the first generations and without reference to the strain of the visible microorganism. On the other hand, in this fluctuation of pathogenicity the cultures imitate the action of the virus as contained in human materials, namely, nervous tissue, secretions from the nasopharynx and intestinal washings, in which the virus, either known or believed to be present, may yet fail to be demonstrated by reason of the want of infectious power for monkeys or for the particular monkey inoculated in a given instance. Moreover, it is a common experience in bacteriology to find even among the ordinary bacteria lack or rapid loss of virulence among saprophytic cultures, while virulence is not only retained, but may be increased in rapid passages from animal to animal.

In view of these considerations it would appear that an etiological relationship has been shown to exist between the cultivated microorganism and epidemic poliomyelitis as it occurs in human beings or in monkeys. There remains merely a single other possibility, already indicated, namely, that two factors are present in the cultures, the one an invisible because ultramicroscopic organism, the other the globoid bodies described. On this basis it would have to be supposed that the former but hypothetical factor is the essential agent of infection. As against this supposition it may be urged that an instance of symbiosis of this nature is not known to animal pathology. Regarding the cultivated minute but visible microorganism itself, it may be held on the basis of the data presented that it fulfills the conditions hitherto demanded for the establishment of causal relation between an extraneous parasite and a specific disease. The microorganism exists in the infectious and diseased organs; it is not, as far as is known, a common saprophyte, or associated with any other pathological condition; it is capable of reproducing, on inoculation, the experimental disease in monkeys, from which animals it can be recovered in pure culture. And besides these classical requirements, the microorganism withstands preservation and glycerination as does the ordinary virus of poliomyelitis within the nervous organs. Finally, the anaerobic nature of the microorganism interposes no obstacle to its acceptance as the causative agent, since the living tissues are devoid of free oxygen and the virus of poliomyelitis has not yet been detected in the circulating blood or cerebrospinal fluid of human beings, in which the oxygen is less firmly bound; nor need it, even should the microorganism be found sometimes to survive in these fluids.

SCIENTIFIC NOTES AND NEWS

At the celebration of founder's day at Lehigh University, on October 3, the degree of doctor of laws was conferred upon Dr. Mansfield Merriman, from 1878 to 1907 head of the department of civil engineering, and on Professor Edward H. Williams, Jr., head of the department of mining and geology from 1881 to 1902.

Professor Eliakim Hastings Moore, head of the department of mathematics of the University of Chicago, was recently elected by the council as a corresponding member of the British Association for the Advancement of Science.

Dr. Arthur Shipley, professor of zoology and master of Christ's College, of Cambridge, will make one of the addresses at the formal opening of the graduate college of Princeton University, on October 22.

Dr. A. F. Blakeslee, who has been spending a year's leave of absence in research work in the Carnegie Station for Experimental Evolution at Cold Spring Harbor, L. I., has returned to the Connecticut Agricultural College, Storrs, Conn., where he is in charge of the department of botany.

Last summer the U. S. Weather Bureau, in cooperation with the Smithsonian Institution, made a series of balloon ascensions in southern California, with Mr. W. R. Gregg in charge of the field party. The latter part of July was spent at Catalina Island, and the first twelve days of August on the summit of Mount Whitney.

PRESIDENT WILSON has nominated Col. Dan C. Kingman, corps of engineers, as chief of engineers, with the rank of brigadier general.

DR. R. LÖWENHERZ has been appointed curator of the chemical museum of the Berlin School of Technology.

MR. W. F. FISKE has been requested by the Tropical Diseases Committee of the Royal Society to investigate the life-history of the tsetse flies in Uganda.

DR. HIDEYO NOGUCHI, of the Rockefeller Institute, New York, on September 23 presented the results of his researches on the etiology of rabies before the German Association of Men of Science and Physicians.

A REPORT on tropical diseases prevalent in Ecuador and adjacent republics is being made to Superintendent Smith, of the Johns Hopkins Hospital, by Dr. A. W. Sellards who was the representative of the Johns Hopkins Hospital in the expedition sent out by the Harvard Medical School, under the direction of Dr. Richard P. Strong.

