—as indeed we must—the conclusions based upon several centuries of scientific endeavour. The other two are quite different in that they propound questions possibly unanswerable. This seems perfectly legitimate, and in full accord

with the traditional duty of a philosopher, especially since many an ordinary person (if such exists) would scarcely dream that such problems were stuff for thought at all, let alone disciplined inquiry. It is the merit of these papers that, through reading them, attention is inevitably directed to the presence of several formidable philosophical hurdles confronting the individual and society. There may be little inclination to try to jump them, but to know that they are there is salutary.

Chapter 1 describes what are in effect two life-lines, one that of the logical development of scientific knowledge, the other the actual. Naturally, at certain points they intersect. Broadly, however, the factual course is strewn with minor deviations which lead nowhere, whereas the chart of formal progress is dead straight. Prof. Dingle points the moral clearly. The logical *Lebenslauf* is the lot of the student, if only for the reason that to wander aside into history might touch off some sparks of interest, and thus endanger his effective working hours. As things are, it is only rarely that he has any chance of appreciating how major discoveries and inventions came about; he is constrained largely to pool them in order to get some kind of tidy conspectus. Experience, however, goes far to condemn this tendency, because it is crystal-clear that the capacity for original work of the highest order is more often than not found in those who have deliberately studied the past and pondered over its message.

Turning now to Chapter 9, this deals with 'the philosophical viewpoint of the scientist'. The emphasis is upon two anomalies, to which the author has devoted a great deal of thought. One is the subject-object relation. The other concerns time. The solution offered is to regard the subject 'as inevitably stationed at the present', whereas the object is to recede into the past. Following upon this, reason is seen not to be objective 'in the act of thought', whereas experience is found to be placed in time.

Towards the end of this chapter comes the link which seems to join it without constraint to Chapter 19. This is the problem of ethics. We are faced with the Kantian co-equals, 'practical reason' and 'pure reason'; and, sure enough, back we are driven to the categorical imperative. This the author fails to find coercive, and, philosophically speaking, the majority of mankind will agree with him. But, once again, nothing can be done about it.

From here, the reader may well survey the last contribution as from a point of vantage. Its subject is 'science and religion'. Even to anyone a little wearied of such a theme, it must appear as exceedingly well conceived. Perhaps the reason for this is because Prof. Dingle refuses to get bogged down in the minutiae of what will always, on this side Jordan, be essentially subjective and personal experiences. Yet—and here is the strength of this particular presentation—they are none the less real for that.

Time was, and perhaps to some degree still is, when philosophy was the accredited handmaid of theology, and proud to share a palace with the queen of the sciences. This ancillary relationship has since become somewhat difficult. It is not wholly a question of 'abdication'; events have made it less easy for 'the Crown' to keep clear of, and to sit above, the stresses and strains of contemporary life. But these are matters only discernible maybe upon another plane of discourse, namely, that on which we shall know, even as we are known.

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