sets would certainly cause complaint. In describing the different forms of apparatus which have been used for measuring vibrations, no hint is given as to the trustworthiness of the results. This is an important omission, for in the greater number of those instruments the records are an imperfect catalogue of peculiarities of the instrument rather than of the magnitude of the external vibrations which they were designed to measure. All such instruments have natural periods of their own, and one of the most important points in their design should be to arrange that neither the slowest nor any of the more rapid natural periods shall approach those of the imposed vibrations, and since in most cases the imposed vibrations are (like white light) made up of a great many arbitrary disturbances, this is not a condition which it is easy to fulfil. Many mistaken diagnoses have been made from neglecting the effects of resonance on the recording apparatus, and from supposing that a large recorded amplitude necessarily indicates a large external vibration.

Perhaps the most interesting chapter is that on the isolation and damping of sound, in which many examples are given of successes and failures in practical attempts in this direction. In most of these the actual results might have been anticipated. In speaking of the minimum audible sound (as in reference to the least sensible vibration) insufficient prominence is given to the effect of the surrounding conditions. In an absolute silence many experiments have shown that a sound, the wave amplitude of which is a twenty-five millionth of an inch, can be heard, but in the midst of other noises, if the amplitude of the loudest of these is taken as unity, another sound with an amplitude of 1/15 is only just audible, so that the greatest and least intensities which can be appreciated simultaneously are something like two hundred to one.

With regard to the isolation of sound, an absolute barrier to the propagation of vibrations may be set up either by complete reflection or complete absorption, but when the amplitude is large and the absorption rapid, a gradual change may probably occur in the absorbent. The secular change in the efficiency of sound-absorbing materials is not mentioned.

In reference to the acoustic qualities of halls and rooms, most of the experimenters whose work is quoted seem to consider that "good" and "bad" depend on the rate at which vowel sounds and musical notes are damped, but it is not uncommon to find rooms which are good for music but bad for speech, and it is the effect of the resonance of the room on the consonants rather than on the vowels which determines whether spoken words are clearly heard.

Though there are many published papers on the subjects which come under the head of "vibration," Mr. Eason's is the only book in which any collection of their results has been attempted, and notwithstanding some defects (chiefly of omission), it should form a very useful addition to the literature of the subject. A. M.

Our Bookshelf.

Advanced Practical Physics for Students. By B. L. Worsnop and Dr. H. T. Flint. Pp. vii+640. (London: Methuen and Co., Ltd., 1923.) 21*s.* net.

TEACHERS of experimental physics will find much that is useful and suggestive in this volume. Though some experiments of an elementary character have been included, the work is intended for advanced students who are working for a pass or honours degree. The bulk and the price of the book might have been reduced materially by the omission of much that is common to many elementary text-books. In some cases full experimental details are given, while in others the description is insufficient to enable an ordinary student to carry out the necessary manipulations. Little attention is given to the degree of accuracy to be expected.

Many recent experiments and modern forms of apparatus have been described. We may mention in particular the determination of the ratio of the charge to the mass for an electron by means of the Zeeman effect using a Lummer-Gehrcke plate, and also by Sir J. J. Thomson's method. From the account given in the book the student might infer that the latter method is due to Braun. There is a useful chapter on the quadrant electrometer (in which Wheatham should be Whetham), and a section on the three-electrode valve.

The most striking feature of the work is the stress laid on the theoretical side of the subject, the aim being to make the course practically independent of other treatises, at least as regards immediate reference. To aid this scheme an introductory chapter on the calculus has been included.

It is to be regretted that the proof-sheets were not submitted to a literary critic, as there are too many examples of careless or ungrammatical construction, and the punctuation needs amendment in many places. The wholly inadequate table headed "Units" needs revision: the value for the electrochemical equivalent of hydrogen has long been superseded, and to give the charge on an electron as $4{\cdot}71\times10^{-20}$ E.S.U. is unpardonable.

Mechanical Testing: a Treatise in Two Volumes. By R. G. Batson and J. H. Hyde. Vol. 2: Testing of Prime Movers, Machines, Structures and Engineering Apparatus. (The Directly-Useful Technical Series.) Pp. xi+446. (London: Chapman and Hall, Ltd., 1922.) 25*s.* net.

THE first volume of this work dealt with the testing of materials of construction; the present volume concludes the treatise and contains a great deal of matter which will be of service to all who are interested in the testing of machines and structures. The selection of a suitable dynamometer is of vital importance in the testing of an engine or machine, and, roughly, one-quarter of the volume is devoted to different types of this instrument. This section includes traction dynamometers such as