are to some extent partisans of a definite school of hypnotism, and that some of the phenomena upon which they lay stress would be otherwise interpreted by other workers, or even entirely discredited. About nothing is this caution more necessary than the results these authors describe as due to the action of the magnet. As long as it has not been proved that the normal nervous system is to the slightest degree subject to magnetic influence, it seems premature to have it play so great a part in the observation of hysterical hypnotics; and the more so, as the same results have been obtained by suggestion; and, in so far as this has been ruled out, the results have failed to follow with other experimenters.

Lectures on Bacteria. 2d ed. Tr. by H. E. F. Garnsey. Rev. by I. B. Balfour. New York, Macmillan. 12°. $1.50.

THIS book is a translation of De Bary's 'Vorlesungen über Bacterien,' and, as Dr. Balfour states in his preface, has been prepared because there is at present no book in English which gives in like manner a general view of the subject of bacteria. It sets forth the known facts in the life of bacteria in their connection with those with which we are acquainted in other branches of natural history. The second edition of De Bary's lectures appeared in October, 1886; so that we have the researches into this abstruse field of science brought down to a very recent date. In the introductory chapter the author considers the position which bacteria occupy in the vegetable kingdom among the fission-fungi or *Schizomycetes*, and their structure. He then defines the meaning of the terms 'coccus,' 'bacterium,' and 'spirillum.' In speaking of these three forms, he says that they are so exactly represented by a billiard-ball, a lead-pencil, and a corkscrew, that no one requires for his instruction the costly models which are offered for sale.

The course of development of bacteria, and the distinction between the endosporous and arthrosporous groups, next receive attention. From this the author passes on to the consideration of the much-mooted question of whether there are specifically distinct forms, species of bacteria, and, if so, how many such species can be determined. In treating of this interesting topic, he says that species are determined by the course of development, and defines the term 'species' as the sum-total of the separate individuals and generations which, during the time afforded for observation, exhibit the same periodically repeated course of development within certain empirically determined limits of variation. In the list of those who believe that the bacteria may be distinguished into species, are Leeuwenhoeck, their discoverer, Ehrenberg, and Cohn. Among those who deny this, and who consider that the observed forms proceed alternately from one another, the one being converted into the other with a change in the conditions of life, are Billroth, who, in a publication issued in 1874, included all the many and various forms which he had examined in one species, which he named *Coccobacteria septica;* and Nägeli, who has supported the same views since 1877. Nägeli says that he finds no necessity for separating the thousands of bacterium-forms even into two species, but that it would be rash to speak decidedly on a subject that is so imperfectly explored. But he also says, that, if his view is correct, the same species, in the course of generations, assumes a variety of morphologically and physiologically dissimilar forms one after another, which, in the course of years and decades of years, at one time turn milk sour, at another give rise to butyric acid in sauerkraut, or to ropiness in wine, or to putrefaction in albumen, or decompose urine, or impart a red stain to food-material containing starch, or produce typhus, relapsing-fever, cholera, or malarial-fever. In commenting on this view of Nägeli's, De Bary truly says that our practical interests require that we should obtain a decided answer to the question of species; for it certainly is not a matter of indifference in medical practice, for example, whether a bacterium which is everywhere present in sour milk or in other objects of food, but without being injurious to health, is capable or not of being changed at any moment into a form which produces typhus or cholera. The scientific interest demands that the question should be set at rest. The opinion to which De Bary himself comes, in reference to this important question, is that it may safely be maintained that continued investigation has at length arrived at the decision that there is no difference, as regards the existence of species and their determination, between this and any other portion of the domain of natural history, and that species may be distinguished provided the course of development is followed with sufficient attention. The origin and distribution of bacteria, their vegetative processes, the effects of temperature and the presence or absence of moisture upon them, and the subjects of culture, disinfection, and antisepsis, are discussed by the author, but lack of space prevents us from following him into these subjects in detail.

One of the most interesting chapters in the book is that which treats of the causal connection of parasitic bacteria with infectious diseases, especially in warm-blooded animals. De Bary regards as proved the causal connection between the *Spirochæte obermeieri* and relapsing-fever, Koch's bacillus and tuberculosis, Neisser's gonococcus and gonorrhœa, and Koch's spirillum and Asiatic cholera. Among the diseases due to the action of bacteria, he reckons also traumatic infectious diseases, affections incident to child-bearing, and others connected with the formation of groups of ulcers, abscesses, and boils. He does not think that we have any precise determination of the nature of the contagium or miasma virum of malaria. The relation of bacteria to typhoid-fever and diphtheria in men, he regards as uncertain, notwithstanding Goffky's and Löffler's model investigations. The concluding chapter of De Bary's admirable *résumé* is concerned with the discussion of the diseases caused by bacteria in the lower animals and in plants, while this is followed by a conspectus of the literature of the subject, and notes on the text. The whole volume is admirably arranged, and we know of no book which gives so concise and at the same time satisfactory an account of bacteria as the one before us. It is well translated; and its revision by Dr. Balfour, who is professor of botany in the University of Oxford, is a sufficient guaranty of its scientific accuracy.

