

small, it would help to combat many infections, and would do much less harm than most of the official remedies of the profession. Indeed, the only contemporary complaints seem to have come from a few disgruntled medical men who disapproved of black-legs. If Berkeley himself rated its virtues too high, it was because of the enthusiasm of grateful patients. There are two minor mysteries which Prof. Luce has not been able to clear up. How is it that no correspondence between Swift and Berkeley has come to light? And what were the circumstances that led the unhappy 'Vanessa' to make Berkeley her heir?

It is nearly two hundred years since Berkeley's death, and this is the first full-length biography to appear. The wait has perhaps been worth while. Nobody in earlier times was so well equipped for the task as Prof. Luce. Other lives may possibly be written; this one will be read. A. D. RITCHIE

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ENERGY AND MATTER

Energy and Matter

By R. L. Worrall. Pp. 144. (London: Staples Press, Ltd., 1948.) 10s. 6d. net.

THIS unusual book opens with a quotation from Lenin—"Modern physics is in a state of confinement; it is giving birth to dialectic materialism". The author is a medical man whose previous book, "The Outlook of Science", was first published in 1933 and reached a second edition in 1946. The greater part of the present book is a history of the evolution of ideas concerning matter and energy. It is emphasized that Newtonian ideas, in which mass or inertia was the characteristic property of what is usually called matter, must now, in the light of Einstein's work, be modified so that what is usually called energy must also be attributed with mass. Every physicist will agree with this, and will be interested in the quotations from Newton, Maxwell, Einstein, and others. Dr. R. L. Worrall's distinctive contribution is to insist that the term matter should now be extended to include what is usually called energy. When a distinction is needed, we can speak of the corporeal and incorporeal state (p. 62).

Probably most physicists would consider the issue raised an entirely verbal one, adding nothing to the accumulated facts of the science or to the mathematical theories co-ordinating those facts. However, Dr. Worrall would not agree. On pp. 61-62 he says: "If the material character of radiant energy was recognized, it would not be possible to regard matter as absolutely inert. Matter would then be seen to have an active as well as a passive quality; motivity as well as inertia. Instead of the current view that inert matter is acted upon by non-material energy, matter would be recognized as self-motivated. All this would conflict with theology, which teaches that something supernatural is ultimately responsible for the activity of 'inert' matter. Physics, therefore, retains the assumption that matter is absolutely inert, and that radiant energy is non-material in character. Modern materialism has no such attachment to theologically inspired assumptions. Defining matter as that which exists independently of thought, we can see that matter is active as well as passive, self-motivated as well as inert."

In the opinion of the reviewer, theories concerning physics should be based entirely on the experimental evidence available and the mathematical co-ordina-

tion of this evidence. Whether these theories agree or not with theology or dialectic materialism is entirely irrelevant. Most of us think it was monstrous that Galileo's astronomical theories were condemned by the Holy Office. However, this was more than three hundred years ago, and is now obsolete; but it is alarming that Prof. E. A. Milne's astronomical theories are condemned by Dr. Worrall (p. 113) on the ground that "Milne's kinematical time-scale involves a theological assumption, namely, a beginning of time at a supposed creation of the universe". Let us hope that there will never arise a new Unholy Office, with power to force recantation of scientific theories which are considered likely to support theology. H. T. H. PIAGGIO

NEW STAR CHARTS

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Skalnate Pleso Atlas of the Heavens 1950·0

By A. Becvar. Pp. ii+16 charts (18 in. × 25 in.). (Cambridge, Mass.: Sky Publishing Corporation, 1949.) 5 dollars.

Mappa Coelestis Nova

Containing all Stars brighter than 5·0 Visual Magnitude classified according to the Henry Draper Catalogue. (Cambridge, Mass.: Sky Publishing Corporation, 1949.) 3·50 dollars.

THE Skalnate Pleso Atlas of the Heavens is named after the new astrophysical observatory at Skalnate Pleso (Rocky Lake) in the High Tatra Mountains of Czechoslovakia, the director of which, Dr. Antonín Becvar, planned the work and, with the aid of a devoted and enthusiastic band of collaborators, carried it through in less than a year. The Atlas was published in Prague in 1948, but shortage of paper limited the number of copies that could be printed. The present edition, published in the United States from duplicate negatives, will make the Atlas available to all who require it.

Every observatory and every amateur observer should possess this Atlas. Its sixteen charts show the positions of all the stars (32,571 in number) down to 7·75 visual apparent magnitude in the whole sky, depicted in a graduated scale of images with sixteen steps. Double and multiple visual and spectroscopic systems are shown in a manner which indicates the number of visual and spectroscopic components. Novæ and variable stars with maximum brightness 7·75 or brighter are shown. The positions and relative dimensions of galactic star clusters, globular clusters, planetary nebulae, extragalactic nebulae of magnitude 13·0 or brighter, and of the principal galactic gaseous nebulae are depicted. The principal dark nebulae and obscuring patches as well as the outlines of the Milky Way are shown. The galactic equator, the ecliptic, and the limits of the constellations as adopted by the International Astronomical Union are marked.

The Atlas will be useful to the professional astronomer in a variety of ways and particularly in planning observational programmes. To observers of double and variable stars and to comet searchers it will be invaluable. The Atlas is well printed on paper of excellent quality and is good value at the published price.

The Mappa Coelestis Nova is also a reproduction of a chart published in Prague. It shows the principal naked-eye stars (to about the fifth magnitude) in the