THE Royal Geographical Society's specially designed Antarctic medals will be presented to the surviving members of the Scott expedition by Lord Curzon of Kedleston at a meeting of the society on November 10. At the same time, at the request of the Italian Geographical Society, the president will present to Lady Scott the great Humbert gold medal awarded by that society in memory of Captain Scott. Silver duplicates will be presented to Mrs. Wilson, Mrs. Oates, Mrs. Bowers and Mrs. Evans, widow of petty officer Evans.

THE Harveian oration before the Royal College of Physicians, of London, will be delivered by Dr. J. Mitchell Bruce, on October 18.

THE *School Review*, published by the University of Chicago Press, will hereafter be under the editorial charge of Rollo LaVerne Lyman, this year appointed associate professor of the teaching of English in the School of Education. Frank Nugent Freeman, instructor in educational psychology, has been placed in editorial charge of the *Elementary School Teacher*.

PROFESSOR LUCIEN AGUSTUS WAIT, emeritus professor of mathematics in Cornell University, with the faculty of which he was connected from 1870 until his retirement in 1910, has died, aged sixty-seven years.

DR. REGINALD FABER FITZ, professor emeritus in the Harvard Medical School, where for many years he was Shattuck professor of pathological anatomy, died on September 30, aged seventy years.

THE death is announced of Edward Gardner Murphy, who was active in educational and social matters, and under the name Kelvin McKready was the author of various publications in astronomy.

THE deaths are also announced of Mr. Samuel Roberts, F.R.S., president of the London Mathematical Society from 1880 to 1882, and De Morgan medallist in 1896, and of Mr. John Greaves, bursar and senior mathematical lecturer at Christ's College, Cambridge.

THE government through Secretary of Commerce Redfield has decided to change the sale of all the government catch of seal, fox and other Alaska furs, from London to St. Louis. At the present time St. Louis is said to be the largest primary fur market in the world. It is estimated that three fourths of all the furs trapped on the North American Continent are shipped to St. Louis houses to be sold.

THE British secretary of state for the colonies has nominated a committee to report: (1) Upon the present knowledge available on the question of the parts played by wild animals and tsetse flies in Africa in the maintenance and spread of trypanosome infections of man and stock. (2) Whether it is necessary and feasible to carry out an experiment of game destruction in a localized area in order to gain further knowledge on these questions, and, if so, to decide the locality, probable cost, and other details of such an experiment, and to provide a scheme for its conduct. (3) Whether it is advisable to attempt the extermination of

wild animals, either generally or locally, with a view of checking the trypanosome diseases of man and stock. (4) Whether any other measures should be taken in order to obtain means of controlling these diseases.

The production of gypsum in 1912 was the greatest in the history of the industry, according to the U. S. Geological Survey, the amount of gypsum consumed being 2,500,757 short tons. The value of gypsum and gypsum products was $6,563,908, an increase of $101,873 over 1911. In 1880 only 90,000 tons of gypsum were produced; in 1900 the production was 590,000 tons. The bulk of the gypsum produced in the United States is manufactured by grinding partial or complete calcination into the various plasters, such as plaster of Paris, molding and casting plaster, stucco, cement plaster, flooring plaster and hard-finish plaster. Refined grades of plaster are used in dental work, for making pottery molds, stereotype molds, molds for rubber stamps, and as an ingredient in various patent cements. A steadily increasing quantity is being used in the raw state as a retarder in Portland cement. Considerable quantities are ground without burning and used as land plaster; smaller quantities are used in the manufacture of paint, wall tints, crayons, paper, imitation meerschaum and ivory, and as an adulterant. The pure white massive form, known as alabaster, is much used by sculptors for interior ornamentation, less, however, in this country than abroad.

