schools whose teachers recognize that most of their pupils are studying zoology for use in everyday life and not as preparation for advanced study in college. Moreover, college officers in charge of admission requirements will probably give more favor to such a course in elementary zoology than they have accorded the purely morphological study which is now so much in vogue in secondary schools.

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Oysters and Disease. An account of Certain Observations upon the Normal and Pathological Histology and Bacteriology of the Oyster and other Shell-fish. By W. A. HERDMAN, D.Sc., F.R.S., and RUBERT BOYCE, M.B., London. George Philip and Son. 1899. Lancashire Sea-fisheries Memoir No. 1.

In this thin volume Professors Herdman and Boyce, record the results of an investigation extending over a period of three years and, although they have not actually established a connection between oysters and disease, they have produced the most important contribution which has yet appeared upon the subject, which is one of considerable scientific and unusual popular interest.

The disputed question as to the cause of green oysters has been re-examined, with the result that several forms of greenness have been recognized and studied. But little is added to our knowledge of the well-known oysters of Marennes, the authors being in practical accord with most previous investigators, but concerning the green oysters of Falmouth and certain green American oysters laid down in the vicinity of Liverpool they reach results divergent from the views held by previous workers and more in accord with popular beliefs.

Copper in minute quantities is normally present in all oysters, but in the green Falmouths and Liverpool Americans it is found in unusual amounts. In the greenest of the American oysters as compared with the whitest, the proportion is 3.75 : 1, calculated per oyster, and 3.63 : 1, calculated on the ash, and a careful study of the distribution of the copper by chemical and histo-chemical methods demonstrates that it is the cause of the greenness.

Some years ago Dr. Ryder, as noted by the authors, studied a case of leucocytosis in American oysters, although he did not determine the presence of copper nor appreciate the true cause of the greenness. The reviewer has examined during recent years, a great many green oysters, but in no case has the greenness been in the leucocytes of the blood of the heart and the sinuses and tissues of the mantle, as described by Ryder and the present authors, nor in those which were tested, has the copper been present in abnormal quantities or unusual distribution. The specimens rather resembled the poor but harmless Dutch oysters described by Herdman and Boyce, and it would appear that we have in America, as in Europe, several kinds of green oysters, that in which the color is due to copper being comparatively rare.

The connection of oysters with the transmission of infectious diseases, especially typhoid and enteric fevers, is carefully considered. Bacilli of the colon group are frequently found in oysters sold in towns, but there is no evidence that they occur in those living in pure sea-water. The experiments show that pure sea-water is inimical to the growth of typhoid bacilli and that they do not multiply either in the alimentary tract nor in the tissues of the living oyster. *B. typhosus* was not found in any of the oysters obtained from dealers or directly from the sea, but from inoculated specimens the bacilli were obtained up to the tenth day, although the results indicate that they perish during passage through the intestines.

Oysters and other mollusca obtained from dealers frequently contain a bacillus possessing the characters of Klein's *B. enteritidis sporogenes*, presumptively resulting from sewage contamination, but it was found that the infected oysters could be cleansed by washing in clean running sea-water. It is evident, therefore, that by changing oysters from an infected bed to one where the surroundings are pure they may be purged of their dangerous qualities. The authors urge, in conclusion, that, by legislative action and cooperation among growers, steps be taken to prevent sewage contamination of the oyster beds from which the markets are supplied.

Several facts are added to our knowledge of the minor anatomy of the oyster, especially interesting being the demonstrated change in the primitive retractor pedis muscle whereby it becomes a dilator oris.

The paper is well illustrated.

H. F. Moore.

Washington, August 25, 1900.

Anatomie et physiologie végétale. For the use of students of natural science in universities and agricultural schools, etc. By Professor Er. Belzung. Ancienne Librairie, Germer Baillière et Cie. Paris, 1900. 1699 Figs. 8vo. Pp. iii + 1320.

Professor Belzung is the author of text-books on geology, zoology, animal physiology, and animal paleontology, in addition to two or three botanical works besides the subject of this review. Such breadth of authorship undoubtedly relieves him from any taint of narrow specialism. This experience secures for the book in question, however, no new points of view, since it is a purely formal presentation of the better known facts in botany compiled after the manner of an encyclopedia. Perhaps the freshest portion of the book is that taken up with the subject of fermentation, which is given a treatment not usually accorded this phase of botany in general texts. The final section of the work consists of the 'Conclusions' and is devoted to the general characters of protoplasm and plants usually given in the introductory chapters of such texts.

The book leads chiefly to the examination room, and only the most determined enthusiasm could carry through its use a genuine interest in the study of plants.

D. T. MacDougal.

Report of Competitive Tests of Street Car Brakes. By the Board of Railroad Commissioners of the State of New York. 1899. Albany, Brandon Printing Co., Department Printer, 1900. 8vo. Pp. 60; 67 sheets of diagrams.

The report of the electrical expert, Mr. C. R. Barnes, April 4, 1900, details the origin and progress of the work of the N. Y. State Board of R. R. Commissioners, conducted to ascertain the practicability of insuring greater safety in the operation of street cars moved by cable and by the electric current, comparing the newer forms of brake with the older. It is stated that 295 people have been killed and 1599 injured by the electric railways of the State of New York in three years, as shown by the records of the Board. These figures indicate a rapid increase in this form of mortality, due to rising weights of cars and increasing speeds. Cars are now in use weighing 23 tons and speeds exceeding 50 miles an hour have been attained on suburban lines.

In preparing for these trials Messrs. Barnes and Pierson, the electrical engineer of the Metropolitan R'y Co., designed and constructed an automatic recording apparatus for measuring lengths of run under action of the brake. The apparatus was calibrated on 275 feet of track assigned for the purpose by the railway company and the essential observations and data were derived by use of this instrument; the work being performed in New York on the Lenox Avenue line, in the half-mile between 135th and 146th streets. Sixteen brakes—4 air-brakes, 4 electric, 3 hand-power, 2 friction and 2 'track-and-wheel' brakes—were tried.

The reliability of the air-brake is reported to be thoroughly established and a number of them have come into use. But one electric brake, that of the General Electric Co., is in use to any extent. New forms of the older type, the hand-power brake, were tested. They act directly upon the wheels, as usual. The so-called 'friction-brake' is a friction device on the axle, usually disks rotating with the axle and engaging stationary disks, the two sets arranged to be forced strongly against each other, when in action, by means of ingenious mechanisms. The 'track-and-wheel brake' acts on the tracks as well as the wheel. Photographic reproductions of the autographic diagrams obtained from each brake are published, with appended tables exhibiting results numerically.

The usual experiences in such work with dilatory exhibitors, incomplete outfits and occasional miscarriage of the plans of the Board was observed in these trials; but a large amount of new data in a novel field of re-