compendium on the variations of the forms of folded strata to those geologists who do not have ready access to the original descriptions. J. G. RAMSAY

HAMILTON'S PRINCIPLE

Hamilton's Principle and Physical Systems

By B. R. Gossick. Pp. xiii + 247. (New York: Academic Press, Inc.; London: Academic Press, Inc. (London), Ltd., 1967.) 68s.

MOST books on classical mechanics discuss the Lagrangian formulation of mechanics and then usually include a demonstration that Lagrange's equations can be derived from Hamilton's principle. Although it is often stated that problems of electrical systems can be expressed in a similar mathematical form this is not usually developed at any length in such books.

The author of this book is anxious to provide a text giving a treatment of mechanical and electromagnetic systems which emphasizes the similarity of approach used in dealing with problems arising in both. In brief he attempts to do this by giving a general form of Hamilton's principle and using this to provide the appropriate framework for a discussion of the mechanical and electrical examples selected in the book.

There are six chapters. The first consists of a three page historical introduction. The second provides a background of mathematics (mostly concerned with Fourier series and Laplace transforms) which is used from time to time in later chapters.

The third chapter discusses the calculus of variations and gives an account of Hamilton's principle for general physical systems. The theory is given a concrete interpretation in the fourth chapter where conservative mechanical and electrical systems are considered.

The fifth chapter, which constitutes a third of the book, deals with non-conservative linear systems. The only mechanical system treated here (which occupies two pages) is that of a rigid body with damping. The last chapter deals with the Lagrangian density.

The author claims in the preface that a comprehensive and elementary presentation of mechanical and electromagnetic systems is given. Students unfamiliar with the material will not find this a suitable text. The presentation is not self-contained and is incomplete. For example, when the Euler angles for a rigid body are introduced in the fourth chapter the only explanation is a diagram which would be unintelligible. On the other hand, for those with an appropriate background of physics a considerable part of the book is redundant.

In view of the length and emphasis of the fifth chapter and a comment in the preface that the application of Hamilton's principle to non-conservative linear systems has not previously appeared in other texts it seems reasonable to suppose that this chapter is the main reason for the appearance of the book.

Although the book is well printed and clearly set out, I find it difficult to suggest what class of readers would find it of greatest value. M. J. WILFORD

TESTING IN SCHOOLS

Teachers and Testing

By David A. Goslin. Pp. xix + 195. (New York: Russell Sage Foundation, 1967.) \$7.50.

THE supposed advantages and alleged deficiencies of intelligence and objective achievement tests (forced multiple-choice, true/false, matching, completion, and

so on) have been widely debated. Less attention has been paid to the immediate social context in which such tests are given: particularly to how schools and teachers use tests, and are themselves influenced by them. This book reports a well-conducted survey of these sociological aspects of testing. Although American, it should be of relevance and interest to teachers, testers and education policy makers in Britain. American children average three standardized tests every year of their schooldays. If we are following this trend, we should pay attention to how it will affect our schools and teaching.

A large sample of public secondary school teachers, counsellors and pupils received questionnaires covering a wide range of issues: beliefs about tests; teachers' psychometric sophistication; the intended and actual use made of tests in selection, grading and vocational guidance; the dissemination—or lack of it—of test scores; the extent to which pupils are pre-trained for testing; the weight of test scores in evaluation, and so on. Numerous summary tables accompany the text but are not always adequately summarized within it.

Despite the thoroughness of the investigation there are three methodological deficiencies. First, in this type of work the interesting questions often emerge only after quantities of data have been collected. A pilot study would have enabled subsequent concentration of resources and treatment of pertinent issues in greater depth. Second, there is little said about how subjects perceived the investigation, although the author himself acknowledges the extent of extraneous social influences on expression of opinion. It is not clear, for instance, whether or not teachers thought their personal views on testing might filter back to their employers. Third, there is reliance almost entirely on self-reported questionnaire data. The one exception was an interesting experiment—using made-up school records—to see what weight teachers attached to test scores in contrast to other recorded information, in placing pupils in *A* or *B* streams. There was a marked disparity between teachers' reports of what they generally do, and what they did in the experiment. It pinpoints the weakness of over-reliance on questionnaires and the need for more imaginative and realistic methods of investigation. It also undermines confidence in the rest of the study. The author describes other points of dissonance and disagreement that seem to reflect an underlying sense of uncertainty among teachers about the place of testing in their work. There are many examples. Of those teachers who strongly advocate letting their pupils have a general indication as to their IQ, a quarter had never given their pupils any such information. The number of tests a school gives, and its stated test policy, are unrelated to how much actual use is made of test results in the school. Teachers generally want to withhold test scores from parents, while parents urgently want to know them.

Two major effects of testing on teaching are mentioned, but too briefly and peripherally for their importance. First, despite their protestations to the contrary, it was found that teachers do often coach pupils for tests. Moreover, the more schools are oriented towards college admission, the more likely they are to give such preparation and assistance. The chances of going to college for pupils in other schools may therefore be affected. The second major effect is on the school's own examining, where the multiple-choice form of question has replaced other forms, such as the essay. It is conceivable that this predominance may lead to students being rewarded for achieving complete coverage of the syllabus, rather than for exercising their individuality in selection and expression. The way in which exams impose their own constraints and patterns on teaching, learning and subsequent intellectual development needs to be further investigated. The dog should wag the tail, and not the tail wag the dog.

MALCOLM PARLETT