by the number of schools in which chemistry is taught. A recently published list shows that there are 116 schools in California whose graduates are admitted by the University of California without entrance examination. Twenty-five of these are not accredited in chemistry, but the remaining ninety-one have chemistry courses sufficiently thorough to satisfy all University requirements. And in the twenty-five not accredited in chemistry the subject is taught in most cases, though not with the necessary thoroughness. Moreover, there are many other schools in the State whose graduates are not accorded free entrance to the University, and the names of which do not, in consequence, appear on the published list, in which chemistry is one of the subjects taught. It is probable that in the State of California alone there are at least one hundred and fifty chemistry teachers; and it would be making a very modest estimate and one undoubtedly far below the true numbers to estimate at two hundred the chemistry teachers who look toward Berkeley for their inspiration.

As yet the new organization is in a formative condition. It has been getting itself together, rather than attempting to accomplish anything. Its first circular of information, just published, contains, however, a number of interesting facts. On data, not as complete as desirable, it was shown that the high-schools of California give their students a year of chemistry, recitations being supplemented with laboratory practice. The majority of the schools report fairly good laboratory facilities, one small school in the southern part of the State claiming to have a better equipment for elementary work than does the University itself. Of books of reference there is an almost total lack. In many cases there are no reference-books whatever.

One of the interesting features of the first circular is a letter from President Ira Remsen of Johns Hopkins on the proper methods of chemistry-teaching. He writes:

I thank you for the opportunity you have given me to say a few words to the members of your association. The formation of such societies as yours will, I am sure, do much to further the study of chemistry and raise the standard of teaching. As I have watched the work of teachers of our science in schools, in colleges and in universities, it has seemed to me that the chief defect is what in plain English may be called slovenliness. The students get into bad habits of work and have no clear idea in regard to what they are doing. They are often left to themselves too much and work as they ought not to, without knowing that anything is wrong. Then, too, when the students attempt to give an account of what they have done, they use language that would hardly be permitted in a recitation room or in writing about a literary or historical subject. The language and the notebooks are apt to be slovenly, especially if the work has been slovenly. Now, we shall never get what we ought to get from laboratory courses in chemistry or any other subject until this slovenliness is eliminated. The ability to state the source of an element, its properties or the law of definite proportions or any other law —this ability is of little value. This kind of knowledge is meaningless unless based upon some actual experience in the laboratory.

Courses in scientific subjects are still on trial, and we teachers of chemistry are to determine by the way we do our work whether these courses are to be recognized as valuable from a purely educational point of view. Too much of the instruction now given seems to be shaped with the idea that the pupils are all to become chemists. As a matter of fact, this is true of very few of them. But I may as well stop here. I have opened up too broad a subject to be dealt with satisfactorily at this sitting.

Edward Booth,
Secretary.

SCIENTIFIC NOTES AND NEWS.

Professor Yves Delage has been elected a member of the Paris Academy of Sciences in the section of zoology, in the place of the late Lacaze-Duthiers.

Mr. Philip Watts, F.R.S., has been appointed director of naval construction by the British Board of Admiralty, succeeding Sir William H. White, F.R.S., who has resigned in consequence of ill health.

Dr. Charles Porter, M.D., of Shrewsbury, has been selected for the appointment of medical officer of health to the municipality of Johannesburg. The salary is £2,000 per annum.

WE learn from the *American Geologist* that Dr. H. M. Ami, of the Geological Survey of Canada, who sustained a rather severe injury to his left arm and shoulder last September, from a fall down a steep cliff at Cap à L'Aigle, below Quebec City, is sufficiently recovered to resume his official duties at Ottawa.

DR. J. W. SPENCER is at present engaged in geological explorations in Central America.

UNDER the auspices of the astronomical department of Columbia University Sir Robert S. Ball will lecture in Havemeyer Hall, on January 10, at 3:30 P. M. His subject will be 'The Cause of an Ice Age.'

DR. SVEN ANDERS HEDIN, the Swedish traveler, who recently reached Ladakh, Cashmere, from exploring the Gobi desert and Thibet, has informed King Oscar that his party was attacked by Thibetans during his journey and that all his collections and almost the whole of his caravan was lost, but that his notes were saved.

