

ing any adequate recognition of the work which in later days caused his name to be handed down to posterity.

Of the remaining two books on our list a great deal might be said, but it would be difficult to give more than a bare statement of their contents in a general review of the present character. Dr. Field's development of the theory of algebraic functions by algebraic methods occupies a useful place in the literature of the subject, and is well adapted for use as an introductory treatise. In the matter of exposition, the summaries at the commencement of each chapter are valuable. The subject-matter includes a discussion of the Riemann-Roch theorem, Plücker's formulæ, and the Abelian integrals. The development of the theory, which is applicable to algebraic equations of the most general character, culminates in the complementary theorem, from which such applications as those just mentioned follow as corollaries.

Prof. Duhem's treatise has for its object the study and analytical expression of the equations of a material medium for displacements and stresses of a more general character than those considered in the ordinary analysis of stresses and small strains. It thus takes account of finite strains and of viscous in addition to elastic resistances. It includes the study of isothermal and adiabatic changes. The problem of wave propagation is discussed at considerable length, and in particular the conditions for permanence of wave motion. Hysteresis is not taken into account. The problem is a generalisation of that dealt with in 1874 by Dr. Oskar Emil Meyer. Some time back a small elementary treatise was reviewed in NATURE dealing with a somewhat cognate subject, namely, the classification of the various phenomena that can exist in a deformable medium, and the present treatise may be conveniently described as an analytical discussion of the x , y , and z equations, while the little book in question explained the A, B, C of the subject.

G. H. B.

OUR BOOK SHELF.

Arboriculture Fruitière. By Léon Bussard and Georges Duval. Pp. xii+562; illustrated. (Paris: Baillière et Fils, 1907.)

THE object of this little book, we are told, is to be useful to fruit-growers, and with that view to lay before the reader in a condensed but systematic form as complete a general view as possible of the scientific principles underlying practical methods of fruit culture.

The actual details of cultivation do not differ materially from those followed in this country, but there is a marked difference in the manner, and especially in the spirit, in which the several operations are carried out in the two countries.

Here the details of pruning, pinching, and the like are done in routine fashion, handed down from our predecessors and pursued because experience has shown the utility of the practice.

In France much more thought is given to the matter. The book before us affords an instance of this. The various shapes and positions which the

buds assume and the circumstances in which they are formed are gone into with much detail, and we have descriptions of *lambourdes*, *dards*, *brindilles*, *cochonnets*, *bouquets de mai*, *chiffons*, *coursons*, and *bourses*, for many of which we have no corresponding terms in English. Nevertheless, a knowledge of these details is essential to a rational system of pruning, and apart from their practical interest they should be carefully studied by those interested in bud-variation and "mutation."

We do not think that botanists in general adequately recognise the great diversity that exists in the buds of a single tree. The study of a pear-branch or of a peach-shoot would form an excellent preliminary exercise to the investigation of bud-variation, and perhaps serve to restrain premature theoretical pronouncements. For this reason, apart from its practical utility, we can commend the work before us as well thought out and carefully written. The principal varieties are described, the illustrations are appropriate, there is a table of contents, and an index, the latter not so complete as it should have been.

Physikalische Kristallographie vom Standpunkt der Strukturtheorie. By Ernst Sommerfeldt. Pp. vi+132. (Leipzig: C. Tauchnitz, 1907.) Price 6 marks.

THE title of this book is somewhat misleading. According to the commonly accepted nomenclature of crystallography the book would be described as a geometrical account of the structure-theory with a few physical applications. The ground covered is hardly wide enough to warrant the name "physical crystallography."

The author's style and method are obviously modelled on those of Sohncke. His account of the 230 possible types of crystal-structure is descriptive rather than logical, and will appeal far more to a practical crystallographer who wishes to have some slight acquaintance with modern developments of the structure-theory than to a mathematician who regards the subject as an application of the group-theory. The latter will probably feel a little irritated at the absence of exactness in definition and completeness in proof. For instance, the "space-partitions" on which the argument is based are nowhere clearly defined, and the reason given (p. 65) for assuming fifteen of these partitions as fundamental is quite unconvincing. Surely the partitions should either be limited to the fourteen possible space-lattices or be extended to include such figures as Kelvin's fourteen-walled cell. Sohncke's systems are illustrated by photographs of excellent models, but such diagrams probably convey very little to a reader unless they are arranged for stereoscopic use. The author gives, however, figures showing the projections of these models on a plane, which will doubtless be an assistance to the student, though they might with advantage be clearer.

The last forty pages of the book are devoted to a discussion of some physical applications of the structure-theory. Here the author appears at his best, and has some very interesting things to say on the subject of etched figures and rotatory polarisation. His suggestions on etching of low symmetry seem to be new; those on rotatory structure, twinning, &c., are to be found in other books, but the author has brought the argument well up to date. All this part of the treatise is well worth reading, except that in the chapter on crystals with a trigonal axis the real point at issue is a little obscured.

H. H.