for study by the younger generation of coming geologists, who have yet to begin their acquaintance with the structure of that vast region.

The geological map is a very welcome contribution to our records of the physical history of British North America. It measures the great progress made in western explorations since Sir William Logan and Professor James Hall prepared the well-known map of Canada and the north-eastern United States in 1866, and presents an authorized graphic digest of the many sketch-maps and reports that have been published since that time. Much of the work is, of course, broadly generalized, and is doubtless open to serious changes; but the great features of the country are well represented, and in the west show a very clear continuation northward of those found within our territory, with the addition of certain peculiarities probably dependent on a more extensive glaciation and a greater recent depression in the northern area. The vast breadth of the horizontal mesozoic and tertiary strata of the plains, between the undetermined confusion of the Archaean on the east, and the paleozoic mountain ranges on the west, gives a character to this region that finds no close parallel in other parts of the world.

The 'general map of part of the north-west territories,' prepared at the Dominion lands-office at Ottawa, may be recalled while mentioning the geological sheets. It represents the region northward from our boundary, between Hudson Bay and the front range of the Rocky Mountains, on the same scale of forty miles to an inch, and, in the latest edition we have seen, is corrected to March, 1883. Its topographic detail, especially as regards the ragged outlines of the numerous lakes drained by the Nelson River, is decidedly greater than that of the later geological map. Both are, we presume, in great part only approximations to the exact truth; but, unless the former is imaginary in its details, the uninitiated can hardly understand why it was not used as the base-map for the geological coloring. Perhaps there is need of better co-ordination of government work in Canada as well as with us.

GOODALE'S VEGETABLE HISTOLOGY.

UP to the time of the translation of Sachs's text-book of botany into English, something over ten years ago, comparatively little interest was felt in vegetable histology and physiology in this country; and no modern English treatise on the subject, of any importance, existed. The direction given to the work of students by Sachs's book was soon manifested by a demand for less comprehensive text-books, adapted to the use of more elementary classes; and Thomé, Prantl, Bessey, and Kellerman have successively appeared as the result of this demand.

While the space given to physiological subjects in the earlier editions of Gray was doubtless adequate when these were prepared, the revision of the book required that these subjects should be treated far more comprehensively than was possible within the limits of the original work: hence the appearance of a separate volume allotted to them.

For convenience the author has divided this volume into two parts, devoted respectively to histology and physiology. The first of these has recently come from the press, and sustains the high character of the work of which it forms a part.

An important feature of this volume is the concise introduction, in which the histological appliances and methods most frequently used are brought together for discussion, the writer's long experience as a laboratory teacher making this condensed account of much practical value to the student. Following this are chapters on the cell and its parts; modified cells, and the tissues they compose; the structure and development of the root, stem, and leaf of phaenogams; and the structure and development of the flower, fruit, and seed.

These subjects are treated in much the same manner as in several of the later text-books, though an unusual degree of facility in grouping the topics in a logical manner is shown; and no opportunity is lost of indicating the practical aspects of the subject under consideration.

While this part maintains the conservatism with regard to insufficiently substantiated theories that characterizes the earlier volume of the text-book, it is well abreast of the times in a branch of botany which is admittedly in a far from settled condition. A marked improvement on the usual classification of tissues is observable in the adoption of a smaller number of types, the limits of which are capable of more precise definition, while the treatment of their derivatives is probably the best possible on a morphological basis. A physiological classification of tissues, based largely on the admirable work of Haberlandt, forms

Gray's botanical text-book, sixth edition. Vol. ii., *Physiological botany;* i., *Outlines of the histology of phaenogamous plants.* By GEORGE LINCOLN GOODALE, A.M., M.D., professor of botany in Harvard university. New York and Chicago, *Ivison, Blakeman, Taylor, & Co.*, 1885.

the last chapter, and will be found of much assistance as an introduction to the physiological part of the volume.

In point of illustration, this stands in marked contrast with the more recent American text-books on related subjects. If the figures do not all possess the highest artistic merits, they are for the most part well executed. Their chief value, however, lies in the fact that very few of them have before appeared in American books. Sachs, which has supplied most of our later text-books with their only meritorious histological illustrations, has been practically discarded. While most of the cuts are copies, many of them are taken from special memoirs not readily accessible to the majority of teachers, and hence are as useful as if original; and those that have been reproduced from other sources have the merit of excellence of execution and ready comprehensibility.

If the closing part of the volume, dealing with vegetable physiology, which, as we understand, is soon to appear, shall maintain the character of that already published, the book cannot fail to meet the requirements of the class of botanists for whom the 'Botanical text-book' was planned.

DISEASE-GERMS.

Dr. Klein's book is by far the best we have seen on the subject of the pathogenic and septic bacteria. The author has had a thorough practical education in the matter, as he has worked at it experimentally during the last ten years for the medical department of the local government board of England. In this little volume are embodied his own researches, supplemented by those of others, arranged to form an admirable guide, either for those who may wish to work in this field practically or for those who may wish to get merely a critical knowledge.

The first five chapters are devoted to the apparatus and methods employed in the cultivation of bacteria outside of the body, and the precautions which are necessary in order to avoid error. Also the inoculation of animals, and the care to be taken in this, are spoken of here.

An exhaustive account of the morphological characters of all the micro-organisms is not attempted, but only of such as are related to disease in some way or other.

The classification of Cohn is followed; and the micrococci are first taken up, then the bacteria proper, after this the bacilli, then the vibrios and spirilli, and finally the fungi, including actinomycetes.

The descriptions of the appearance and characteristics of the various species are greatly aided by woodcuts giving the shape and particular way of grouping together. The difference in outline between many of the bacteria is so slight that it cannot be attained in the most highly executed plates: therefore it is much better to try to represent their method of association, and the abundance in which they occur in the tissues, than to strive for great accuracy in the delineation of individuals. The last chapters of the book are well worth reading, as they deal with some of the general questions. That on the relations of septic to pathogenic organisms considers the possibility of certain of the former assuming the properties of the latter under extraordinary conditions. Three examples have been brought forward as proof of this: first, the transformation of the hay bacillus into the bacillus anthracis; second, the properties of exciting inflammation in the eye, which the bacillus subtilis of the air is said to assume when grown in a solution of jequirity-bean (Abrus precatorius); and, third, that the common aspergillus, when cultivated under peculiar conditions, is reported to be fatal when inoculated into rabbits. The facts bearing on these cases are carefully reviewed and tested by his own experiments, and he comes to the conclusion that in each case there is an error. In the first it arises from the accidental contamination of the nutritive fluid; in the second it is not the microbe which is the active agent, but a peculiar chemical ferment (abrin) which is contained in the beans, and has also been obtained from other parts of the plant; and in the third the fungus acts simply mechanically, and not as a toxic agent, in causing death. The septic alkaloids (ptomaines) and the zymogenic ferments are noticed in the chapter on the vital phenomena of non-pathogenic organisms. He takes up the subject of vaccination and immunity, and concludes that the weight of evidence tends to show that the milder form of disease furnishes some substance, not as yet demonstrated, in addition to those already in the system, which acts in preventing the development of the severer forms. In the last chapter, attention is directed to antiseptics;

Micro-organisms and disease. An introduction into the study of specific micro-organisms. By E. Klein, M.D., F.R.S. London, *Macmillan*, 1884. 8°.

The formation of poisons by micro-organisms. A biological study of the germ theory of disease. By G. V. Black, M.D., D.D.S. Philadelphia, *Blakiston*, 1884. 12°.