DR. ALES HRDLICKA will start about January first on his fourth expedition among the Indians of the southwestern United States and northern Mexico. These expeditions are a part of the system of anthropological exploration and investigation known as the Hyde Expedition and are carried on under the direction of Professor F. W. Putnam for the American Museum of Natural History. The expenses of the present undertaking are generously provided for by Mr. F. E. Hyde, Jr., of New York City. Dr. Hrdlicka is in charge of the somatological work of the Hyde Expedition and his plan, now more than half fulfilled, is, in the main, to ascertain the physical characteristics of the extinct as well as the living peoples in that area which has once been occupied by the Cliff-Dwellers and Pueblos, and by the Toltec, Aztec and Chechemec peoples. It is hoped that on the present journey the somatological part of the research in the field will be completed. The principal tribes that will be studied on the present trip are the Pimas, Papagos, Yaquis, Mayos, Tepehuanes, Coras, Aztecs and Tarascos. Dr. Hrdlicka will be accompanied and assisted by Mr. Gustavus Meyers, of New York City.

THE editors of the *Botanische Centralblatt* for Great Britain are: Algæ, Miss Barton, British Museum (Natural History); Fungi, Mr. Massee, Royal Gardens, Kew; Archegoniatæ, Mr. A. Gepp, British Museum (Natural History); Phanerogams, Mr. Daydon Jackson, 21 Cautley Avenue, Clapham Common, S.W.; Cytology, Professor Farmer, Royal College of Science, S. Kensington; Physiology, Professor Vines, Headington Hill, Oxford; Morphology, Dr. W. H. Lang, University, Glasgow; Paleontology, Professor Scott, Old Palace, Richmond, Surrey.

MR. CLARENCE KING, the eminent geologist, died at Phœnix, Arizona, on December 24. Born in Newport, R. I., he graduated from the Sheffield Scientific School of Yale University in 1852, and joined the California Geological Survey in 1853. He was instrumental in the organization of the U. S. Geological Survey, of which he was director from 1878 to 1881. We hope to give subsequently some account of Mr. King's geological work.

SIR JOSEPH HENRY GILBERT, the well-known agricultural chemist, died on December 23, aged 83 years. With Sir John Bennet-Lawes, he was over fifty years director of the Rothamsted Laboratory, and was for some years professor of rural economy at Oxford University He was a fellow of the Royal Society and a correspondent of the Paris Academy of Sciences.

MAJOR ROBERT TEMPLE, the well-known southern engineer, died at Richmond, Va., on December 22, at the age of seventy years.

Nature records the death of the Rev. Hugh Alexander Macpherson, of Glendale, at the early age of forty-three. Mr. Macpherson was an authority on the fauna of the lake country, and had published an elaborate work on the subject, 'A Vertebrate Fauna of Lakeland, including Cumberland and Westmoreland, with Lancashire North of the Sands.' He was also the author of a book entitled 'British Birds.'

MR. ANDREW CARNEGIE has offered the city of Akron $70,000 for a free public library, the city to guarantee $7,000 annually to maintain it.

The Misses Olivia and Caroline Phelps Stokes have presented to the Board of Managers of the New York Botanical Garden, $3,000, on condition that the interest of this fund should always be used for the investigation and preservation of native plants, or for bringing the need for such preservation before the public. The income this year is offered in three prizes for papers on the subject mentioned. The papers must be presented not later than February 1, 1902.

At a meeting of the trustees of the Connecticut Agricultural College, on December 27, a resolution was passed favoring a bill now before Congress providing for the study of forestry and mining in the agricultural colleges.

An Anthropological Club was recently organized at Yale University. Dr. Kellar presided and Professor Sumner outlined the subjects to be treated. The attendance was eighteen.

The Society of College Gymnasium Directors met at Columbia University on December 27 and 28. The following officers were elected: *President,* Professor Paul C. Phillips, Amherst College; *First Vice-President,* Edward Hitchcock, Jr., Cornell University; *Second Vice-President,* Dr. Frederick E. Parker, Brown University; *Secretary and Treasurer,* Dr. James A. Babbitt, Haverford College; *Executive Committee,* Dr. R. Tait McKenzie, McGill University, Montreal; Dr. Dudley A. Sargent, Harvard, and Dr. William G. Anderson, Yale; *Council and Committee on Admissions,* Dr. Casper W. Miller, University of Pennsylvania; Dr. Watson Lewis Savage, Columbia; Professor A. Alonzo Stagg, University of Chicago, and the officers of the Society, *ex-officio. Committee on Strength Tests and Inspection of Instruments,* Dr. Sargent, Harvard; Dr. Savage, Columbia, and Dr. Jay W. Seaver, Yale. *Committee on Nomenclature,* Dr. Anderson, Yale; Dr. Sargent, Harvard, and Professor George Goldie, Princeton.