According to the *Scottish Geographical Magazine* the research vessel *Hiawatha,* chartered for fishery research in the North Sea, left the Tyne in August for the purpose of making certain practically continuous hydrographic observations, at a fixed position. She was to take part in a coordinated research into the movements of the great water masses in the North Sea, and for this purpose was to drop her anchor about 150 miles "E. by N. ½ N." of Shields. Her labors were to be identical in aim with researches simultaneously carried out on board eight other vessels, also at anchor. Two of these other vessels were to be research vessels, acting on behalf of Sweden and Scotland, the Swedish vessel working in the Skagerak, the Scottish well to the northeast of Aberdeen. The remaining vessels are light vessels, two acting for Holland and the other four for the English department. The observations were to consist of current measurements made near both surface and bottom every hour night and day throughout the fortnight, and in fine weather at other intermediate depths. Special attention was to be paid to the submarine waves which, it is expected, are to be met with at the depth at which the heavier bottom water and the lighter surface water are in contact. Specially devised current meters are used in this work. The temperature and salinity of the various layers of the sea were also to be ascertained, special water-bottles being employed to secure samples of the sea from any desired depth. Samples of the minute floating organisms which, directly or indirectly, constitute the food of all our food fishes were also to be taken at various depths and at the extremes of the tide. It is expected that some 8,000 independent current measurements would be made from the English vessels alone. The operations have been planned by a special committee of the International Council for the Exploration of the Sea, it is stated, because a knowledge of the constitution and movements of the sea water is essential to the understanding of the movements and of the abundance of the fishes upon which the fishing industry depends. For instance, the abundance or scarcity of the herring of the Kattegat and Skager Rack has been found to be connected directly with the amount of water which enters the Baltic from the North Sea, and other fisheries in southern Sweden have been shown to change with the ebb and flow of this layer of cold, salt water.

The U. S. Bureau of Mines has issued Bulletin 22, entitled "Analyses of Coals in the United States, with Descriptions of Mine and Field Samples collected between July 1, 1904, and June 30, 1910." This report contains the analyses of 5,000 samples of coal taken from 1,500 coal mines and prospects situated in the various coal fields of the United States. Not

only all of the important fields are represented, but practically all of the more important mining districts. The purpose of the bureau in compiling and publishing this information is to present reliable information regarding the chemical composition and heating value of the coals. The samples of coals were collected by experienced men according to a definite and uniform system, and were analyzed under carefully controlled conditions, so that there might be no question as to the relative merits of the different coals so far as this can be determined by chemical analyses and determination of heating values. An increasing proportion of the coal consumed in the power stations and the larger manufacturing plants of the country is now being purchased under specifications based on chemical analyses and calorimetric determinations of heat units. In the purchase of fuels many matters that have been left to chance are now carefully investigated. It is the aim of mechanical engineers to construct furnaces and to arrange the heat-absorbing surface in a furnace with reference to the peculiar character of the fuel which is to be burned. The report just issued by the Bureau of Mines is in two parts, one giving the methods used in collecting and analyzing the samples, and the results of the analyses, and the other giving the exact location from which each sample of coal was taken, together with a description of the characteristic features of the coal bed at the point of sampling, the nominal capacity of the mine, and such notes on the preparation of the coal as might be useful to consumers. The data contained in these two volumes is not equalled in scope and detail and in value for comparative purposes by the figures that have been published by any other coal-producing country in the world. The governments of some of these countries have published analyses of coals from different mines and from different districts but, with few exceptions, the samples of coal were not collected and analyzed under a uniform system that would make the results comparable in all respects, and no country has attempted to publish such a large number of analyses that would be comparable because of the care taken in collecting and analyzing the samples.

