and construction of the buildings, showing their home life and religious practises; the domestic utensils and tools, indicating their industrial development; decoration, showing the origin and progress of their ideas of design and ornament, bearing upon the evolution of beliefs and habits of thought.

All these lines of research lead up to the most important phase of the inquiry, viz.,

4. *Psychology.*—For it is the human mind that we are studying, and the ultimate aim of these correlated investigations is to find out how the mind of man has been influenced by his environment; how his beliefs and life have been created, modified, continued, or destroyed by his physical surroundings.

The methods adopted for carrying out the foregoing scheme, and which were successfully practised during the recent summer session, may be summarized as follows:

1. Excavations of the designated ruins, systematically made under proper supervision; insuring the adequate scientific record of all facts disclosed, care of the objects discovered, and preservation of the structures for the use of future students.

2. Special investigations upon the collateral subjects above indicated, made by persons thoroughly qualified, within the definite region under consideration. These embraced the survey and mapping of the area; and the geology, botany and zoology, studied in direct connection with the linguistics of the existing Indians derived largely from the same stock as the ancient dwellers. This was accomplished by taking a number of intelligent Indians into the field, and learning from them at first hand the original names of all the objects studied, their uses, and the beliefs and traditions concerning them.

3. Daily class excursions under instruction, bringing the students from time to time into direct contact with the researches mentioned in the last two paragraphs, thus affording opportunity for study where the things are, and for discussion in their presence.

4. Facilities for direct comparison of pertinent literature, by means of a library on the spot.

5. Intelligent presentation of the results of the work, and of related questions, by means of daily lectures, with opportunity for inquiry and discussion following them.

The foregoing program of field study will be followed by work at the museum during the year, where the material obtained in the field will be digested, and the results prepared for publication. This will include, among the special features, phonographic and kymographic studies of languages now rapidly disappearing, thus securing mechanically accurate records for future use.

Frank Springer

SCIENTIFIC NOTES AND NEWS

Announcement is made that the Nobel Prize in medicine for 1910 has been awarded to Dr. Albrecht Kossel, professor of physiology at Heidelberg.

At its last meeting the Rumford Committee of the American Academy made the following grants: to Mr. P. W. Bridgman, of the Jefferson Physical Laboratory, Harvard University, $400 additional, in aid of his research on the thermal and optical properties of bodies under pressure; to Professor Charles L. Norton, of the Massachusetts Institute of Technology, $400, in aid of his research on thermal insulation.

The Royal Scottish Geographical Society will award its medal to Professor James Geikie, F.R.S., for his contributions to geographical research and his services to the society; and the Livingstone gold medal to Sir John Murray, K.C.B., F.R.S., in recognition of his oceanographical work.

At Cambridge University the Gedge prize has been awarded to G. R. Mines, of Sidney Sussex College, for his essay entitled "Researches on the Physiological Action of Inorganic Salts chiefly in Relation to the Cardiac and Skeletal Muscles of the Frog."

M. Lacroix, professor of mineralogy at Paris, has been elected a corresponding member of the Vienna Academy of Sciences.

Mr. John Randall, of Maidley, England, who has made various contributions to geology

and to the history of the clay industries in Great Britain, celebrated on September 1 his hundredth birthday.

DR. DUDLEY P. ALLEN has retired from the chair of surgery in Western Reserve University and will leave Cleveland for an extended trip abroad. The trustees have passed a resolution in which they say: "Upon the medical school of the university, to which his father and his grandfather gave their labor, he conferred distinction, as well as giving professional and personal devotion." Dr. Allen has been appointed professor emeritus.

DR. KENDRIC CHARLES BABCOCK, president of the University of Arizona, has been appointed specialist in higher education in the United States Bureau of Education, to fill the new position created by the present congress at its recent session.

DR. DAVID H. RAY, who has had charge of the engineering courses in the College of the City of New York, has been appointed chief engineer of the Bureau of Buildings of the Borough of Manhattan, New York City.

PROFESSOR A. N. TALBOT, of the College of Engineering of the University of Illinois, is serving as a member of an expert commission which is engaged in inspecting and reviewing the work of construction of the new City Hall of Chicago.

DR. C. A. CRAMPTON, after serving twenty years as chief chemist of the Internal Revenue Bureau of the Treasury Department and prior to that time seven years in the Bureau of Chemistry of the Department of Agriculture, has retired from the government service for the purpose of engaging in private practise.

