author to preach rather than to guide is often noticeable. After most properly bidding the student accept as fact no scientific statement capable of easy demonstration until he has proved it such, the book contains several chapters with hardly a single one of the statements made supported by experiment. For instance, we find (p. 179) that "we have now become somewhat familiar with," among other elements, "aluminum and iron; and we have incidentally become acquainted with a number of their more important compounds." Experimentally, how? Thus: The student is bidden to look for iron ore in soil, to write down what he already knows about iron, to examine the physical properties of siderite, to heat a piece of pyrite, and to note the physical properties of slate and of feldspar. That is all. Now, this is not experimental chemistry; it is boiled-down encyclopædia.

On the other hand, after having studied Ice, Water, Fire, Air, Earth and Quartz, molecules and atoms and all the other fascinating mysteries are brought in in a chapter called A Lesson in Chemistry (!); later, atomic weights are given and symbols in plenty. After having stated as facts the Laws of Chemical Combination, the author later, without further explanation, gives the following formulæ for some of the minerals the student is to work with—of course, with their names: Fe_7S_8, $(FeMnZn)_2O_4$, $(CaMg\ AlFe)SiO_3$, $(KFeMgAl)_2\ SiO_4$, $Li_6Al_8Si_{15}O_{45}$, $(CaMg)_8(AlFe)_4Si_7O_{28}$.

The directions are in some cases almost tediously explicit, and this is right; frequently, however, they err on the other side. The student is given directions to use phosphorus, and occasionally other dangerous substances, without a word of caution. Considering the inexperience of the student, and the fact of his working probably alone, this is a matter of some importance.

To sum up, if all the theoretical portion of the book, all symbols, atomic weights, etc., had been left out, and a few experiments on the *chemical properties* of substances like iron and aluminium—to mention but two—put in to fill the vacuum, Mr. Ballard's book would have filled a lack. It cannot at present—at least, unassisted.

Wyatt W. Randall.

NOTES AND NEWS.

At the meeting of the trustees of Columbia College, on May 6th, President Low subscribed one million dollars for the construction of the new library building. He stated that it is to be a memorial to his father, the late A. A. Low, 'a merchant who taught his son to value the things for which Columbia College stands.' The trustees passed the following resolution:

Resolved, That the trustees accept with the deepest sense of gratitude the offer conveyed by President Low in his letter of May 6, 1895, subject to all the conditions therein expressed; and that the Clerk of the Board be instructed to convey to the president the thanks of the trustees for this most munificent and opportune gift, unprecedented in the scale of its generosity, and affording fresh evidence of the president's unbounded devotion to the interest of the College.

President Low's gift was accompanied by the following conditions which add to rather than detract from its value: That twelve Brooklyn scholarships for boys be established in Columbia College, and twelve Brooklyn scholarships for girls in Barnard College; that eight university scholarships, to be known as the President's University Scholarships, be established; that a university fellowship, the Class of '70 Fellowship, be established. President Low graduated in the class of '70.

At the same meeting Mr. W. C. Schermerhorn, chairman of the trustees, subscribed three hundred thousand dollars for the Natural Science Building, or other building or part of building that may be more needed.

CARL VOGT, Professor of Natural History in the University of Geneva, died in Geneva on May 5th, at the age of seventy-seven years. Vogt made important contributions to physiology, zoölogy and geology, but became most widely known through his work 'On Man' (1863), written from a materialistic point of view. He was born at Giessen, July 5, 1817, studied at that place, under Liebig, and at Berne, worked with Agassiz and was made professor at Giessen. After taking a prominent part in the Frankfort Parliament of 1848, he considered it prudent to retire to Switzerland, and from 1852 was professor in the University of Geneva.

MISS CRANE, through her excellent reviews and synopses of current brachiopod literature, certainly keeps the public well informed of the progress made in this department, and from time to time she ventures to make contributions of her own to the knowledge of the class. Her latest paper, *The Evolution of the Brachiopoda* (Geological Magazine, February and March, 1895), is a combination of the results and conclusions reached in the most recent investigations by various authorities, together with a general application of the facts to a scheme of phylogeny. The profound changes which have been made of late in the classification of the Brachiopoda through the application of modern principles of evolution are graphically stated:—"The Brachiopoda now seem to justify the prescience of Darwin. Formerly regarded as one of the most obstinate difficulties in the way of the demonstration of the evolution of the invertebrate life on earth, they now bid fair to become a remarkable illustration in favor of it."

THE building containing the entomological department of the Amherst State College is being enlarged so that the capacity of the laboratories will be doubled.

MONEY has been given to defray the expenses of transporting to Mount Hamilton and erecting there the great reflecting telescope presented to the Lick Observatory by Mr. Edward Crossley, of England. A reflecting telescope was included in the plans for the Lick Observatory made 21 years ago, and before Mr. Crossley presented the telescope to the observatory Professor Holden had been in correspondence with him, with a view to purchasing it. It is hoped that the telescope will be ready for use before the close of the current year.

THROUGH a gift of W. C. McDonald, McGill University has secured 35 acres of land for botanical gardens and an observatory.

