nent citizens of Morgantown and a number of the officers of the University of West Virginia.

The following is the list of persons who attended one or more of the excursions:

I. C. White, Morgantown, W. Va., leader; J. R. Macfarlane, Pittsburgh, Pa., assistant leader; H. L. Fairchild, University of Rochester; B. K. Emerson, Amherst College; C. R. Eastman, Mus. Comp. Zool., Cambridge; J. B. Hatcher, Carnegie Museum, Pittsburgh; F. B. Peck, Lafayette College; C. S. Prosser, Ohio State University; A. E. Turner, President Waynesburg College; A. R. Crook, Northwestern University; U. S. Grant, Northwestern University; Florence Bascom, Bryn Mawr College; G. C. Martin, Johns Hopkins University; A. E. Ortmann, Princeton University; A. W. Grabau, Columbia University; H. W. Shimer, Columbia University; Miss Ida H. Ogilvie, Columbia University; R. R. Hice, Beaver, Pa.; J. C. Williams, Ridgeway, Pa.; Miss L. K. Miller, Groton, Mass.; F. H. Oliphant, Oil City, Pa.; D. E. Crane, Sewickley, Pa.; A. S. Coggeshall, Carnegie Museum; L. S. Coggeshall, Carnegie Museum; Sidney Prentice, Carnegie Museum; Claude McD. Hamilton, of the *Pittsburgh Despatch*, Pittsburgh.

Amadeus W. Grabau.

Columbia University.

SCIENTIFIC NOTES AND NEWS.

M. Bouvier has been elected a member of the Paris Academy of Sciences in the section of anatomy and zoology in the room of the late M. Filhol.

Professor Angelo Heilprin sailed on the 12th instant for the West Indies to complete his observations on the volcanoes of Martinique and St. Vincent.

Gen. A. W. Greely, chief of the U. S. Signal Service, has returned from Alaska, where he had been inspecting the work on the Government telegraph line from Valdez to Eagle City.

The daily papers report that President David Starr Jordan has been successful in securing a valuable collection of fishes in the Bay of Apia, Samoa, some four hundred and fifty species, many of them new, having been collected.

A party, under the direction of Professor Birksland, has left Copenhagen for Nova Zembla to study the aurora borealis during the summer.

Professor W. E. Ritter, of the University of California, has secured funds for the erection of a marine laboratory at San Pedro, which will be used as a center for the biological study of the Pacific coast.

Lieutenant W. E. Safford, U. S. Navy, has resigned his commission in order to take the position of assistant curator in the Bureau of Plant Industry of the Agricultural Department. His specialty will be tropical botany. Mr. Safford has been engaged for many years in collecting material and information relating to useful plants of the countries visited by him in cruising.

Robert L. Randolph, M.D., associate professor of ophthalmology and otology in the Johns Hopkins Medical School, has recently received the Boylston prize for a paper entitled 'The Rôle of the Toxins in Inflammations of the Eye.'

The Paris Society of Geography has conferred its Ducros-Aubert prize on Dr. Huot, a physician in the French colonies.

Dr. Martin Ficker, custodian of the Museum of Hygiene of the University of Berlin, has been appointed director of the Hygienic Institute.

The Advisory Committee of Public Hygien of France has elected as members MM. Ed. Bonjean, Thierry, Binot, Brouardel, Boulloche and Courtois-Suffit.

We learn from the *American Geologist* that a bust of the late Dr. Edward W. Claypole has been placed in the assembly hall of the Throope Polytechnic Institute. The presentation address was made by President W. H. Knight, of the Los Angeles Academy of Sciences, and it was accepted by Dr. Norman Bridge for the board of trustees.

Dr. William S. Bradshear, president of the Iowa State College at Ames, died on August 4, at the age of fifty-two years.

The deaths are also announced of Dr. W. Iveson Macadam, lecturer on chemistry in the School of Medicine of the Royal Colleges of

Edinburgh, and of Dr. P. M. Garibaldi, professor of physics at Genoa.

MR. ANDREW CARNEGIE has given £10,000 to build a free library at Cork, Ireland.

THE University at Tomsk has received a gift of one hundred thousand roubles for the establishment of a biological station.

