

His conclusions are as follows: 1. Leprosy has existed to a considerable extent in this country during the past twenty years; 2. The tendency is for the disease to increase, not only from immigration, but also from the occurrence of sporadic cases; 3. It is a contagious disease, and may be transmitted from parent to offspring; 4. Transmission probably takes place, in some instances at least, through inoculation; 5. Segregation has been proved to be the only sure means of freeing a country from its ravages; 6. It is the duty of the government to establish central leper-hospitals or isolated settlements for the treatment of those afflicted, and for the protection of the community at large.

BURNING GARBAGE.—Sanitarians in this country have for many years been considering the practicability of destroying the garbage of a city by fire. The city of Milwaukee has been a pioneer in the movement to demonstrate the feasibility of this method of disposal. The commissioner of health of that city, in a recent letter to the *Sanitary News*, gives some interesting facts concerning the experience of that city. "For more than five months our garbage has been consumed to a dry, inodorous ash. A test of the cost of consuming the garbage was made on Dec. 27, with the following result: the amount received and consumed was 40,215 pounds, and the fuel required was 5,000 pounds, being 4.3 cents per hundred pounds of garbage consumed, — a result highly gratifying when we consider that on that date there was a large quantity of snow and ice mixed with the garbage."

BOOK-REVIEWS.

Volcanoes and Earthquakes. By SAMUEL KNEELAND. Boston, Lothrop. 8°.

THE present volume is mostly a description of ascents of volcanoes and of remarkable eruptions which the author has witnessed, or the description of which he has taken from reliable sources. Thus the book has some value as a book of travel, or for making clear the phenomena of volcanic action to the general reader. The author has visited so many volcanic regions, — the Hawaiian Islands, Iceland, the Mediterranean Sea, Japan, and the islands of south-eastern Asia, — that he is well able to give a description of the peculiarities of the various volcanoes; and the principal value of the book lies in the vividness of the descriptions, which is due to the personal knowledge of the author of so great a part of the earth's surface. He wisely abstains from a long discussion of the theory of volcanic phenomena, as this would be out of place in a popular book like this, but merely enumerates the various theories that are now held by geologists. The latter part of the book contains descriptions of remarkable earthquakes.

Lectures on the Physiology of Plants. By JULIUS VON SACHS. Tr. by H. Marshall Ward. Oxford, Clarendon Pr. 8°. (New York, Macmillan, \$8.)

VON SACHS'S text-book of botany has always been regarded as one of the best in any language, and no better proof of this can be given than the fact that four editions have been published and exhausted. Dr. Sachs was requested by the publishers of his text-book, and also by his botanical friends, to prepare a fifth edition. This he declined to do, and gives his reasons therefor in the following language: "It is an old experience, that, while one works up with pleasure a second and even third edition of a comprehensive work, frequent repetition eventually becomes inconvenient or even painful to the author. Having experienced this sufficiently with the fourth edition, I was unable to make up my mind to a fifth. Apart from other circumstances, I was driven to this, to an important extent, by the progressive development of my scientific convictions." He adds, that his mode of comprehending important questions of the physiology of plants had undergone changes in various directions, and that for several years the wish had been taking a more and more definite form, in his mind, to set forth the most important results of the physiology of plants in such a manner that not only students, but also wider circles, should be interested in them. Believing that this object could be better attained by a freer form of exposition than that of a text-book, he determined to present the subject in the form of lectures. This determina-

tion has resulted in the 'Vorlesungen über Pflanzen-physiologie,' which Professor Ward has translated in a most admirable manner.

The volume consists of forty-six lectures, arranged in six parts. These latter are, 1. Organography; 2. The external conditions of vegetable life, and the properties of plants; 3. Nutrition; 4. Growth; 5. Irritability; 6. Reproduction. It is impossible to give more than this brief outline of a book which embraces so many and such varied topics as are treated in the eight hundred and two pages of text. Professor Sachs has succeeded in his undertaking, to a degree which is exceptional, to produce in this series of lectures a treatise adapted to the wants of the skilled botanist and the educated man, whose studies have been in other directions, but whose desire for a knowledge of the physiology of plants has hitherto been unsatisfied. The subject is made much more intelligible by the four hundred and fifty-five woodcuts with which the book is embellished; while the elaborate index, covering thirty-three pages, makes it exceedingly valuable for reference.

Photography applied to Surveying. By HENRY A. REED, U.S.A. New York, Wiley. 4°. \$2.50.

THE author gives a concise sketch of the successful experiments made in photographic surveying, and sets forth the methods now in use. The book is principally founded on the publications of Frenchmen who have paid particular attention to developing this branch of the art of surveying. The author's discussions of the various methods are clear and concise. The principle of photographic surveying is the same as that of ordinary surveying. Stations are occupied by the photographer; and the angles, which are generally measured by the theodolite, are measured on the photographic negative. For this purpose the camera is provided with a level, and the distance between the sensitive plate and the object-glass is kept constant. The horizon is marked on the negative, and a measurement of distances serves for finding the azimuths and elevations of objects. In making the photographs, various instruments are used, — the ordinary camera, with a wide-angle objective; a camera in which a cylindrical sheet of sensitive paper takes the place of the plate, and in which the photograph is produced by turning the camera around its axis; or the photographic plane table. In the latter the photographic view is represented on a horizontal surface, the rays from the object being reflected either by a triangular glass prism or by a spherical convex reflector. The author justly claims great advantages for these methods, among which the most valuable are the cheapness of field-work, and the great amount of information contained in the photographic views. Setting aside geodetic operations, photographic surveying is undoubtedly the cheapest and best method wherever the principal object is to attain, not the greatest possible accuracy, but the fullest amount of information in the shortest possible time. Therefore the publication is very valuable and welcome, giving a concise review of the advantages and results of this method, which is still very little used in this country. We may be allowed to add a few remarks on this subject, in addition to Lieutenant Reed's full discussion. Photographic surveying cannot attain the same accuracy as ordinary surveying; but the errors are so small, that for tertiary, and even for secondary triangulation, it meets all demands. Its greatest value, however, lies in the full material it furnishes for constructing the orographic features of a country. No topographer, however experienced he may be, can draw contour lines as well from sketches and a few fixed points as he can construct them from photographic surveys. The number of elevations that may be determined by this method is practically without limit. Another important use of photographic work is the facility it affords for re-surveying tracts of land, particularly in regard to changes in culture. Deforestation, roads, the extent of agricultural land, etc., are shown on the photographs, and may readily be inserted in maps without fear of omissions. Thus it will be of the greatest utility for the questions of a census. Lieutenant Reed touches only slightly upon its use in reconnaissance work. For this purpose the cylindrical arrangement gives the greatest satisfaction, principally as it dispenses with the use of bulky and heavy photographic plates, which are difficult to carry. For topographic work of this kind, the use of photography, supplemented by sketches made by the *camera lucida*, gives by far the best results. A concluding chapter of the book