rope and in North America instead of forming a single line of evolution there were at least seven or eight nearly contemporary but distinct lines of rhinoceros succession, some of which can be traced back as far as the base of the middle Tertiary. The truly American rhinoceroses which appear to have branched out into several water-living, forest-living and plains-living types, were reinforced by the sudden appearance of the extremely short-limbed rhinoceroses which had evolved in Europe and came over to this country simultaneously with the earliest elephants or mastodons.

Another remarkable feature of this law of multiple evolution is that even where these varieties have evolved quite separately and independently, they still have inherited from remote common ancestors certain tendencies or potentialities of evolution which were latent but not expressed in the ancestral forms but which find a more or less simultaneous expression in the derived forms. Thus, among the rhinoceroses and titanotheres the rudiments of horns begin to appear more or less simultaneously in several of these multiple independent races or varieties, indicating a hereditary predisposition toward the development of certain organs quite unsuspected in the earlier evolutionary writings of Lamarck and Darwin. This predisposition to evolve certain structures tends to establish the idea that the laws of development are not controlled *solely* by the survival of the fittest as according to the original Darwinian theory, nor by the inherited effects of use and disuse as according to the Lamack-Spencer theory, but represent the budding out or expression of certain innate or inherited ancestral tendencies.

Among the greatest surprises in recent discovery has been the finding of armadillo-like edentates in the Rocky Mountain region near Ft. Bridger, Wyo., from rocks of the lower Tertiary period. These armadillos certainly bore a leathery if not a bony shield. Some ossicles indicating the presence of the bony shield are reported to be present in the collections of the Yale Museum; the remains thus far found by the American Museum exploring parties show a provision for the shield in the structure of the backbone but do not exhibit the bony elements of the shield itself.

Almost equally surprising results of ten years' exploration are the tracing back of the dog family into the Lower Eocene, of the saber-tooth tiger family into the Middle Eocene, of the camel family into the Upper Eocene, of the hedge-hogs (now extinct in this country) into the Lower Oligocene, of the raccoons into the Lower Miocene. The camel family, like the horses and the rhinoceroses, branched out into a great many varieties, short- and long-limbed, most remarkable among the latter being the giraffe-camel (*Alticamelus*), which, although a true camel, was closely similar in build to the giraffe. With these discoveries the names of Scott, Wortman and Matthew are honorably associated.

It has long been known that the deer, bear, moose, the oxen and sheep families did not appear in this country until very late in geological times, shortly before the Ice Age.

Among the many difficult and still unsolved problems is the cause of the total extinction of the horse in North and South America while it survived and multiplied in Europe, Asia and Africa. Just before the time of the extinction of the horse, America exhibited the greatest beauty and variety in the development of this family. As studied by Gidley, there were horses exceeding in size the enormous Percherons of to-day and there were also varieties smaller than the most diminutive Shetlands. Yet with all this wide range of variation all became extinct.

The elephants also exhibited three great varieties, the true mammoth (*E. primigenius*) to the north, the Columbian elephant in the central states, and the gigantic Imperial mammoth to the south, forms shown to be quite distinct by Lucas and undoubtedly adapted to various kinds of climate; yet all died out with the great wave of death which swept off the camels, horses and the giant South American sloths, just before or during the first advance of the Glacial period. H. F. O.

SCIENTIFIC NOTES AND NEWS.

The senate of the University of Edinburgh has voted to confer its honorary doctorate of

laws on Dr. Alexander Graham Bell, of Washington, and on Dr. W. W. Keen, professor of surgery at Jefferson Medical College, Philadelphia.

DR. S. WEIR MITCHELL, the eminent physiologist, physician and author, celebrated his seventy-fifth birthday on February 15. Dr. Weir Mitchell will present candidates for honorary degrees at the celebration of the University of Pennsylvania on February 22. Degrees will be conferred on President Roosevelt and on the Emperor of Germany.

ON the occasion of the opening of the new public health laboratory of the Victoria University, Manchester, honorary doctorates of science were conferred upon Professor Calmette, Lille University; Professor Perroncito, Turin University; Professor Salomonsen, Copenhagen University, and Captain R. F. Scott, R.N.

PROFESSOR K. MÖBIUS has retired from the directorship of the Berlin Museum of Natural History. The position has been offered to Professor H. H. Schauinsland, director of the museum at Bremen.