Catalogue of the Pedagogical Library, Philadelphia. Philadelphia, Board of Education. 12°.

WHEN Superintendent MacAlister went to Philadelphia from Milwaukee four or five years ago, he saw and felt the need of having at his command the best authorities on the history, science, and art of education. The Board of Education appreciated the need, and by liberal appropriations it has been made possible for Mr. MacAlister to get together the volumes for which he has now printed a catalogue. Naturally, he has only selected from the field of educational literature, and has made no attempts to cover it in all its extensiveness. What he has gotten together is a good working pedagogical library, and "it is believed that the selection made furnishes the essentials for a pretty thorough study of the history and theory of education in the past, as well as ample materials for dealing with the living questions of our own time." Therefore it is that this catalogue, while referring to this one collection only, really serves as a carefully selected bibliography of pedagogics. In this respect it is far more useful than that of Messrs. Hall and Mansfield, published a year or two ago. That is too diffuse to be really useful, and it is disfigured by hundreds of mistakes and typographical errors. We trust that professor MacAlister has printed a sufficiently large edition of his catalogue to permit its general sale.

Natural Resources of the United States. By J. H. PATTON. New York, Appleton. 12°.

THE present volume is a concise review of the resources of the United States, compiled from the publications of the various National and State departments, and from private information obtained from the State governments. Therefore the data are presumably, as a rule, reliable; and as the book deals not only with the mineral resources, but comprises others also, it will be found handy as a brief review of the whole subject. 324 of the 523 pages of the book are taken up by a report of the mineral resources, on which D. T. Day treats in his annual summaries. This part is followed by notes on mineral springs and health resorts. The following sections, dealing with the vegetable products of the United States, grain, fibre plants, and timber, are very superficial; that on grasses, such as are the basis of American stock-raising, is even more so, the whole subject being treated in nine pages.

In the book we find a considerable number of remarks on physical geography which show that the author's knowledge of this subject is not very extensive. The authorities he quotes for his views

are not those which are recognized by modern science. Maury's 'Physical Geography of the Sea' is not in accordance with the views held nowadays; neither are primers on geography good authorities. It is meaningless to say that the valley of the Mississippi 'greets the south,' as its slope is southward. The author would have us believe that this southward exposure affects its climate, while practically it has no influence whatever. Passages like this are numerous in the book. On the whole, it may be considered a fair account of the subject, sufficient to meet the wants of the general reader, although the author's teleological views lead him to a considerable number of statements which will not be conceded by scientists.

NOTES AND NEWS.

PROF. ANTON DE BARY died at Strassburg on Jan. 19, aged fifty-seven years. He had been suffering for several months of carcinoma of the face, and had undergone an operation, but without recovering. He had held the chair of botany at the University of Strassburg since 1872, being called there from Halle. He had studied botany at Berlin under Alexander Brown, and was made professor of botany at Freiburg at an early age. His first publication, 'On the Fungi causing "Rusts" and "Smuts,"' in 1853, attracted much attention. While the anatomical methods of other authors had somewhat increased our knowledge of the *Thallophytes*, De Bary's method of tracing their life-history opened a new era in this study. For a few years he was engaged in studying certain algæ, but he soon returned to his favorite study, that of fungi. In 1864 he published the first number of the *Beiträge zur Morphologie und Physiologie der Pilze*, which was followed in 1865 by further studies on parasitic fungi. Here he traced the whole life-history of several parasitic fungi from their entrance into the host through all the various stages. He showed that the 'rust' of the wheat is identical with the *æcidium* of the barberry, and thus was the first to prove the occurrence of heteræcism. These observations and their startling results led to the extensive study of cultures which has been carried on so successfully since that time. In 1866 De Bary brought out the first edition of the 'Morphologie und Physiologie der Pilze, Flechten und Myxomyceten,' the second edition of which, thoroughly revised and brought up to date, was published in 1884 as 'Comparative Morphology and Biology of the Fungi, Mycetozoa, and Bacteria.' Both these editions were the standard books on the fungi, and gave for the first time a comprehensive review of the subject, much of their contents being the results of De Bary's own studies. The third number of his *Beiträge* appeared in 1870; but at the same time he published numerous memoirs, among which we mention that on the epidermis in the *Botanische Zeitung*, of which he had become editor after Von Mohl's death. Since 1866 he has been working on the 'Comparative Anatomy of the Ferns and Phanerogams,' but it was only in 1877 that the results of his researches were published, — a monument of De Bary's faculties of observation, his accuracy and extensive critical reading. The influence of this book in the botanical world has been enormous. In 1885 appeared his 'Lectures on Bacteria' in the form of a book. While the style of this book is attractive and clear, it abounds in new facts brought to light by De Bary's researches, among which the study of the development of the spores of *Bacillus Megaterium* takes a prominent place, and gives a comprehensive and critical review of the whole literature of the subject. As a teacher he was eminently successful, and the influence of the Strassburg school upon the development of botany and biology has been very great. Although he was not a brilliant lecturer, he knew how to excite the enthusiasm of students who worked in his laboratory; and all who worked under his direction were so impressed with the truthfulness of his nature, his justice, modesty, and kindness, that so long as his pupils live he will not be forgotten.

