

facing the ends, are recessed screens, on one of which are shown pictures illustrating the different kinds of survey work and the part they play in the development of the country. On the other screen are shown several series of pictures.

At one end of the space is shown the per capita production of minerals in the United States in 1880, about the time of the Centennial Exposition, and of the organization of the survey, and in 1913, the period between these dates practically covering the past work of the United States Geological Survey. The exhibit consists of one 97-millionth of the actual production of each mineral in 1913 and one 48-millionth of the production in 1880.

The space along one of the outside aisles is devoted to a series of cases, illustrating what our common things are made of, what the raw material looks like as it is obtained from the earth, and where it occurs in the United States. For example, many of the familiar household articles are there, such as an aluminum saucepan, an electric-bulb filament, and a fountain-pen point; and above each article is shown the mineral from which it is made, traced back to the ore, and then a map of the United States, showing where the ores occur. Most of these individual maps have been prepared especially for this exhibit.

At the west end of the space is an exhibit of the power and fuel resources of the United States, including maps showing the distribution of the black shale from which oil is derived and the apparatus used in the field in determining the shales that are worth studying.

In order to show the transparencies included in the exhibit to the best advantage, arcades resembling mine entrances have been built at the corners of the space. The methods of work in the survey are illustrated by a series of cases showing by a set of partial results how maps are made and other features of the work.

In the portion of the exhibit relating to water resources is a display of automatic gages being run by clock work and recording the fluctuating height of water in a tank.

One feature of the exhibit is the stereoscopic pictures, resembling the old mutoscope views but of a modernized type. These will be arranged in boxes of fifty each on a table at which one may sit and study leisurely various features of survey work. There are also shown four series of pictures of the Grand Canyon and Rocky Mountain region, taken in the early days of the geological survey by the famous photographers Jackson and Hillers.

Other cases show the gem minerals, the rare mineral ores, etc.

#### SCIENTIFIC NOTES AND NEWS

COL. GEORGE W. GOETHALS has been made a major-general of the line in recognition of his services in building the Panama Canal. Brig.-Gen. William C. Gorgas, surgeon-general, has been made major-general in the medical department. Col. Harry F. Hodges and Lieut.-Col. William L. Sibert, United States Corps of Engineers, have been promoted to be brigadier-generals. The bill providing for their promotions extended the thanks of congress to the officers.

UNDER the leadership of Dr. Hiram Bingham, the National Geographic Society-Yale University Peruvian Expedition sailed from New York on March 3 to continue its work in the Andean Mountains. Members who left New York on this expedition are: Director, Hiram Bingham, Yale University; geologist, Herbert E. Gregory, Ph.D., Silliman professor of geology in Yale University, geologist of the 1912 expedition; naturalist, Edmund Heller, naturalist of the Smithsonian's African expedition, under the leadership of Colonel Roosevelt; botanist, O. F. Cook, Ph.D., of the United States Department of Agriculture; chief engineer, Ellwood C. Erdis, of the 1912 expedition; topographer, Edwin L. Anderson; chief assistant and interpreter, Osgood Hardy, M.A., of the 1912 expedition; assistant topographer, C. F. Westerberg, B.S., and several assistants.

MISS KATHARINE LILLY, head nurse of the department of surgery of the Rockefeller Institute for Medical Research, has gone to

France to assist Dr. Alexis Carrel, of the institute, who recently has been detached from the Lyons Hospital and placed in charge of a hospital at Compiègne, France, near the northern line of battle. Dr. H. D. Dakin, the biological chemist, who worked some years in this country, has also joined Dr. Carrel.

PRESIDENT RAYMOND A. PEARSON, of the State Agricultural College at Ames, Iowa, has decided not to accept the offer of Governor Whitman, of New York, to become state commissioner of agriculture to succeed Mr. Calvin Hudson. Dr. Pearson was commissioner of agriculture under Governor Hughes.

MR. WILLET M. HAYES, formerly assistant secretary of agriculture, has returned from a year's service as adviser to the government of the Argentine Republic and of the Province of Tucuman.

Dr. and Mrs. N. L. Britton, of the New York Botanical Garden, Mrs. N. Wille, Mr. John F. Cowell, director of the Buffalo Botanical Garden, and Mr. Stewardson Brown, of the Philadelphia Academy of Natural Science, are in Porto Rico engaged in botanical explorations.