THE Berlin Academy of Sciences has announced that its academic prize, 5,000 Marks, will be awarded in 1904 for an investigation of the kathode rays and in 1905 for an investigation of the theory of functions of several variables which admit of linear substitution. The income of the Cothenius legacy—$2,000—for 1904 will be awarded for investigations on new varieties of grain. The papers may be written in English and must be presented without the name of the author to the Bureau of the Academy, Universität Strasse, 8, Berlin.

STEPS are being taken for the establishment of a medico-historical department in the Germanic Museum at Nürnberg on the occasion of the fiftieth anniversary of its foundation. It will contain a collection of medical and surgical instruments and apparatus, drawings, portraits, books and manuscripts, illustrating the history of the art of healing.

THE British Medical Association held its seventieth annual meeting at Manchester, beginning on July 29. The business of the Association was conducted in seventeen sections which held their meetings at Owen's College. There were somewhat over 1,500 members in attendance. The meeting next year will be held at Swansea under the presidency of Dr. Griffiths.

THE first conference of the International Bureau for combating tuberculosis will meet at Berlin from October 22 to 26.

THE German Society for Mechanics and Optics, consisting of those engaged in making instruments of precision, will this year meet at Halle on August 15, 16 and 17.

THE Paris correspondent of the London *Standard* states that the Ministers of Foreign Affairs and Agriculture, just before the summer recess, presented to the Chamber a bill approving the international convention for the protection of birds useful to agriculture. The international convention has been signed by eleven European states. Encouraged by the constantly renewed resolutions of the Councils General and the agricultural societies, which deplored the systematic destruction of certain birds useful to agriculture, the French Government, in 1892, took the initiative in the matter by inviting the European powers to send their representatives to an international commission intrusted with the task of elaborating a convention. That committee met in Paris in June, 1895. After long negotiations the convention thus framed has now obtained the adhesion of France, Germany, Austria, Belgium, Spain, Greece, Hungary, Luxembourg, Portugal, Sweden, Switzerland, and the Principality of Monaco. All the other states are empowered by the terms of the agreement to adhere, if they think fit, to this convention for the protection of birds. The various contracting governments undertake to prohibit the employment of snares, cages, nets, glue, and all other means for the capture and destruction of birds in large numbers at a time. In addition to this general measure of protection, no one is to be allowed to capture or kill, between March 1 and Sept. 15, any of the birds useful to agriculture, and of which a complete list is contained in the international agreement. This list of useful birds comprises sparrows, owls, common brown owls, tawny owls, sea eagles, woodpeckers, rollers, wasp-eaters, pewits, martins, fern owls, nightingales, redstarts, robin redbreasts, white bustards, larks of all kinds, wrens, tomtits, swallows, flycatchers, etc.

A LINE of work recently taken up by the Bureau of Forestry, and for the first time receiving adequate attention in the United States, is the study of the tendency of natural forests to extend over the land devoid of forest growth. This tendency has been noticed in many parts of the country, but has never been studied with a view of controlling it for practical use, or assisting it where desirable. A field party from the Bureau is now investigating the reproduction of white pine on

pastures and abandoned lands in Massachusetts and New Hampshire, to learn the conditions under which reproduction takes place. The Bureau is making this investigation in order to be able to give owners of such lands directions as to the best methods of handling them, with a view of securing a stand of pine by natural seeding. A field party of six men is studying the same problem in Oklahoma, in connection with the hardwood growth which composes the timber belts of that region. It has been found in certain places in the middle west that natural forest belts have extended up streams as much as two miles in the last twenty-five years. Particular attention will be paid to devising methods for extending and improving the forest growth of the Wichita Forest Reserve, where at present the stand of timber consists of only a scattering growth of oak. A similar study is being made on the Prescott Forest Reserve in Arizona, where the stand of timber consists almost entirely of Western yellow pine. For several years only a scant reproduction has taken place on this reserve, and one of the objects of the present investigation is to devise means of increasing the stand of young timber.