— In his bulletin for December, 1887, Mr. J. R. Dodge, statistician of the Department of Agriculture, has an interesting note on the British wheat-supply for the last fifteen years. Great Britain absorbs a large portion of the wheat-supply of the world, and, if it is determined where its supply comes from, we ascertain thereby where a surplus of wheat is grown. Since 1874 the largest national product has been that of the United States. France comes second, although she imports more than she exports, and India third. Russia occupies the fourth position. By analyzing the official statistics of Great Britain, we find where the needed wheat has been obtained, and in what proportion each source of supply has contributed. From 1872 to 1886 inclusive, the United States has furnished in grain and flour 51.1 per cent, and for eleven months of 1887 the proportion has increased to 64 per cent. Russia in fifteen years averaged 13.6 per cent of the whole, and for 1887 only 5.4 per cent. India contributed an average of 7.9 per cent, and for 1887 11.3 per cent, which is the smallest percentage in the last five years, and a marked decline in absolute quantity from the previous year. Australasia fluctuates greatly in its contribution, averaging 3.9 per cent for fifteen years, and less than 2 per cent for the sixteenth. These three competitors of the United States have together furnished only 25.4 per cent, — less than half as much as this country during fifteen years, and a much smaller proportion in 1887.

— Mr. William Ellis, president of the Royal Meteorological Society, reviewed, in his recent annual address, the work and object of the society, which, although unable to carry out expensive original or experimental work, has a considerable influence upon the development of the science of meteorology. Mr. Ellis remarked that the society has succeeded in inciting volunteer workers throughout the country to united action, of which one recent example was the ready response to the request of the society for photographs of lightning, an excellent collection of which had been obtained, and which would shortly be exhibited; in addition to which, arrangements were being made for the more systematic observation of thunder-storms. Referring to the question of sympathetic relation between sun-spots and magnetism and meteorology, he thought that any complete treatment of the question in its meteorological aspect seemed to require that it should be dealt with in a much more comprehensive manner than before, for which purpose observations more completely covering the surface of the globe might be necessary, if indeed not necessary also for the solution of many other meteorological questions, the present meteorological stations being distributed over the earth in such isolated clusters. The attention given to synoptic charts was most important, but the general meteorological characteristics of places should also still continue to be studied. After remarking upon other matters, he laid before the meeting tables showing the monthly means of amount of cloud from observations made in three different series at the Royal Observatory, Greenwich, extending in all from 1818 to the present time. In concluding, Mr. Ellis said that at one time the science of meteorology seemed likely to form an exception to the general rule of advance, for, more than any other, it has required the united action of many workers; but the field of inquiry of late years opened out allows us already to talk of the new or modern meteorology, — phrases typical of the advance achieved, although the knowledge gained seems only to remind us of how much has yet to be done. The Royal Meteorological Society has at present five hundred and twenty-two members. Dr. William Marcet was elected president for the ensuing year.

— A firm in Yokohama, Japan, is now manufacturing the excellent Auzoux models of human anatomy at low prices, as a correspondent learns by private letter.

— In *Science* of Feb. 3, p. 57, 1st column, 21st line from bottom, 'thallophytes' should read 'protophytes.'

— In *Science* of Feb. 10, p. 67, 1st column, 35th line, 'Herndon' should read 'Heudon,' as also throughout the paragraph.

— In *Science* for Feb. 10, p. 69, 2d column, 27th line from bottom, '$2' should read '$1.'

— Leaflets Nos. 7 and 8 in the series issued by the Industrial Education Association (9 University Place, New York City) have reached us. No. 7 is an able and concise paper on the scientific treatment of education, and No. 8 gives an account of progress in the New York City schools in 1887. This series is having a large circulation, and doing great good; for the phenomenally low price