sketch of the development of American education, and a socio-economic essay on Asian society: but little about 'excellence'. It is unfortunate that the English contribution should repeat the legend of Arnold's responsibility for the cult of games as part of the education of the gentleman.

The second section is much more valuable and contains some excellent discussion of the different systems adopted to educate that aspirant after excellence, the 'gifted child'. Three main patterns emerge. The American and the Russian are firmly committed to the common secondary school, while the European and British show a tradition of segregated schools being modified in the direction of the 'comprehensive principle'. It is particularly interesting, for example, to read a classic exposition of the English 'tripartite' division by Lord James, immediately followed by a defence from Roger Gal of the French preference for postponing 'positive differentiation' until about the age of fourteen or fifteen. There are excellent descriptions of the Swiss and Italian segregated systems, but on the whole the major weight is given to the comprehensive schools of North America and the Soviet Block. This is probably justified if the editors are right in their feeling that the trend of world opinion is towards a common school with varying devices for differentiation within it, until the age of fifteen.

The device used to provide for the gifted child in the Soviet Block is the provision of a wide range of study circles outside school hours. These circles study mathematics, physics or languages in a more adult way and to a more advanced level than is provided for in the school curriculum. In North America the same objective is sought by the twin methods of 'enrichment' and 'acceleration'. The case studies in the third section of the book are mainly American and show that 'acceleration' is no more than the promotion by ability rather than age with which English public schools with a wide ability-range have long been familiar. Enrichment classes seem not unlike the Soviet study circles except that they find their place inside the curriculum instead of out.

A short review cannot do detailed justice to a *Year Book* containing forty-three separate articles, some, like Prof. Bereday's, of surely lasting value. But clearly no one ought to discuss the 'Grammar/Comprehensive' controversy further without referring to it. The proof reading has been at times curiously lax. It is startling, for example, to read that "the Muslims of Dacca were abolished to promote the cloth from Bradford and Manchester". A. D. C. PETERSON

ACTION AT A DISTANCE AND METAPHYSICS

Forces and Fields

The Concept of Action at a Distance in the History of Physics. By Dr. Mary B. Hesse. Pp. x+318. (Edinburgh and London: Thomas Nelson and Sons, Ltd., 1961.) 35s. net.

THIS book deals historically and philosophically with the concept of action at a distance up to its present almost complete eclipse by field theories. The scope is indicated by the headings of the eleven chapters, of roughly equal length: the logical status of theories, the primitive analogies, mechanism in Greek science, the Greek inheritance, the corpuscular philosophy, the theory of gravitation, action at a

distance, the field theories, the theory of relativity, modern physics, the metaphysical framework of physics. There are two appendixes, a bibliography and indexes. It is a scholarly work, obviously the result of long study. The style is pleasant, but occasionally long sentences make the going heavy, for example, there are sentences of eight lines each on pp. 260 and 298. A reader unversed in the techniques of mathematical physics will find some of the book difficult. This is not due to proliferation of mathematical formulae (there are few), but because, from the time of Newton, physics can scarcely be understood without its mathematical formulation. To those with the requisite background I recommend the book, particularly to young physicists who, by studying the queer ideas of their forebears, may come to see that they too may think queerly without knowing it.

However, in spite of the high merit of the book, the respect I have for the author's erudition, and the shrewd and penetrating remarks scattered through the pages, I ended it with some feeling of isolation. The party was on, I had been invited; but somehow I could not join in because I was wearing the wrong clothes. The thing was brought to a head in the closing paragraph of the book, which I now quote with the addition of my own italics:

"Our discussion has not enabled us to answer the question 'Do bodies act at a distance'—this in any case is not *the business of the philosophy of science*. It has not enabled us to show that physics itself gives a definite answer, because although we have maintained that physical theories are asserted as facts, the problem of action at a distance is not so much a problem of particular theories as of *metaphysical framework*. The discussion has, however, enabled us to compose some variations on a theme: namely, the historical, heuristic, and logical importance for physics of ideas and assumptions commonly called *metaphysical*. A society which is uninterested in *metaphysics* will have no theoretical science."

Reading this over, particularly the italicized parts, I oscillate between extremes of humility and arrogance. Dr. Hesse handles with assurance certain technical expressions which I do not understand, and modesty demands that I creep into a corner, leaving her to pontificate in her field of expertise. But, on the other hand, I am a theoretical scientist, and I begin to wonder whether my inability to understand what she says about theoretical science may not be due to the absence of meaning in her words. In this mood, I feel inclined to throw them back at her, telling her that the philosophy of science and metaphysics are nothing but two empty battered tin cans drawn behind the triumphal car of science on strings two or three centuries long. It would help me to find an equilibrium between these two extremes if Dr. Hesse would look over my shoulder when I am trying to understand or solve some scientific problem, and say, as I write down one formula: "That is philosophical!" and, as I write down another: "That is metaphysical!" provided that in the circumstances self-consciousness did not prevent me from writing down any formulae at all.

I searched the *Oxford English Dictionary* for a meaningful meaning of 'metaphysics', but did not find it; I found instead a quotation to end this review with: Shakespeare, *Taming of the Shrew*, I, i, 37 "The Mathematickes, and the Metaphysickes, Fall to them as you finde your stomacke serves you".

J. L. SYNGE