THE bill consolidating the Astor, Tilden and Lennox libraries has been approved by Gov. Morton. The present site of the Lennox library will probably be adopted.

DR. GUSTAV HIRSCHFELD, Professor of Classical Archæology in the University of Königsberg, died on April 20th.

A JOINT meeting of the Scientific Societies of Washington, was held on May 10th, on the occasion of the delivery of the annual address of the President of the National Geographic Society, the Hon. Gardiner G. Hubbard. The subject of the address was 'Russia.'

DR. FERDINAND BRAUN, of Tübingen, has been appointed Professor of Physics in the University of Strasburg, succeeding Professor Kohlrausch.

DR. W. S. HALL has accepted the Davis Professorship of Physiology in the Northwestern University Medical School, of Chicago.

THE trustees of the University of Pennsylvania have accepted with regret the resignation of Professor Harrison Allen from the Professorship of Comparative Anatomy and Zoölogy.

ACCORDING to the *American Geologist*, Mr. Warren Upham, recently of the Minnesota

Geological Survey, has removed to Cleveland, Ohio, to accept the position of librarian for the Western Reserve Historical Society, and Mr. H. F. Bain has been elected Assistant State Geologist of Iowa in place of Dr. Charles R. Keyes, who recently resigned to take charge of the Missouri Survey.

The Provincial Legislative Assembly of Ontario has authorized a grant of $7,500 towards defraying the expenses of a meeting of the British Association at Toronto in 1897, should the Association decide to accept the invitation that has already been received from Toronto.

The Society of German Naturalists and Physicians will meet at Lubeck from September 16th to 21st.

The death is announced of Dr. Tomsa, Professor of Physiology in the University of Prague.

It is stated that Dr. Bertillon has discovered a new method for identifying handwriting by enlarging the letters by photography and measuring the alterations due to beating of the pulse.

The celebrated Villino Ludovisi, in Rome, has been leased for the new American School of Architecture and Archæology.

According to the *Medical Record* 14 of the 140 Medical Schools of the United States now require a four years' course.

Swan, Sonnenschein & Co. announce for publication next autumn a translation by Professor E. B. Titchener, of Cornell University, of Professor O. Külpe's *Grundriss der Psychologie*.

According to a note in the London *Times*, the excavations by the American School at the Heraion of Argos, under the direction of Professor Waldstein, which were resumed this spring, have been very successful. Two hundred and fifty men have been employed on the work. Besides the two temples and five other buildings previously discovered, a large and well-preserved colonnade 45 metres long has now been found 25 feet below the surface south of the second temple. The discoveries include parts of metopes, two marble heads of the best Greek period, a hundred objects in bronze and gold, gems, vases and terra cottas of the Homeric period, as well as numerous scarabs and several Mycenean tombs with Argive inscriptions on bronze, probably of a religious character. The excavations, which are now in the fourth season, will be completed this year. They rival the French excavations at Delphi in magnitude and importance, representing all the periods of Greek life from prehistoric to Roman epochs.

The residue of the estate of Mary D. Peabody has been left to the Catholic University of Washington, for the foundation of scholarships (probably three or four of the value of $5,000 each) in the chemical and physical sciences.

The *Medical Record* gives an account of the malarial map of Italy, recently issued by the Italian Bureau of Statistics. It is based upon the death returns during the years 1890–92. The varying intensity of the disease in different sections is shown by modifications of color. In the three years there were 50,000 deaths from malarial causes, or 54 in 100,000. The worst districts, where the mortality is as high as 8 in 1,000, are in southwestern Sardinia, southeastern Sicily, the Pontine marshes, the district at the head of the Gulf of Taranto, and the southeastern slope, from the promontory of Gargano south to the Ionian Sea. Districts where malaria prevails, but not so intensely as to be fatal, are the lower reaches of the Po, Grosseto in Tuscany, the mouth of the Tiber, and the district near Salerno and the temples of Pæstum. In Rome itself malaria has sensibly declined; the deaths in 1881 were 600, in 1892 only

139. The general mortality from this cause in Italy has remained pretty constant; the average is 15 or 18 per 1,000.

PROGRAMS of the School of Applied Ethics, which opens at Plymouth, Mass, on July 8th, may be obtained from the Secretary, S. B. Weston, 1305 Arch street, Philadelphia.

THE Metropolis Law School has been united with the Law School of the University of the City of New York.

ACCORDING to the prospectus of the Cotton States and International Exposition, which opens at Atlanta, Ga., on September 18th, science will be well represented. There will be special buildings for machinery, minerals and forestry, agriculture, electricity and transportation. The United States Fish Commission will supply an aquarium with tanks occupying 10,000 square feet, and the National Bureau of Forestry will exhibit models showing methods of forest cultivation and preservation.

WE learn from a notice by Prof. Ziwet, in the April number of the *Bulletin of the American Mathematical Society*, that the first installment of the *Répertoire bibliographique des Sciences Mathématiques* has been issued. This consists of a set of 100 cards, 14x8 cm., on each of which about 10 titles are printed. The series is published by Gauthier-Villars in Paris and sells for two francs. It was decided at an international meeting held in Paris under the auspices of the French Mathematical Society to prepare a complete bibliography of the literature of mathematics since 1800 and of the history of mathematics since 1600.