DURING the past fiscal year 4,686 predatory animals were killed by federal officers on the national forests, according to an actual count of carcasses. An indeterminate number of animals, whose bodies were not found, are presumed to have died from poison. The ranger's bag of beasts of prey this year, as shown by forest service figures, was made up of 206 bears, 3,541 coyotes, 133 mountain lions, 62 lynx, 583 wild cats, 64 wolves and 97 wolf pups. The figures indicate that the national forests are becoming cleared of wild animals that prey upon domestic livestock and game, for the forest ranger fills in odd moments between other jobs by thinning out "undesirable citizens" of the animal world. Wolves are said to cause greater losses to western stockmen than any other of the predatory animals. It is estimated that a family of wolves will destroy about $3,000 worth of stock per annum, and that one able-bodied individual costs the grazing industry $600 a season. The wolves are of two classes, the smaller prairie wolves or coyotes, and the larger gray, black or timber wolves, called "lobos." These latter are the great stock-destroyers against which the campaign of the rangers has been waged. The methods of hunting wolves in the west vary. On the plains wolves are sometimes hunted with dogs and horses, but this way is considered expensive and often dangerous. This sport is described by Roosevelt in his earlier hunting books. On national forests the rangers either set out poison or baited steel traps or, by watching trails and hiding near a wolf's den, are able to shoot one or both of the old wolves when they return from foraging. In no other way, according to the forest service, can the number of wolves be kept down so well as by finding their dens and destroying the young. The skins of the predatory animals killed by the rangers are either kept as souvenirs or sold for a price or for bounty. Wolf skins in the west are said to bring from $4 to $6 for robes and rugs; a mountain lion skin, $10 to $20; and a bear skin, anywhere from $20 to $150, according to size and species. In addi-

tion to this there are bounties on bear, lions and wolves in most of the western stock states. Wyoming, in ten years, has paid out, it is said, over $65,000 in bounties on wolves alone and $95,000 more on coyotes and mountain lions. Through his activity against these pests, the forest ranger, it is said, has saved the stockmen many thousands of dollars during the year, while the protection to game animals, such as deer, elk and antelope, is of almost equal importance.

With the middle of September the fire season on the national forests has come practically to an end with less damage than ever recorded. There is always some danger from carelessness of campers or of settlers burning brush and clearing land, but the real danger season extends only from the middle of June until the middle of September. Forest officers throughout the west are congratulating themselves on a season so markedly free from heavy losses. They feel that the immunity from loss has been due to two principal causes, partly to a favorable season, but largely to a much better organization for fire prevention than has been attained heretofore. The effectiveness of the organization is shown particularly by the fact that while there were in all approximately 2,260 fires, as against 2,470 last year, yet the area burned so far this year is only about 60,000 acres as against 230,000 acres in 1912, and 780,000 in 1911. The various causes of fires have not changed greatly in their relative proportions. Railroads and lightning head the list, with campers next. There has been, however, a marked decrease in the number of fires caused by burning brush, which, according to the forest officers, indicates a closer cooperation with the settlers in and near the forests and with timberland owners in fire prevention and control. It is still true, nevertheless, that a large proportion of all fires started are due to human agencies and may generally be charged against carelessness. Fires caused by lightning are of course not preventable, but the system of lookouts by which they may be detected immediately after being set is greatly lessening the loss from this source.

UNIVERSITY AND EDUCATIONAL NEWS

The Harvard Medical School has received $50,000 from the estate of George S. Hyde.

The Flora Stone Mather Memorial Building of the College for Women of Western Reserve University was formally dedicated on September 30. The building is the gift of Mr. Samuel Mather and his children and is a memorial to Mrs. Mather, daughter of Amasa Stone, the refounder of Adelbert College, and the sister of Adelbert Stone, for whom Adelbert College is named. Mr. Mather has built the building, equipped it completely throughout, and has added to the gift the sum of $50,000, as an endowment. The Flora Stone Mather Memorial Dormitory, the gift of the alumnæ of the College for Women, will be built upon land situated south of the gymnasium. Immediately following the services at the new memorial building the land upon which the memorial dormitory is to be built was dedicated.

The College of Agriculture and Mechanic Arts, Mayaguez, Porto Rico, is this year offering an apprentice course in general agriculture. The plans for the course were approved at the April meeting of the board of trustees. The dominant feature of the course is that each student is employed eight hours per day in ordinary manual labor on the farm. From one to two hours are devoted to special class instruction. The work done by these students will be the ordinary manual labor of the farm, except that the work will be diversified so as to give each student as broad and varied experience as is possible.

Dr. John Casper Branner, professor of geology, was installed as president of Stanford University on October 1.

At the University of Illinois the following appointments have been made: L. H. Provine, superintendent of construction with the Stone and Webster Engineering Corporation at Seattle, professor of architectural engineering; L. A. Harding, professor and head of the de-