tact Resistance of Carbon and Copper Brushes and the Temperature Rise of the Commutator.' He finds that the contact resistance decreases with increase of current density, especially with higher velocities of commutator surface; thus, with a velocity of 368 meters (1205 ft.) per minute, the resistance per sq. cm. is for .7 amp. per sq. cm. .6 ohm., while for 10 amp. it becomes only .1 ohm., beyond which point it is nearly constant. He finds also that for a given current density the resistance increases with speed to a maximum, and then decreases for higher speeds; this he accounts for by supposing an unfavorable relation between the weight of the brush and the periodicity of the vibrations from passing over the segments; this theory is upheld by the fact that the same maximum appears at a lower speed for the heavier copper brush. A highly polished metal surface gives a higher resistance, which oiling increases still further. He mentions eddy currents as producing losses in the segments, and gives formulæ for the friction losses and the rise of the temperature.

F. C. C.

ENZYMES AS REMEDIES IN INFECTIOUS DISEASES.

DURING the past year Drs. R. Emmerich and Oscar Loew have been engaged upon an interesting problem in connection with enzymes as remedies in infectious diseases. The work was carried on in Munich, and as yet the results have not been published in full. We are indebted to Dr. Loew for the following facts in regard to the investigations: It has been surmised by Nencki and by Pfeiffer that the substances leading to recovery from infectious diseases, and producing immunity from them, belong to the enzymes. The latter author believed that these enzymes are prepared by the animal organs and not by bacteria themselves. Dr. de Schweinitz has observed an enzyme in cultures of the hog cholera germ which had a potent action in rendering guinea pigs insusceptible to this disease. However, this enzyme exhibited poisonous action in but little higher doses than necessary for immunizing.

Recently Emmerich and Loew have proved that certain kinds of bacteria, for example, *Bacillus pyocyaneus*, produce enzymes which not only dissolve these bacilli themselves, but also other microbes, such as the germs of cholera, typhoid fever, anthrax, diphtheria, black plague, stapthlococci and probably also gonococci. The germs of tuberculosis and many others are not affected by this enzyme within 24 hours. *Micrococcus prodigiosus* can also produce a bacteriolytic enzyme, which does not appear to act so favorably as that of the Pyocyaneus. The *Micrococcus erysipelatos* produces one, but this is associated, as in many other cases, with very poisonous qualities.* Emmerich and Loew have demonstrated that in a rabbit first infected with anthrax and then treated with subcutaneous injections of the concentrated enzyme of the *Bacillus pyocyaneus* the anthrax bacilli in the spleen are found completely broken up and partly dissolved, exactly as it can be observed in *vitro* when a dose of millions of anthrax and the other named bacilli are transferred into a few cubic centimeters of the concentrated and purified pyocyaneus enzyme. The latter enzyme can, by combination with an animal protein, be transformed into an immunizing substance. The authors have succeeded in obtaining both these agencies in a durable solid form. Thus the time seems near at hand when the treatment with serum will be replaced by a cheaper and simpler method, at least in certain cases.

B. T. GALLOWAY.

SCIENTIFIC NOTES AND NEWS.

THE refusal of Congress to establish a permanent census bureau for the proper conduct of the work has had its natural sequence in the appointment of a politician as Director of the Twelfth Census. The best that can be said of ex-Governor Merriam is that he had a creditable record as Governor of Minnesota. The New York *Evening Post* speaks of the appointment as follows: "Mr. Merriam is appointed Director of the Census simply because there was no other good office vacant at home or abroad. He has never had any experience as

*The bacillus of the black plague, that of tuberculosis, and other kinds, seem incapable of producing bacteriolytic enzymes, at least not to any noticeable degree, and the serum of black plague has, therefore, been applied without success in the cases at Vienna.

a statistician, and possesses none of those expert qualifications which the place imperatively demands. He is a spoilsman, and can be trusted to run the bureau on a spoils basis, from top to bottom. No appointment could be made which would so certainly secure the failure of the next census as a trustworthy and creditable work."

MR. F. H. WINES, who has been appointed Assistant Director of the Census, is an expert statistician.

THE nomination of Mr. Barrows as Librarian of Congress has failed of confirmation by the Senate. It is to be hoped that the action of the Senate was due to the fact that Mr. Barrows is not a librarian by profession, and not to the fact that he is a good executive officer, who would probably have administered the National Library without regard to party considerations.

THE civilian members of the United States Philippine Commission, President Schurman, of Cornell University; Col. Charles Denby, and Professor Dean C. Worcester, of the University of Michigan, have arrived at Manila.