Among the important economic studies now being conducted by the United States Geological Survey in the region east of the Mississippi River is the investigation of the coal field within the first district in southwestern Indiana, the results of which will appear before the close of the year. The area covered to date embraces nearly 1,000 square miles, and includes portions of Pike, Gibson, Vanderburg, Warrick, Spencer and Dubois counties. The Survey has prepared unusually accurate topographic maps, showing not only the houses, highways, railways, town and county boundaries, and drainage features, but also, by means of contours, the heights and shapes of the hills. The geologic maps, which are being prepared by Messrs. M. L. Fuller and George H. Ashley, will show the outcrop of the 'big' or Petersburg coal vein from near the White River to the vicinity of the Ohio. Its approximate elevation above sea level will be shown both along its outcrop and beneath the surface, giving a basis from which its depth below the surface can be calculated at any point. The locations of the mines are also shown. The outcrop of the smaller coal, designated 'No. 7' by the Indiana State Survey, which occurs above the Petersburg coal, will be shown in the same manner, as will also some of the coals beneath the latter. The maps will be accompanied by an account of the geologic history of the region, by descriptions of a number of important drainage changes, and by a detailed description of the character and structure of the rocks, especially of the coal. The maps described are the first installment of a series which will later be extended westward into Illinois and southward into Kentucky.

The United States Geological Survey has recently completed a study of the oil fields of California, which of late years have become so important an economic feature of that State. The investigation was conducted by Mr. George H. Eldridge, one of the geologists of the Survey, who is now engaged in the preparation of a report. This report, which will later be available to the public, will contain information of interest regarding the geologic conditions governing the occurrence of oil in the California district. During the year Mr. Eldridge will also complete a report on the phosphate deposits of Florida, upon which a portion of his time has recently been spent.

Mr. George F. Lincoln, Consul-General of Antwerp, writes to the Department of State that the Cartographic, Ethnographic and Maritime Exposition was opened to the public on May 22. The Royal Geographical Society of Belgium has obtained for the purposes of this exhibition the assistance of the French, Dutch, Spanish, Italian and Mexican Governments, and in addition the Queen has sent many interesting objects from her private collections. The exhibition of ancient and modern charts, atlases, maps, globes and projections is perhaps the most interesting that has ever been brought together, and is particularly notable for its fine specimens of the works of Mercator, Ortelius, Blaeu, Hondius and the val-

uable display of those of Elisée, Reclus, the great geographer of modern times. The charts of the Ka-Tanga scientific expedition here find a place, as well as the various scientific apparatus used by the members of the mission. There is a fine map of the Lower Kongo and some remarkable relief maps of the Suez and Panama canals, the districts of Lake Geneva and the Matterhorn, as well as a large one of the surface of the moon. The ethnographical section comprises photographs, weapons, household utensils, religious objects, articles of wearing apparel, etc., from the Kongo Museum at Terveuren, from missions in the Kongo, China, Java and South America, besides a brilliant display of gods and goddesses from the Dutch East Indies and beautiful tapestries from the royal palace at Pekin. In the maritime section are models of the newest types of ocean liners, furnished by the principal steam navigation lines; models of old Dutch craft and men-of-war, and of the proposed ports at Ghent, Brussels and Heyst; souvenirs of the explorations of the Duke of Abruzzi, of the Belgian Antarctic expedition, etc. A number of improved instruments for studying the depths of the sea, life-saving apparatus, and instruments of precision for exploring, prospecting and surveying purposes, besides astronomical instruments, complete an exhibition that is highly interesting from both an educational and scientific point of view.

Nature states that at the meeting of the London County Council on Tuesday the Technical Education Board reported the result of the inquiry by a special subcommittee of the board as to the need and present provision for special training of an advanced kind in connection with the application of science (especially chemistry and electricity) to industry, and as to what, if any, developments are needed to secure efficient training in these subjects for senior county scholars and other advanced students who desire to qualify themselves to take leading positions in scientific industries. The report of the special subcommittee deals with matters which the board points out are of great importance to the present and future prosperity of various English industries, notably some connected with London. The members of the special committee came, without a dissentient voice, to the conclusions (1) that England (and London in particular) has suffered the loss of certain industries and that others are in danger; (2) that this loss has been largely due to defective education, especially in the higher grades; and (3) that London is still seriously behind other cities, notably Berlin, in the provision for the higher grades of scientific training and research. The report was accepted, with the addition of the recommendation 'that the Technical Education Board be instructed to report as to the steps it proposes to take in order to give practical effect to the suggestions contained in the report.'