MR. CLEMENS R. MARKHAM, President of the Royal Geographical Society, in a paper read before the Royal United Service Institution, urges the importance of an Antarctic expedition from a scientific and naval point of view, and recommends that it be undertaken by the British Government.

THE correspondent of the *Evening Post* announces the following new appointments at Bryn Mawr College: Dr. Florence Bascom, the only woman who has received the Ph. D. from Johns Hopkins University, now of the Ohio State University, Reader in Geology; Mr. Richard Norton, Lecturer in Archæology; Dr. M. L. Earle, Ph. D., of Columbia, Associate Professor of Greek; Mr. P. E. More, Associate in Sanscrit; and Dr. Alfred Hodder, Lecturer in English Literature.

DR. PEAT, of Butler, Pa., has cast a lens 60 inches in diameter for the telescope for the American University (of Washington).

MR. LEONARD T. METCALF has been appointed Professor of Mathematics in the Amherst State College.

The Bakerian Lecture before the Royal Society on May 9th was based upon a research conducted by Messrs. A. Vernon Harcourt and William Esson, on 'The Laws of Connexion between the Conditions of a Chemical Change and its Amount.'

IN a brochure of fifty pages issued in connection with an exhibit at the World's Fair, Mr. Gifford Pinchot gives an account of an attempt to introduce a proper system of forest management upon the estate of Mr. George W. Vanderbilt in North Carolina, together with the result of the first year's work. Biltmore is about two miles from Asheville, on the table land in western North Carolina. The estate includes 3,891 acres of woodland on the banks of the French Broad River. The forest is composed chiefly of young oaks and other deciduous trees, the best timber having been cut away. Fires and neglect have also done much injury. This forest has been divided into suitable blocks and compartments, and put into the care of a competent forester for improvement while at the same time yielding money returns to the owner. The location of the forest, soil, climate, kinds of trees, treatment previous to coming into the

hands of the present owner, improvement, cuttings and other topics are discussed. While it was not expected that the forest would be self-supporting from the start, it has been nearly so, the expenditures for the year ending April 30, 1893, being $9,911.76, and the income from sale of ties, cord-wood, lumber and posts, together with the estimated value of stock on hand, amounting to $9,519.36. Part of the tract will be managed on the regular high forest system with a 150-year rotation; the rest, on a selection system. Steps have also been taken to reforest a thousand acres of waste land, using many kinds of native and foreign trees. In connection with this work it is designed to build up an arboretum second to none in the world. This is under the direction of Mr. Frederick Law Olmsted. Already there are in the nursery more kinds of trees and shrubs than in the gardens at Kew, and the number is being steadily increased. This arboretum will form the borders of a drive about five mile long. Careful records are being kept in connection with the work, and a forest botanical library, already of considerable extent, will furnish the necessary aid to study. Accompanying the report is a map of the forest and a number of good half-tones showing original condition, proper and improper methods of lumbering, etc. This is the first time proper forest management has ever been undertaken in the United States, and as time goes on the results will undoubtedly become an object lesson of prime importance, and one badly needed by the American public, whose delight from the earliest settlement of the country has been to destroy trees.

E. F. S.

SOCIETIES AND ACADEMIES.

GEOLOGICAL SOCIETY OF WASHINGTON.

The following are abstracts of the communications presented at the 33d meeting, April 24, 1895:

W J McGee. 'The topographic development of Sonora.'

The territory described, lying between the Gila river on the north and the Rio Sonora on the south, and extending from the Sierra Madre to the Gulf of California, is about 400 by 200 miles square. Essentially it consists of an undulating plain with embossed mountain ranges. The plain varies from sea-level to some 4000 feet in altitude; the mountain ranges, commonly 4000 feet or less in height above the plain, are rugged, narrow and generally parallel, trending somewhat east of south. These ranges are remnants of larger mountain areas, shaped by erosion, and sometimes they are connected by transverse ridges which, like the ranges themselves, are residua of ancient masses. The area is one of complete gradation within itself, *i. e.*, the rainfall is so slight that the material degraded from the mountain is aggregated on the intermontane plains, as the storm-waters sink or evaporate—for none of the rivers between the Gila and Yaqui ever reach the sea. Certain peculiarities of the topography grow out of this condition.

The entire plain inclines southwestward, having evidently been tilted in this direction during late geologic time, though the date is not yet fixed. A consequence of this tilting was the stimulation of the streams flowing westward, southward and southwestward, and partial paralysis of the streams flowing in the opposite direction; and by reason of previous adjustments of topographic processes and products under the peculiar climatal conditions of the region these effects were greatly increased. Accordingly the southwestward-flowing streams retrogressed and pushed their headwaters through the parallel ranges and sometimes through the transverse ranges connecting them, while the northeastward-flowing streams practically ceased to corrade. Accordingly the area is characterized