D. ANTON FRITSCH, Director of the Natural History Museum of Prag, who has just begun publishing the fourth volume of his *Fauna der Gaskohle* of the Permian of Bohemia, sails for New York in the *Kaiser Wilhelm* on March 28th, to visit the museums of this country.

PROFESSOR T. E. THORPE, F.R.S., has been nominated for the presidency of the Chemical Society, London, and Mr. William Whitaker, F.R.S., has been elected President of the Geological Society, London.

WE regret to learn that Dr. J. J. Valentini, the student of Mexicana, is seriously ill with pneumonia at St. Luke's Hospital, New York City.

DR. H. FOSTER BAIN, Assistant State Geologist of Iowa, is delivering a course of lectures on economic geology to the graduate students in geology at the University of Chicago. Dr. W. S. Beyer, professor of geology and mining in the Iowa State College of Agriculture and Mechanic Arts, has charge of the office of the Iowa Geological Survey at Des Moines during Dr. Bain's absence.

MR. M. A. CARLETON, who has been engaged for several years upon an investigation of the rusts affecting cereals, has just returned from Russia, where he has been collecting cereals for use in this country in connection with the investigations now being carried on by the Section of Seed and Plant Distribution. Mr. Carleton has collected much valuable material and information which will further the work of the Division of Vegetable Physiology and Pathology on cereal diseases and the breeding of new and valuable varieties.

ARRANGEMENTS have been made by the Rothschilds to send Mr. G. W. Dunn on an expedition to the Philippine Islands for the collection of objects of natural history. Mr. Dunn has made many collecting expeditions to South America and Mexico. He is at present 85 years of age.

SIGNOR MARCONI described and demonstrated his method of wireless telegraphy at a meeting of the British Society of Electrical Engineers on March 2d.

THE Academy of Sciences of Vienna has made a new departure in entertaining at a banquet Dr. Gerhardt Hauptmann, the eminent dramatic writer. Dr. Ed. Suess, the President, presided and made an address in honor of Dr. Hauptmann.

ON the retirement of Mr. W. H. Preece, C.B, the British Postmaster-General has appointed Mr. J. Hookey, previously assistant engineer-in-chief, to be engineer-in-chief of the post office, and he has also appointed Mr. J. Gavey to be assistant engineer-in-chief and electrician.

M. BOUQUET DE LA GRYE has been appointed President of the Council of the French Bureau of Meteorology. M. Darboux has been appointed Vice-President and M. Anthoine, Secretary.

DR. ALLAN MCLANE HAMILTON, professor of mental diseases in Cornell Medical College, has been elected a member of the Royal Society of Edinburgh.

A CIVIL SERVICE examination will be held on April 11–12, 1899, for the position of Assistant in Irrigation, Office of Experiment Stations, Department of Agriculture, at a salary of $1,500 per annum. The examination will consist of

the subjects mentioned below, which will be rated as follows:

Subjects.	*Weights.*
1. Drafting,	30
2. Theory and practice of irrigation,	20
3. Irrigation engineering,	20
4. Essays on irrigation subject,	20
5. Training and experience,	10
Total,	100

WE learn from *Nature* that at the annual meeting of the Russian Geographical Society, on February 2d, the following medals were awarded: The Constantine medal to Dr. Gustav Radde, the director of the Tiflis Museum, for his forty-five years' work in the study of Russia; the Count Lütke medal to I. I. Pomerantseff, for his researches into the forms of the earth's geoid in the province of Fergana; the Semonoff medal to M. Kleiber, for his investigations into the periods of high water in the Volga; the great gold medal of the Section of Ethnography to N. L. Gondatti, for his three years' work of exploration of the Land of the Chuckchis; the Przewalski medal to L. A. Jaczewski, for his physico-geographical researches in Siberia; and three small gold medals to M. Tachaloff, for his instruction of travellers in astronomical observations; A. A. Rostkovsky, for a map of population in the Bitol vilayet of Turkey; and N. A. Zarudnyi, for researches in Persia; a number of silver medals were awarded for minor works.

IT is proposed to establish, with the sum of $5,000, at the University of Glasgow, a prize in pathology in memory of the late Professor Joseph Coats.

STEPS are being taken to found a memorial in honor of the late Robert Hebert Quick, who accomplished much for the advancement of education in Great Britain. It is hoped that £500 may be collected and used to endow a Quick Memorial Library at the Teachers' Guild, London, where Mr. Quick's educational library is at present deposited. Subscriptions may be sent Mr. John Russell, Cripplegate, Woking Surrey.