THE *Electrical World* states that Arizona has several large and very important water power projects under construction. Lack of rain in the southwest serves as a great hindrance to development of water storage and developments in water power. In the Salt River Valley the towns of Phœnix, Tempe and Mesa are lighted with electricity, generated by small falls in the valley's canal systems. Sixty miles southeast of Prescott, on Fossil Creek, work has begun on a scheme that is destined to develop 2,000 horse-power, to be used mainly in the mines of central Yavapai County. A great power project is in incubation, based upon the damming of Bill Williams Fork, in extreme western Arizona. The new dam that is to store flood waters for the use of the Salt River Valley is to be built largely with the aid of water power, and a few miles above the reservoir it will supply power for a 3,000-h. p. transmission line to Globe and other central Arizona mining camps. This plant is being built by C. M. Clark. The Grand Canyon of Arizona affords the greatest field for electricity generated by water power. Below the new Santa Fé Hotel, on the canyon brink, are Indian Garden Springs, which, in ordinary seasons, have a flow of nearly 100 miners' inches, that can be thrown over a cliff 3,000 feet high. In Cataract Canyon, the stream of flow usually approximating 10,000 miners' inches, makes three great leaps of 70,

144 and 250 feet, respectively, without reference to several thousand feet of drops from the Indian villages to the Colorado's channel. Many plans have been mooted for developing the marvelous power of the Colorado, a stream which rises as much as 100 feet in flood time within the canyon. Floats equipped with great paddle wheels have been suggested, but it is probable that the river will some day be harnessed by means of tunnels that will 'pick up' the fall of the stream. One such tunnel, at a point near Bass's Trail, and not over half a mile in length, driven through black granite, would cut off 12 miles of river channel, averaging not less than 12 feet of fall to the mile. Dr. A. J. Chandler, of Mesa, Arizona, is engineering the latest Grand Canyon power plant. Dr. Chandler is the manager of the southwestern interests of Bowen & Ferry, the Detroit capitalists, and has made a success of a power-generating plant near Mesa. He has found an ideal location for power-generating works on the Kanal, Wash., not far from its union with the inner canyon of the Colorado about 70 miles north of Williams. It is stated that even 5,000 feet of fall can be found in a distance a little over a mile. The water supply is said to be ample and of remarkable regularity of flow. The only question seems to be that involving the carriage of the necessary heavy machinery down into the canyon and across the river, unless it be hauled southward from some Utah railroad point and lowered over the precipitous cliffs.

UNIVERSITY AND EDUCATIONAL NEWS.

The University of Toronto has arranged its academic course leading to the B.A. degree, so that when the student has completed four years of work he may have fulfilled the requirements of the first two years of medicine. He can then enter the third year of medicine and graduate in two years, thus making it possible to obtain the degrees of Bachelor of Arts and Bachelor of Medicine after six years of study.

A laboratory of experimental psychology will be opened next winter at King's College, London. It will be under the general supervision of the professor of physiology, Dr. Haliburton, and the special conduct will be entrusted to Dr. W. G. Smith, formerly of Smith College, Northampton, Mass.

The University of Jena will celebrate its three hundred and fiftieth anniversary in 1908. Arrangements are already in progress for the preparation of a history of the university based on unpublished documents.

Cornell University, through the generosity of Abraham Abraham of Brooklyn, has acquired the Egyptological and Assyriological library of the late Professor August Eisenlohr of Heidelberg.

The registration at the summer school of Columbia University is this year 643 as compared with 589 in 1901 and 417 in 1900, when the school was first established.

The State University of Iowa has created a chair of psychology and elected to it Dr. C. E. Seashore, at present assistant professor in philosophy. Dr. Seashore took his doctor's degree at Yale in 1895 and was assistant in the Psychological Laboratory from 1895 to 1897.

Robert S. Shaw, professor of agriculture in Montana, has been elected to the chair of agriculture in Michigan Agricultural College. He graduated at Guelph, Ontario, in 1892, managed his father's farm for four years, and took his father's classes for one year in the University of Minnesota.

L. B. Walton, A.M. (Brown, 1900), Ph.D. (Cornell, 1902), has been appointed instructor in biology at Kenyon College, Gambier, Ohio. He held last year the Goldwin Smith fellowship in zoology at Cornell University.

At Purdue University J. R. McColl, now of the University of Tennessee, a graduate of the Michigan Agricultural College, has been appointed associate professor of thermodynamics, and Mr. Fritz B. Ernst, now on the editorial staff of the *Railway Age* and a graduate of Purdue University, has been appointed assistant in car and locomotive design.