The twelfth annual banquet provided for in the will of the late Henry Shaw, the founder of Shaw's Botanical Garden, was given on December 7, at the Mercantile Club, St. Louis.

The *Lancet* states that the fellows and associates of the Institute of Chemistry assembled under Professor J. Millar-Thomson, F.R.S., the president, for their annual dinner on December 4. The president was supported by a distinguished company. The minister of agriculture emphasized the importance of scientific chemistry to agriculture. The president gave a general report on the condition of the institute, pointing to the advance that that body was steadily making in the high standard of its examinations.

The Archeological Institute of America held its annual meeting at Columbia University, on December 27 and 28, under the presidency of Professor John W. White, of Harvard University.

At a meeting held in London on December 5, under the presidency of Dr. W. R. Smith, a medico-legal society was organized.

The *Lancet* states that at the meeting held on November 25, M. Gaule laid before the Paris Academy of Sciences the result of some researches which had been undertaken by himself with a view to ascertain whether the results of a balloon ascent were comparable with those obtained at a high altitude on land—*e. g.,* at the top of a mountain. The most notable of these is a marked augmentation in the number of red corpuscles. Viaux and sundry observers who followed him have ascertained that at a high altitude there is a great increase in the number of red corpuscles. Thus in the Cordilleras at a height of 4,000 meters, Viaux found 8,000,000 red corpuscles per cubic millimeter. M. Gaule wished to see whether in a balloon ascent, where ascension is very rapid and entails no muscular exertion, a similar phenomenon would occur. He made two investigations at heights of 4,200 and 4,700 meters and found in himself 8,000,000 red corpuscles per cubic millimeter. Further, M. Gaule at a height of over 4,000 meters made some blood-films stained after Ehrlich's method with eosin and hæmatoxylin. He found numerous red corpuscles which showed a nucleus colored blue by the hæmatoxylin. This nucleus was in many instances segmenting, and also groups of three or four corpuscles were seen as if they had undergone subdivi-

sions. Similar preparations made before the ascent showed no such appearances. M. Gaule therefore considers that at high altitudes there is an actual formation of red corpuscles and that this takes place with great rapidity. At the following meeting M. Tissot and M. Haillon gave an account of researches on a somewhat analogous subject. On November 21 they undertook some researches at various altitudes into the physics and chemistry of the respiration. Experiments were made at the following heights: 1,350 meters, 2,600 meters, and 4,450 meters in the case of M. Tissot, and at 1,700 meters and 3,500 meters in the case of M. Haillon. The chemical phenomena of the respiration did not vary appreciably at these different altitudes. The respiratory rhythm, however, was greatly modified. Although the total quantity of air entering the lungs was less the number of respirations was not sensibly altered. It would thus appear that at high altitudes the air is purer and more completely used.

THE London *Times* states that Sir Colin Scott Moncrieff, has been appointed by the Secretary of State for India to preside over a commission to consider exhaustively the possibilities of further protection against famine by means of irrigation. His colleagues will be Mr. Ibbetson (recently appointed to fill a prospective vacancy in the Viceroy's council), Mr. Higham, of the Irrigation Department, and the Hon. Mr. Rajaratna Mudaliyar, of Madras. The Punjab, Sind and Rajputana are the parts of India to be first visited as being most susceptible to the advantages of irrigation. Other provinces will then be taken one after the other, Burma alone being left unvisited. In order that the commission may be assisted in its inquiries by local knowledge, each provincial administration has been asked to nominate an experienced revenue officer to be a member of the commission for the period that it remains in the province. The terms of reference to the commission show that the inquiry will be of a most exhaustive character. The Government resolution points out that the irrigation works hitherto constructed by the State have on the whole proved directly remunerative, but it is recognized that the program of works of this kind may be approaching completion. The great storage works required for any considerable extension of irrigation in tracts most exposed to famine must necessarily be more costly per acre protected, and therefore less remunerative than completed works, which draw unfailing and perennial supplies from the great rivers of Northern and Southern India. As regards new works, therefore, the Commission is directed to regard as the main question not whether they will be likely to prove directly remunerative, but whether the net financial burden which they may impose on the State in the form of charges for interest and maintenance will be too high a price to pay for the protection against famine which they may be relied on to afford. One of the most valuable results that may be anticipated from the labors of a Commission taking this as its guiding principle will be to authoritatively set at rest the assumption that in all cases areas liable to famine can be protected by irrigation with comparatively small cost annually to the State.