ARRANGEMENTS are being made to collect a fund in memory of the late Professor Kanthack. Owing to his early death, Mrs. Kanthack is not sufficiently provided for, and it is proposed that the income of the fund be given to her and at her death be used for a permanent memorial to commemorate his important contributions to pathology. Subscriptions may be sent to Dr. J. H. Drysdale, 25 Welbeck-street, London, West.

MAJOR GENERAL JOSEPH J. REYNOLDS, U. S. A., formerly professor of mechanics and engineering at Washington University, St. Louis, and during and since the Civil War a distinguished officer of the army, died on February 26th, at the age of 77 years.

THE death is announced of Alexandre Laboulbene, professor of the history of medicine in the University of Paris, at the age of 73 years. Dr. Laboulbene had not only published valuable works on the history of medicine, but was also well known as a pathologist and entomologist, having published a 'Traité d'Anatomie Pathologique' and a 'Faune Entomologique Française.'

WE regret also to record the death of Dr. William Rutherford, professor of physiology in the University of Edinburgh, which occurred on February 21st, from a relapse following influenza. We learn from the London *Times* that Professor Rutherford was born at Ancrum Craig, Roxburgshire, in 1839, and was educated first at Jedburgh Grammar School, and afterwards at Edinburgh University, where he graduated with honors in 1863, obtaining a gold medal for his thesis. He held office as house physician and house surgeon in the Edinburgh Royal Infirmary under Dr. Rutherford Haldane and Professor Spence, and then taught anatomy for a year in the Surgeons'-hall under Dr. Struthers. He afterwards went to the Continent and studied at the great medical schools of Berlin, Vienna and Paris. In 1865 he was appointed University assistant to the late Professor John Hughes Bennett. In 1869, when only 30 years of age, he was appointed professor of physiology in King's College, London, a post which he filled for five years, during three of which he was also Fullerian professor of physiology in the Royal Institution, London. His reputation as a teacher and lecturer spread rapidly, and in 1874, on the resignation of Professor Hughes Bennett, he was appointed to the chair of physiology in Edinburgh University.

Here he labored till the close of his life, and did much to develop the practical teaching of physiology, both in lectures and by the institution of practical classes. His chief work was 'The Action of Drugs on the Secretion of Bile,' and he was also the author of 'Outlines of Practical Histology,' and a 'Text-book on Physiology,' besides many papers on various scientific subjects. His recent efforts were chiefly directed to the study of hearing, sight and other special senses. He was also the inventor of the freezing microtome, which has proved of great value in microscopical research and demonstration. In 1876 Professor Rutherford was elected a Fellow of the Royal Society of London.

THE French Mathematical Society is making active arrangements for the International Congress of Mathematicians, to be held at Paris, from the 6th to the 12th of August, 1900. Replies have already been received from 900 intending members. A meeting was recently held at Göttingen, at which representatives of the Academies of Vienna, Munich and Leipzig were present for the purpose of planning a program for the Congress.

A COMMITTEE, of which Professor Newcomb is the chairman, is collecting information in regard to the best methods for observing the total eclipse of the sun on May 28, 1900. The track of the shadow runs from New Orleans to Norfolk and across to Spain and Algeria. Arrangements are also being made by the British Astronomical Society. A paper was read by Mr. A. C. D. Krommelin before the Society on February 22d. As a result of a close study of the weather statistics the conclusions he drew were: (1) That Algiers was certainly worth occupying on account of its low cloud ratio, it accessibility and its excellent harbor; (2) that the Portuguese stations had a higher cloud ratio, but a longer totality (1 min. 36 sec., as compared with 1 min. 6 sec. at Algiers); (3) the region south of Madrid had a low cloud ratio, and several railway lines cut the shadow track, so that there would be no difficulty in transporting instruments; (4) the Alicante region seemed less clear than central Spain, but more so than Portugal. The Association's special steamer could land detachments at various points on the Portuguese and Spanish coasts, and then proceed to Algiers with the remainder of the party. It could remain at Algiers as a floating hotel to the party, and after the eclipse return by the same route, picking up the various detachments.

American Gardening, New York City, offers prizes amounting to $150 for papers on hybridization treated from the point of view of its relations to science and horticulture. The papers must be between 1,000 and 5,000 words in length and must be sent in before April 15th.

THE Paris Academy of Sciences has received a legacy of 35,000 fr. from M. Paul Frédéric Hély d'Oissel.

THE late Dr. E. F. A. Obach has bequeathed his scientific library to the Siemens' Engineering Society, Woolwich, with the exception of his special library on india rubber, which, with specimens, etc., is left to the Botanical Museum, Berlin.