DR. JANET T. HOWELL, daughter of Dr. William Howell, professor of physiology in the Johns Hopkins Medical School, has been awarded the Sarah Berliner Fellowship for Women. This fellowship carries with it a gift of \$1,000 to enable the recipient to engage in research work in physics, chemistry or biology. Dr. Howell received the A.B. from Bryn Mawr College in 1910, and the Ph.D. from the Johns Hopkins University in 1913. She was holder of the Helen Schaffer Huff research fellowship in physics at Bryn Mawr College during 1913-14 and this year she holds the position of lecturer in physics at Bryn Mawr College, taking the place of Professor James Barnes.

ON February 26, Professor Alexander Smith, of Columbia University, delivered a lecture to the Boylston Chemical Club of Harvard University on "The Forms of Sulphur and Their Relations."

PROFESSOR W. K. HATT, of Purdue University, lectured at the University of Illinois on

February 24 on the subject of "Flood Protection in Indiana."

IRA O. BAKER, professor of civil engineering in the University of Illinois, lectured recently before the students of the Short Course in Highway Engineering at the University of Michigan. His subject was "Selecting the Road Surface."

DR. WALTER HOUGH, curator of ethnology, U. S. National Museum, gave an address before the California Academy of Sciences on February 17, on "Explorations of a Sacred Cave in Arizona."

DR. BARTON W. EVERMANN, director of the Museum of the California Academy of Sciences, gave the Sigma Xi lecture at the University of California on February 24. His subject was "The Conservation of the California Elk."

DR. RICHARD MILLS PEARCE, professor of research medicine in the University of Pennsylvania, addressed the Buffalo Academy of Medicine on Wednesday evening, February 24, on "Experimental Studies of the Spleen in its Relation to Anemia, Hemolysis and Hemolytic Jaundice." A reception to the speaker followed the lecture.

WE learn from *Nature* that M. Louis Moissan, son of the late Professor Henri Moissan, and assistant at the Ecole supérieure de Pharmacie at Paris, who died on the field of battle on August 10, has left to his school, in addition to the scientific books and apparatus of his father, the capital sum of 200,000 francs for the foundation of two prizes—one for chemistry (prix Moissan), and one for pharmacy (prix Lugan), in memory respectively of his father and his mother, née Lugan.

DR. T. WESLEY MILLS, emeritus professor of physiology in McGill University, died in London on February 14.

PROFESSOR JAMES GEIKIE, the distinguished geologist, died in Edinburgh, on March 2, in his seventy-sixth year. He entered the British Geological Survey in 1861 and was called to the Murchison chair of geology at Edinburgh University in 1882, succeeding his brother, Sir Archibald Geikie.

DR. RICHARD WEITZENBÖCK, aged thirty years, docent for chemistry at Gratz, has been killed in the war.

A DESPATCH from Rome states that all physicians in Vienna who are under fifty years of age have been ordered by an imperial decree to join the army medical corps.

THE Rockefeller Institute for Medical Research has appropriated \$20,000 to be used under the institute's direction to further medical research work under war conditions, and is equipping Dr. Carrel's new hospital in France with apparatus for research work on pathological, bacteriological, surgical and chemical conditions.

THE New England Association of Chemistry Teachers held its fifty-second regular meeting on February 27, at the Roxbury Latin School, when an address entitled "Some possible items, new and old, for the course in elementary chemistry," was given by Professor Alexander Smith, head of the department of chemistry in Columbia University. At the request of the executive committee Professor Smith discussed several topics, such as: Action of air in the Bunsen burner flame; colloidal suspensions; cause of valence, electrons; the shortest route to atomic weights; the distinction between physical and chemical change; and new view of a crystalline solid. Several experiments were performed to illustrate these subjects. The members who were present in large numbers discussed the value of these topics in an elementary course in chemistry.

THE U. S. Civil Service Commission announces an examination for metallographist, for men only, to fill a vacancy in this position for service in the Engineering Experiment Station, Naval Academy, Annapolis, Maryland, at a salary of \$2,500. The duties of this position will be (a) to direct the preparation of metal specimens for microscopic examination and the photographing of the same, and to interpret the appearance of specimens under the microscope; (b) to prescribe correct heat treatment for steel specimens which have not had proper treatment; (c) to make and interpret the various standard physical tests applied

to metal specimens; (d) to investigate miscellaneous problems that may arise in the course of naval practise, such as the cracking of the tin linings of copper cooking kettles, imperfect welds, various processes of galvanizing, etc.; (e) to investigate the properties of various alloys of metal; (f) occasionally to make a chemical analysis of metallic substances. The degree of Ph.D. from a college or university of recognized standing, and at least five years' experience since receiving the bachelor's degree, such experience to have included the use of the microscope in the examination of metals, and the making and interpretation of photomicrographs of metals, are prerequisites for consideration for this position.