THE London *Times* states that the National Association of British and Irish Millers have decided to institute an inquiry into the whole question of the relative strengths of English and American wheats, and have secured the cooperation of the Southeastern Agricultural College at Wye, Kent, in the agricultural side of the work. The question has arisen in consequence of complaints by agriculturists that English millers will not purchase English-grown wheats as they did formerly, but give the preference to American wheat, though they have to pay a higher price for it. The millers reply that, however favorably they may be situated for obtaining home-grown corn, they cannot sell for bread-making purposes flour made from English wheats, because they lack the strength of the American kinds. It is hoped that the inquiry will result in an improvement in the quality and yield of English wheat. For this season the Southeastern Agricultural College is sowing the same wheats on different soils; different manures are being tried, and the wheats in each case will be tested by milling and baking. New varieties are being obtained from Canada and

America, and selection and cross-breeding will be tried to improve the yield of the old varieties, not by increasing the size, but by increasing the number of grains in the ear.

UNIVERSITY AND EDUCATIONAL NEWS.

By the will of Mrs. S. C. Warren, about $150,000 is given for educational and charitable purposes, including $5,000 to Harvard University for the Peabody Museum of Archeology and $5,000 to Williams College.

Palmer College, at Le Grand, Iowa, has received $30,000 from Mr. F. A. Palmer, of New York, making $50,000 given to the institution in the last six months.

A cable despatch to the New York *Sun* announces that the Chinese government has decided to present to Columbia University a compilation of Chinese literature, history, maps, illustrations and official papers in acknowledgment of the establishment of a chair of Chinese history, language, customs and manners in that institution. The recommendation that such action be taken was made by Liu Kun Yi, the Viceroy of Nankin.

The Philadelphia correspondent of the New York *Evening Post* records the buildings to be erected at the University of Pennsylvania, as follows: Engineering building and machinery, $500,000; gymnasium building and ground, $400,000; medical laboratories, $500,000; veterinary building, $150,000; and various sums for additions to the chemistry and physics laboratories. About one-half of this sum has been secured, and the plans for the new engineering building have already been completed. The equipment will cost over $200,000, and the building $300,000. The site for the new medical laboratories has been cleared and work begun on the foundations. The trustees plan to have the laboratories ready for use by the opening of the next college year.

Mrs. George Holt and Miss Holt have endowed a fellowship in physics in University College, Liverpool, to be associated with the name of Dr. Oliver Lodge, formerly professor of physics at the College, and now principal of Birmingham University. Its annual value will be £100 or more. A prize to be called the 'Oliver Lodge Prize' has also been established by Dr. Lodge's friends and late colleagues, to be awarded annually to the best student in physics in the third year of the honors course.

Cornell University will hereafter confer the degree of 'Forest Engineer,' in place of 'Bachelor of the Science of Forestry.' The arguments presented in favor of this change are as follows: (1) The degree 'Forest Engineer' expresses more adequately than the academic degree now conferred, and according to precedent in other technical arts, the fact that not a science, but an art of technical character has been studied to a certain degree, namely the degree of entering the student into the profession. (2) It expresses the kind of work—namely, the application of technical scientific knowledge to a business end in a productive industry—for which the student has been prepared as a professional man. (3) It does not, as does the academic degree B. S. F., place the scientific basis and the literary accomplishment before the professional result. (4) It is, in the eyes of the world, a prima facie title of practical attainments, fitting for employment in practical rather than literary or scientific work. (5) There is sufficient precedent, not only in other technical arts for the form of title, but in the art of forestry, wherever a title has been given outside of this country, it has assumed the form of Engineer.

At its next session the Legislature of Pennsylvania will be asked to establish a School of Forestry.

Professor Luther Foster has resigned his position of vice-director of the experiment station and professor of agriculture in connection with the University of Wyoming at Laramie, in order to accept the presidency of the New Mexico College of Agriculture and Mechanic Arts located at Mesilla Park, and the directorship of the agricultural experiment station at the same place. Professor Foster was elected to his new position unanimously by the board of regents of the college and station on November 22, and assumed charge of the duties of the position on December 1.