THE Zoological Society of London has subscribed £200 towards the fund being collected for a British Antarctic expedition.

THE Goldsmith's Company, London, has made a further grant, this time of £500, for the the continuation of experiments on the antitoxin treatment of diphtheria undertaken under the direction of the Royal Colleges of Physicians and Surgeons.

A HUNDRED-YEAR Club has been established in New York City, and will be glad to receive members whose only duties are to pay the annual fees and to try to pledge themselves to endeavor to live and persuade others to live more than a hundred years. A beginning has been made by a dinner at the Waldorf-Astoria.

IN connection with the work on pear blight conducted by Mr. M. B. Waite, of the Division of Vegetable Physiology and Pathology, United States Department of Agriculture, an interesting feature has been developed in the way of growing the bacillus of blight on dormant pear shoots. The fact that the organism could be grown in this way was discovered by Mr. Waite about two years ago, and it furnishes means of throwing light on a number of points connected

with the disease. For illustrative purposes in class rooms or elsewhere it forms one of the most striking examples of the effects produced by a bacterial plant disease. Shoots the size of a lead pencil or a little larger are cut from pear trees, and after being washed in a clean water their upper ends are cut in a slanting way with a sharp sterilized knife. The shoots are then placed in a glass containing water, with the slanting ends free. The glass and its contents are now set in a plate or dish containing water, and a bell jar or large beaker placed over them in such a way that the rim is immersed in the water in the plate. This insures a saturated atmosphere and other conditions unfavorable to the shoots, but favorable to the germs themselves. Infections with pure cultures of the blight bacillus on the slanting cut surfaces of the shoots begin to show as beautiful, pearly-white, bead-like colonies in from 36 to 48 hours, and as the disease progresses, which it does more or less rapidly under varying conditions of heat, the changes in the host and parasite may be easily watched.

THE new *Turbinia*, of 220 feet in length and 330 tons displacement, is, as we learn from the London *Times*, in an advanced state of construction at Ellswick, and hopes are being entertained of her being tried in two months from the present time. The modifications found to be desirable after the exhaustive trials of her predecessor are considerable. The new vessel has eight propellers on four shafts, instead of the original *Turbinia's* three shafts and nine propellers. Her 'going-astern' arrangements are far in advace of those of the pioneer boat, whose extreme speed caused great excitment in the Solent at the time of the Naval Review of 1897.

UNIVERSITY AND EDUCATIONAL NEWS.

PRESIDENT TAYLOR, of Vassar College, has declined the call to the presidency of Brown University.

MR. A. E. H. LOVE. F.R.S., Fellow of St. John's College, Cambridge, and University lecturer in mathematics, has been appointed Sedleian professor of natural philosophy in succession to the late Professor Bartholomew Price.

MR. A. W. HILL has been appointed demonstrator in botany in Cambridge University.

ROLLINS A. EMERSON, of Washington, D. C. who was elected to the chair of horticulture in the University of Nebraska in June, 1898, assumed the duties of the position March 1st. After resigning his position in the Division of Experiment Stations in the Department of Agriculture, he spent some time in study in Cornell University before taking up his new duties.

DR. H. E. ANNETT has been appointed demonstrator of tropical pathology in the newly-founded school of tropical diseases in Liverpool. Both Edinburgh and Aberdeen have taken steps to establish lectureships on the diseases of tropical climates.

THE chair of natural history at Aberdeen, vacant by the death of Professor Nicholson, will, it is expected, be divided, and professorships of geology and zoology will be established.

THE late Mrs. Martha S. Pomeroy has bequeathed to Wellesley College $60,000 for the erection of a dormitory, and also the residue of her estate.

WE are also glad to record the following gifts and bequests: Miss Maria Hopper has given $10,000 to Bryn Mawr College for the foundation of a scholarship. Syracuse University has received $5,000 from the heirs of H. H. Crary, of Binghamton, in accordance with the wishes he had expressed. The University of North Carolina has been given $15,000 by Mr. Julian S. Carr. Swarthmore College has received $5,000 by the will of the late Daniel Underhill.

THE late Professor Rutherford has bequeathed to Edinburgh University his valuable medical library and his collection of physiological and microscopical specimens.

ON the fifteenth of February the University of Nebraska celebrated its thirtieth anniversary. It has been the custom for many years to observe 'Charter Day' as a holiday, and to have parades, military exercises, addresses, etc., and for several years degrees have been conferred upon such students as completed their work at this time. On the present occasion seven students received the bachelor's degree and two