DR. K. MIYAKE, Ph.D., Cornell, 1902, is spending a couple of months at the laboratory of the department of plant pathology of the New York State College of Agriculture, studying the diseases of ginseng. Dr. Miyake is a lecturer in the department of botany in the Imperial University of Tokyo. He has been sent here by the Korean government along with Mr. M. Tomiiye to investigate the cultivation and particularly the diseases of ginseng. Ginseng is under a government monopoly in Korea and during the past few years there has been a remarkable reduction in the out-put, due to the diseases of the roots. Similar diseases affect the crop in this country. There is an export annually from the United States of about a million dollars worth of ginseng. A large portion of this is cultivated, a considerable part of it being grown in the state of New York.

PROFESSOR DAVID EUGENE SMITH'S "History of Decimal Fractions," published by Teachers College, Columbia University, in March, has been translated into Japanese.

ON October 15 and 16, Professor D. W. Johnson, of Harvard University, conducted a geological excursion to Truro and Provincetown, to study the shore lines and sand dunes of Cape Cod.

SIR FRANCIS LOVELL, dean of the London School of Tropical Medicine, intends to make a tour on behalf of that institution during the winter, visiting the Bahamas, Bermuda and British Honduras.

DR. GEORGE KERSCHENSTEINER, superintendent of schools of Munich, will make an address at the meeting of the Society for the Promotion of Industrial Education, to be held at Boston beginning on November 17.

PRESIDENT ERNEST FOX NICHOLS, of Dartmouth College, was announced to read a paper on "Modern Physics" before the American Philosophical Society on the evening of November 4.

PROFESSOR EUGEN OBERHUMMER, of the University of Vienna, is giving a series of about twenty-four lectures at the University of Chicago, on "The Political Geography of Europe." He addressed the Geographic Society of Chicago at its regular October meeting, on the subject, "The Political Geography of Austria-Hungary."

MR. FREDERICK A. DELANO, president of the Wabash Railroad Company, addressed the students and faculty of the College of Engineering of the University of Illinois on Tuesday, October 25. His subject was "The Railway as a Profession."

THE October number of the *Irish Naturalist,* as quoted in *Nature,* contains obituary notices of Samuel Alexander Stewart, who was born in Philadelphia on February 5, 1826, whence he went in 1837 with his father to Belfast, where he eventually worked as a miller. Details of his life and work are recorded in two separate articles in the serial quoted, the former being described by the Rev. C. H. Waddell and the latter by Mr. R. L. Praeger. Most of his papers were devoted to botanical subjects, although local zoology likewise claimed a share of his attention. Mr. Stewart died on June 15 last as the result of a street accident.

IT is proposed to erect in the new chemical building of the University of Michigan a bronze tablet in memory of Dr. Albert B. Prescott, for many years director of the chemical laboratory.

A DRINKING fountain, designed by Professor R. Tait MacKenzie, of the University of Pennsylvania, has been erected at the Central Experiment Farm, Canada, in memory of Dr. James Fletcher, former Dominion entomologist and botanist.

DAVID PEARCE PENHALLOW, professor of botany in McGill University and eminent for his contributions to paleobotany, died on October 26, at the age of fifty-six years.

ROBERT W. MCFARLAND, emeritus professor of civil engineering in the Ohio State University, died on October 24, at the age of eighty-five years.

PROFESSOR CARL SVANTE HALBERG, professor of pharmacy in the medical school of the University of Illinois, died on October 22, at the age of fifty-four years.

PROFESSOR MELCHIOR TREUB, for twenty-nine years director of the Buitenzorg Botanical Garden in Java, has died at the age of fifty-nine years.

DR. SYDNEY RINGER, F.R.S., sometime Holme professor of clinical medicine at University College, London, has died at the age of seventy-six years.

TRELAWNEY WILLIAM SAUNDERS, for many years assistant geographer to the Indian Office under the British government and known for his contributions to geography, has died in his ninetieth year.

DR. THORVALD NICOLAI THIELE, professor emeritus in the University of Copenhagen and formerly director of the Copenhagen Observatory, known for his contributions to actuarial science as well as to astronomy, died on September 26, at the age of seventy-two years.

DR. R. GEIGEL, professor of physics and geodesy at the Aschaffenberg Forest School, has died at the age of fifty-four years.

DR. B. RAYMANN, professor of chemistry in the Bohemian University at Prague, has died at the age of fifty-eight years.

