themselves, either *viâ* the pedicels or from outside, and the author gives an instructive set of figures illustrating the development of the flower and young fruit in connection with chapter v.

Chapter vi. is concerned with the development of the fungus in the different organs of the vine, and with descriptions and figures of its numerous reproductive phases, comprising two forms of conidia, two forms of pycnidia, the perithecia, and certain sclerotium-like stages.

In chapter vii. the results of pure cultures are described, and the conclusion established that the spores may germinate in rain-water, and the young mycelium suffer desiccation, and again revive if wetted; further, that spores germinating on the surface of the plant may remain alive and active for as much as six days in damp weather, awaiting a moment favourable for infection, as it were. Dry spores may be kept twenty-three months, and still germinate on placing in water. The numerous morphological details must be passed over here.

In chapter viii. the various modes of infection are dealt with, and the results are that the fungus may enter by the pedicel, by the peduncle or one of its branches, or at the articulation of the fruit to its stalk, or it may enter the fruit directly. A valuable series of coloured figures shows the various tints assumed by the diseased grapes, and we are reminded of one form of the disease termed "shanking" in this country.

Chapter ix. is devoted to the experimental infections. Many points of interest are given here, *e.g.*, the tips of the germ-tubes directly dissolve the cuticle; a cellulose dissolving enzyme also occurs; liquefied walls resist attack, &c.

Chapters x. to xii. deal very thoroughly with treatment, and the numerous experiments show that calcium bisulphite and free sulphurous acid are practically the only efficacious remedies, Bordeaux mixture and other copper compounds, or mixtures, as well as several other media being found useless.

In chapter xiii. an account is given of the various other fungi which may accompany the Coniothyrium.

Chapter xiv. is devoted to a discussion of the systematic position of the fungus, while chapter xv., and last, again returns to the question of treatment, this time dealing with it in the form of advice as to methods, quantities, periods, &c.

There can be no question that Istvánffi's memoir has a three-fold importance, (1) to the vegetable pathologist, owing to the clear and exhaustive account of the parasite and its relations to the host; (2) to the histologist and morphologist, because it contains so many interesting anatomical details concerning the host and its parasite, and (3) to the practical vine-grower, who will get from it one of the best accounts of symptoms and treatment we have ever met with.

The scientific value of Istvánffi's book is undoubtedly dependent on his clear recognition of the fact that, to deal properly with any parasitic disease, it is essential to take into account not only the peculiarities of the fungus, but also the reactions of the host-plant.

The one great fault we have to find with it is the want of summaries to the several chapters and to the whole work.

OUR BOOK SHELF.

Kinematics of Machines. By R. J. Durley, B.Sc., Ma.E. Pp. viii + 379. (New York: John Wiley and Sons; London: Chapman and Hall, Ltd., 1903.) Price 17*s.* net.

THIS is a carefully written elementary text-book dealing with the subject from the Reuleaux standpoint. In the first chapter the author introduces the notions of kinematic links and chains and the pairing of elements, and gives some fundamental propositions relating to degrees of freedom and constraint, and to instantaneous centres and centrodes in plane motion.

The next chapter treats pretty fully of motion in a straight line and about a fixed axis. Position, velocity and acceleration, linear and angular, in regard to both time and displacement, are exhibited by means of rectangular and polar diagrams, and problems are worked by graphical processes, the scales for measuring the results being always most carefully determined. The alternative, and often more desirable method of tabulation and the numerical calculation of differences seems to have been overlooked; it might well have been introduced and illustrated in an example like that of the electric car found on p. 47. Several problems on simple harmonic motion are given; but the author is scarcely alive to the great and growing importance of this branch of the subject. The fruitful idea of a rotating vector is not fully taken advantage of. A few additional pages are all that would be required in order to show how, in many cases of periodic motion, being given or having plotted a number of suitable positions in the cycle, the motion could be quite easily analysed and expressed approximately in the first three or four terms of the Fourier series, and thus readily comprehended and dealt with.

In the next two chapters the various mechanisms contained in the quadric and slider crank chains are well described and excellently illustrated. In all the more important cases the relations between the linear and angular velocities and accelerators are obtained both graphically and analytically, the principles established in the first two chapters being now applied.

Chapter v. is interesting, being an investigation of the motion in plane mechanisms in general. The author establishes and uses the velocity and acceleration images of Prof. R. H. Smith. As an example it is shown how to find the velocity of any point in a Stephenson link. The direct and powerful method of working from point paths is also illustrated, but is deprecated on account of its supposed inaccuracy. We, however, have found that, by the use of suitable appliances, large scale plotting can be carried out expeditiously, and with a degree of precision which render it possible to obtain not only velocities, but accelerations (or second differences), with quite surprising accuracy, and sufficient for most purposes.

Subsequent chapters relate to mechanisms containing higher pairing and non-rigid links, illustrated by spur gearing, cams, ratchets, escapements, belt and chain gearing, springs, chamber trains, &c. And there are chapters on screw and spheric motions, the latter containing an instructive investigation of the rolling and spinning velocities in various types of ball-bearings. The book concludes with a short historical account of the attempts which have been made to classify mechanisms.

The rigid exclusion of kinetics and of all dynamical considerations from a book like the present seems artificial, and to restrict its value; but those who do not take this view, and who follow Reuleaux, will welcome the volume. The descriptions are clear, the illustrations well selected, and the diagrams beautifully executed. Graphical and analytical calculations are judiciously mixed without an undue use of either.