A SYSTEMATIC study of Missouri River and its tributaries is being carried on by the United States Geological Survey. Considering the varied character of the streams of the Missouri River basin and their great economic value for irrigation, power, and other purposes, the investigation is one of the highest importance. The water supply of this great drainage area is the subject of a publication recently issued by the Geological Survey, entitled "Surface Water Supply of the Missouri River Basin, 1912" (Water-Supply Paper 326), by W. A. Lamb, Robert Follansbee, and H. D. Padgett. This report contains the records of flow at 130 permanent stations of the survey during the year 1912, data which are necessary to every form of water development, whether it be water power, navigation, irrigation, or domestic water supply. Some of the tributary streams are exceedingly variable in flow; others, like the Niobrara in Nebraska, are remarkably uniform. The Missouri proper is formed in southwestern Montana by the junction of three streams which were discovered by Lewis and Clark in 1806 and were named by them Jefferson, Madison and Galatin rivers. Of these three Jefferson River drains the largest area and is considered the continuation of the main stream. This part of Montana is mountainous and affords many excellent water-power sites. Among the principal tributaries of the Missouri are the Marias, Musselshell, Yellowstone, Cheyenne,

Platte and Kansas. The western part of the basin is in the arid belt and the eastern part is in the semiarid and humid regions. Ten states of the Union are drained in part by Missouri River. Rising at the Red Rock Lakes, at an elevation of 6,700 feet above sea level, this stream descends through the Rocky Mountains and emerges on the broad prairie land a few miles below the city of Great Falls, Montana. From that point it is accounted a navigable stream with an easy grade, and in passing through the Dakotas and along the borders of Nebraska, Kansas and Iowa it receives the flow of great tributaries, so that as it crosses the State of Missouri and joins the Mississippi a short distance above St. Louis it becomes one of the large rivers of the world. Its total drainage area is about 492,000 square miles in extent and comprises, in addition to the states above mentioned, large areas in Wyoming and Colorado and a smaller area in the southwestern part of Minnesota.

THE Michigan College of Mines has received a collection of minerals from the Shattuck Cave, near Bisbee, Arizona, one of the wonders of the mining world. This cave was opened in 1913 by a drift on the third level of the Shattuck Mine. When the miner who had been drifting in this part of the level returned one night after a heavy blast, he found that the working face had entirely disappeared and that before him was a great opening reaching farther than his light would shine. Looking upward he could see tiny lights flashing and believing that they were stars he ran back to the shaft, declaring that he had blasted a hole clear through to surface. Mine officials investigated at once and found that a great natural cavern had been opened up, circular in shape, 340 feet in diameter and 175 feet high. It was a virtual fairyland of beauty, myriads of crystals in the roof reflecting back the lights from the miners' lamps. Walls, roof and floor were covered with great clusters of crystals, and near the center of the cavern a cluster of stalactites hung from the ceiling in the form of a great chandelier 40 feet long. The crystals were for the most part pure white, but in places where the filtering waters had contained

iron and copper, the beauty was enhanced by great transparent stalactites and stalagmites, some ruby red, others a clear emerald green or azure blue. The mining company illuminated the cave with electricity and has allowed thousands of visitors the privilege of seeing it. An attempt was made to have the Smithsonian Institution at Washington remove and reproduce a portion of the cave, but nothing came of it. It is because the mine operators have now found it necessary to fill the cave with waste rock that the Shattuck-Arizona Mining Company sent the specimens to the College of Mines. Superintendent Arthur Houle, of the Shattuck Company, is a brother of Professor A. J. Houle of the college.

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#### UNIVERSITY AND EDUCATIONAL NEWS

THE Massachusetts committee on education voted unanimously on February 25 in favor of "taking initial steps toward the establishment of a state university."

ROBERT FLERSHEIM has left a bequest of a million marks to the University of Frankfurt.

DR. FRANK J. GOODNOW will be formally inaugurated president of the Johns Hopkins University on or about May 20. It is planned to give the occasion a double significance in inaugurating the third president of the university and formally dedicating the new site at Homewood.

AT Smith College the following promotions have been made: from assistant professor to associate professor, Inez Whipple Wilder, A.M., department of zoology; from instructor to assistant professor, Mary Murray Hopkins, A.M., department of astronomy, and Grace Neal Dolson, Ph.D., department of philosophy.

THE senate of the University of London has conferred, as we learn from *Nature*, the titles of professor and reader in the university upon the following: Dr. A. L. Bowley (London School of Economics), statistics; Mr. L. R. Dicksee (London School of Economics), accounting and business organization; Mr. J. E. S. Frazer (St. Mary's Hospital Medical School), anatomy; Dr. T. M. Lowry (Guy's