THE deaths are announced in *Nature* of Mr. John Roche Dakyns, formerly of the British Survey; of Dr. F. W. D. Fraser, formerly professor of anatomy and physiology at the Imperial University of Osaka, Japan; of Mr. A. H. Stokes, until recently chief inspector of mines in the Midland district, of England, and of Mr. Cecil H. Leaf, known for his studies of cancer.

SECTION F of the American Association for the Advancement of Science will join with the Central Branch of the American Society of Zoologists for the reading of technical papers at Minneapolis, Tuesday, December 27, and Wednesday, December 28.

THE twenty-eighth stated meeting of the American Ornithologists' Union will be held in Washington, D. C., beginning November 14, 1910. The business meeting will be on the evening of that date, for the election of officers and members and the transaction of routine business. The public sessions, devoted to the presentation and discussion of scientific papers, will be held in the auditorium of the new U. S. National Museum, November 15 to 17 inclusive, from 10 o'clock A.M. until 4 P.M. each day. Information regarding the meeting can be had by addressing the secretary, Mr. John H. Sage, Portland, Conn.

"THE Volatile Matter of Coal" is the title of the first bulletin to be issued by the new federal Bureau of Mines. The authors, Hor-

ace C. Porter and F. K. Ovitz, conducted their investigations at the Pittsburgh station while it was under the technologic branch of the Geological Survey, the work being a continuation of the fuel investigations begun several years ago at the Louisiana Purchase Exposition, St. Louis, Mo. The results obtained at that plant showed that the work of determining the fuel values of the coals and lignites in the United States with a view to increasing efficiency in their utilization would be incomplete if it did not include systematic physical and chemical researches into the processes of combustion. Hence in their later investigations the authors carried on such researches, concentrating attention on those lines of inquiry which promised results of economic importance. This bulletin is a report on an investigation of the volatile matter in several typical coals—its composition and amount at different temperatures of volatilization.

UNIVERSITY AND EDUCATIONAL NEWS

THE state legislature of Arkansas has appropriated $350,000 for the erection of four agricultural schools and $500,000 additional has been raised by the cities.

AT the recent meeting of the board of directors of Washington University it was announced that a research laboratory in connection with the chair of pathology and therapeutics in the dental school has been endowed. A well equipped laboratory will be in thorough working order at the beginning of the annual session, October 1, 1910. Dr. Hermann Prinz, who has filled the chair of dental pathology and therapeutics for the past ten years, has been chosen to take charge of the new laboratory.

AT a recent meeting of the board of regents of West Virginia, the College of the State University was discontinued, and a department of medicine in the College of Arts and Sciences was established. This department will, as heretofore, offer the work of the first two years of the medical course, but the university will not award the degree of M.D. to those of its students who complete the last two years in medicine at certain other colleges, as has hitherto been done. This preliminary medical work will be improved, and may be counted towards the degree of B.S.

AT the College of Agriculture of the University of Wisconsin and the Wisconsin Agricultural Experiment Station Dr. Ormond S. Butler has been appointed instructor in horticulture to give his entire time to research work. Dr. Butler received his doctor's degree at Cornell in 1910 where he specialized in plant physiology. Dr. Frank B. Hadley has been appointed assistant professor of veterinary science. Assistant Professor E. R. Jones has been granted leave of absence for the second semester to study soil physics and drainage in this country and abroad. Conrad Hoffmann, assistant in agricultural bacteriology, who has been on leave of absence for a year studying soil bacteriology, in Germany, has returned and is giving a course in soil bacteriology.

MRS. HELEN THOMPSON WOOLLEY is assisting in the department of philosophy of the University of Cincinnati this winter.

DR. W. B. PILLSBURY, of the University of Michigan, has been advanced to a full professorship of psychology.

DISCUSSION AND CORRESPONDENCE

THE MENDELIAN THEORY OF HEREDITY AND THE AUGMENTATION OF VIGOR

TO THE EDITOR OF SCIENCE: One of the most interesting questions in connection with the Mendelian theory of heredity is whether the augmentation of vigor observed in crossing distinct varieties can be explained on the hypothesis of the pure gamete.

The following mathematical treatment of the subject may be of interest to some of your readers.

The most general expression for a Mendelian family breeding true to its mean is

$$(p^2(DD) + 2pq(DR) + q^2(RR))^n$$

for, if the array of individuals obtained by expanding this expression be crossed at random, we get the same expression for the array of offspring generation after generation.