reviews

Medieval record
C. J. T. Lewis


over such a wide range of subjects is obviously no mean achievement. It is not only the sheer bulk of available material that renders the construction of an anthology of mediaeval science so problematic a task, however. In addition, there is the difficulty of selecting topics and texts that are relevant both to the subsequent evolution of early modern science and to the interests of the ordinary 'educated reader' at whom this work is partly directed, without simultaneously distorting the emphasis of the original speculations. Professor Grant is, of course, well aware of, and for the most part effectively reconciles, such conflicting demands.

Nevertheless, it is perhaps inevitable that he should tend towards the use of an essentially positivist criterion in making his selections. This tendency is most conspicuous in the devotion of relatively little space to alchemy and astrology, and the complete exclusion of the more exotic magical sciences. More subtly, however, the same criterion determines a concentration on the 'achievements' of mediaeval science that I have already mentioned. Occasionally, this leads to a measure of distortion, most obviously, for example, in the documentation of mediaeval 'kinematics'. On the whole, however, such misrepresentation is avoided; the broader context of individual problems, the characteristic conceptual interrelationships and the typical methods of mediaeval science are illustrated with considerable force and economy. Indeed, a particular virtue of this source book is that the (to a modern mind) metaphysical preoccupation, and the unique gothic complexity, of much scholastic scientific discussion is clearly illustrated by the reproduction of complete questions and treatises.

It is inevitable in a work of such size and scope that one should take exception to certain features and register certain omissions. Thus, although the copious annotation of individual documents renders them perfectly comprehensible, it is regrettable that the sections on physics should be provided with neither a contemporary nor a modern outline of the principles of Aristotelian natural philosophy, which constituted, after all, the foundation of most scholastic physical speculation. Again, it seems a pity, considering the possible audience of this book, that further references for given topics are not more thoroughly recorded. Ultimately, however, it must be said that this book offers a clear and scholarly exposition of a mass of fascinating documents, and provides an unparalleled insight into the processes and preoccupations of mediaeval science.

Most students find mathematical physics a difficult subject. They can follow a qualitative explanation (such as, "magnetisation lines up the spins"). They can follow the steps in an algebraic deduction, or in the solution of an equation and the evaluation of an integral; the physics and the mathematics are philosophically distinct activities. Difficulties arise, however, at the meeting point between these disciplines. How does one mathematise a physical problem? Why do the same equations crop up over and over again, in apparently unrelated physical contexts?

This original undergraduate text is a largely successful attempt to answer the second of these questions. The philosophy is to apply the field equations of mathematical physics (Laplace, Poisson, wave, and diffusion) to problems of increasing complexity, illustrating the solutions obtained with examples from a very wide range of

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fields of physics. First, the field equations are introduced. Then they are solved in rectangular, cylindrical and spherical coordinates. Finally, approximate methods (perturbation, WKBJ and variational) are discussed. The originality lies in the examples chosen which are oriented towards physics rather than applied mathematics and which include lattice vibrations, Bloch waves, skin effect, etc., and the introduction of a rotating star, earthquakes in the Mohorovicic layer, pseudopotentials in liquid metals, and quantum chemistry. There are many interesting exercises for the reader.

Unfortunately, the book is seriously marred by many minor errors and infelicities, most of which could have been avoided by careful proof-reading. Symbols are not defined, figures are imperfectly labelled and terms are introduced without explanation. This will confuse all but the best students. I do, however, warmly recommend the book to teachers.