phism of a group with itself, also a very recent notion, is given a full chapter. The scene then shifts to the graphical representation of groups, exploited by Klein in his treatment of the automorphic functions, and treated separately by Dyck, whose methods are here employed. Cayley's color groups also receive attention. A chapter follows on the linear group, following Jordan's classical discussion. Finally, Sylow's theorem and its derivatives are applied to the determination of the composition of groups whose order are resolved into prime factors.

The book concludes with a useful trilingual table of equivalent technical terms and a still more useful Index. The publishers have done their full duty; the type is large and clear, and the paper gives a good impression. The text would have been improved by the introduction of descriptive section headings, and frequently the reader is not kept comfortably informed of what the author has in view, and must suspend judgment for a too lengthy interval.

The small public to which such a work appeals makes it unlikely that books on the theory of groups should ever become very numerous. It is fortunate, therefore, that in Professor Burnside's treatise we have a work of genuine and permanent value from which many a future student may draw wholesome inspiration.

F. N. COLE.

Elements of Sanitary Engineering. By MANSFIELD MERRIMAN. John Wiley & Sons. 1898.

The book opens with an interesting and, for a student, instructive series of historical notes. This is followed by a section dealing with 'classification of disease,' wherein may be found the novel proposition that 'disease is normal and health ideal—' a view that will call forth much opposition.

The illustrations distinguishing between contagion and infection are good, but the suggestion that goitre is probably due to the use of limestone water is hardly warranted; for, were it a fact, the hard waters of southern England should produce the disease abundantly.

An excellent and timely statement is given in the table on page 17, showing how much more serious is consumption than sundry other diseases against which we take far greater pains to guard.

The relation of filth to disease is well put, and the illustrations are striking. The chapter on 'drinking water and disease' is in terse form, suitable for class-room work, but the remarks concerning the Hamburg cholera epidemic need to be supplemented by a map of the city, in order to grasp fully what may be learned from that instructive outbreak.

The book is evidently intended for use as a student's text-book, and excellent questions are inserted at frequent intervals, which require the student to make use of a reference library. This is a very valuable feature, and one but rarely found. There is, unfortunately, no index.

M.

Bush Fruits: A Horticultural Monograph of Raspberries, Blackberries, Dewberries, Currants, Gooseberries and other Shrub-like Fruits. By FRED. W. CARD, Professor of Horticulture, Rhode Island College of Agriculture. The Macmillan Company. 1898. Pp. xii + 537. Price, $1.50.

Under this concise and somewhat descriptive title another book is added to the list upon small fruits, from which, in this instance, are excluded the grapes, strawberries and cranberries.

The contents are divided into three parts, namely, (I.) General Considerations, (II.) The Brambles and (III.) The Groselles. The last name is adopted from the French, includes both the currants and gooseberries, and is a convenient term as a heading for a book division, but will scarcely be of much service elsewhere.

Under brambles, of course, the red raspberries, black raspberries, blackberries and dewberries are considered each with its separate chapter.

Part I. deals with the consideration of location, fertilizers, planting, tillage tools, pruning, propagation, thinning, spraying, picking, packing and marketing of fruit, with a few closing pages upon the methods of crossing and the results of such blending of the varieties and species.

Many of the above-mentioned points are again more specifically treated under the chap-

ters devoted to the separate groups of bush fruits, and the whole book is so planned that the practical grower may quickly reach replies to the questions in hand by means of a full index even to the varieties of each sort of fruit embraced by the work.

The more scientific portions of the volume are kept as far as possible by themselves, set in smaller type and include histories of the various sorts of fruits, their insect enemies and fungous diseases. This separation is a wise provision for the convenience of the grower, for whom the book is especially written and who is more interested in the art of producing a profitable crop than the underlying principles of botany upon which the art securely rests. For example, there are nearly fifty pages of descriptive text of species of Ribes set under the chapter title of 'The Botany of the Groselles,' and many of the species are figured. Such portions of the work as this are of much value to all who desire to advance American horticulture by introducing new species to cultivation or extending the range of hybridization.

In the more practical part it may be noted that special stress is placed upon the evaporation of the fruit, and several illustrations are given of the apparatus employed in this growing industry. In the preface, by the editor of 'The Rural Science Series,' of which the 'Bush Fruits' is the sixth volume, Professor Bailey states that 'the aim has been to treat general truths and principles rather than mere details of practice.'

The book is written by one who has both an experience with bush fruits and a knowledge of the best things that have been thought and said along the lines he has followed out to a successful issue in the volume in hand.

Byron D. Halsted.

The Lower Cretaceous Gryphæas of the Texas Region. By Robert Thomas Hill and Thomas Wayland Vaughan. Bulletin of the United States Geological Survey, No. 151. Washington, Government Printing Office. 1898. Pp. 66. Pl. xxxv.

The main object of the authors in publishing this brochure is to set aright the confusion that has long existed regarding the classification and stratigraphic position of a series of fossil oysters commonly assigned to a single species, *Gryphæa pitcheri*, Morton. They occur in especial abundance in the Lower Cretaceous formations of Texas, and when properly classified are found to be of great value in determining the position of strata. From forms heretofore known as *G. pitcheri* at least eight species are here recognized (Table, pp. 45–46), viz.. *G. vesicularis*, Lam., 1806; *G. newberryi*, Stanton, 1893; *G. mucronata*, Gabb, 1869; *G. washitaensis*, Hill, 1889; *G. navia*, Hall, 1856; *G. corrugata*, Say, 1823; *G. marcoui*, Hill and Vaughan, 1898; *G. wardi*, H & V, 1898. It is found, furthermore, that even Morton's species (so long considered the type) must be abandoned in favor of Say's *G. corrugata*.

The introduction, dealing historically with the controversy of many years' duration concerning *G. pitcheri* and the formations in which it occurs, is not without a moral, inasmuch as it plainly shows that an inadequate description, with a poor figure, may become a fruitful source of error, which, as in the case of the species under consideration, may be greatly augmented by the want of proper stratigraphical knowledge on the part of collectors.

An account of the fossil oysters of the Texas region and a classification of the Ostreidæ follows. The difficulties encountered by the authors are not underestimated: "In undertaking the study of the Ostreidæ one is soon confronted with the question: What constitutes species and genera in this group? The variation of species is much greater in the Ostreidæ than in other molluscan genera. No other group presents such unsatisfactory criteria for specific differentiation. These forms, judging from their stratigraphic occurrence as well as their habits, seem to adopt new variations of shape with every change in physical condition of habitat, as is illustrated in the variations of our living species. Changes similar to those occurring at the present time have occurred in the past, and no doubt many species have arisen by some of these local variations becoming fixed and persistent. Large suites of specimens often show that two species usually considered very distinct may grade into each other. The intergradations are of such a kind that frequently it can easily