DR. FRIEDRICH PAULSEN, professor of philosophy at Berlin and known also for his works on education, will lecture at Harvard University during the first half of next year in accordance with the plan for an exchange of professors. As already noted, Professor Francis G. Peabody will lecture at Berlin.

VICE-ADMIRAL HUMAN has been elected president of the French Society of Geography.

DR. GEORGE BRUCE HALSTED has been made foreign associate and honorary professor of mathematics in the popular university of Tempio, Italy, and a fellow of the Royal Astronomical Society.

'THE Relation of Graduate Study to General Culture' was the subject of a lecture, given on February 3, at the University of Chicago, by Professor Josiah Royce, of Harvard University.

A CONFERENCE on school hygiene, arranged by the Royal Sanitary Institute, was held in the University of London, under the presidency of Sir Arthur W. Rücker, on February 7–10.

DR. MURGOCI, professor of geology at Bucharest, is carrying on research work in California.

DR. BURTON E. LIVINGSTON, of the department of botany of the University of Chicago, has been appointed to the staff of the Bureau of Soils in the United States Department of Agriculture, and will begin his new work at the close of the winter quarter.

DR. D. T. MACDOUGAL has started on an expedition to lower Colorado and the upper portion of California to collect botanical specimens for the New York Botanical Garden and to study the flora of that region.

MISS VERA K. CHARLES, scientific assistant in the Bureau of Plant Industry, U. S. Department of Agriculture, has recently returned from the Isle of Pines, where she was collecting in the interest of the herbarium connected with the office of vegetable pathological and physiological investigations.

THE SAMUEL D. GROSS prize of the Philadelphia Academy of Surgery, for the year 1905, amounting to $1,200, has been awarded to Dr. James Homer Wright, of Boston, Mass., for his essay, 'The Biology of the Micro-organism of Actinomycosis.'

THE Wilde medal of the Manchester Literary and Philosophical Society has been awarded to Professor C. Lapworth, F.R.S., professor of geology at Birmingham.

THE St. Petersburg Academy of Sciences has awarded the Lomonosoff prize of $500 to Professor N. A. Menschutkin for his researches in theoretical chemistry, and the Ivanoff prize to Professor P. N. Lebedeff, of Moscow, for his experimental researches on the pressure of light.

AT a meeting of the trustees of the Percy Sladen fund, held recently at the rooms of the Linnean Society, London, grants were made to Mr. W. R. Ogilvie Grant towards the expenses of a collector for the British Museum in Central Africa; to Miss Alice L. Embleton to enable her to continue her investigations in insect cytology; and to Mr. J. Stanley Gardiner towards the expenses of an expedition to the Indian Ocean.

The Carnegie Institution of Washington has recently made a grant of $2,500 to Professor C. F. Burgess, of the department of applied electro-chemistry of the College of Engineering of the University of Wisconsin, to aid him in carrying out investigations upon the properties of pure iron and its alloys. During the past three years Professor Burgess has developed a method of producing iron electrolytically of a very high degree of purity, in a manner similar to that employed in the refining of copper. Previous to this work pure iron has been obtained only in very small quantities and at excessive cost, but Professor Burgess is now able to produce comparatively large quantities at a small cost, using for this purpose a cheap grade of steel. Careful analysis of this product fails to show the presence of any foreign element, with the exception of hydrogen, which can readily be driven off by heat. There is already a considerable demand for this iron for scientific purposes, and about half a ton has been made.

According to the New York *Evening Post* the grants made by the Carnegie Institution for scientific research include the following to Cornell: Professor Wilder D. Bancroft, for chemical study of alloys, $500; W. W. Coblentz, for study of infra-red emission and absorption spectra, $1,000; E. S. Shepard, for study of brasses and bronzes as alloys, $1,000.

We learn from *Nature* that an international committee has been formed in Heidelberg, under the presidency of Dr. A. Freiherr von Dusch, minister of education, of the Grand Duchy of Baden, with the object of honoring the memory of the late Professor Carl Gegenbaur, who for nearly thirty years was the director of the Anatomical Institute of Heidelberg. The committee has decided upon a life-size bust of Gegenbaur, to be executed in marble by Professor C. Seffner, Leipzig. The bust will be placed in the vestibule of the Anatomical Institute, probably in the early summer, at a date not yet fixed. The committee invites former pupils of the deceased master, and all those who have benefited from his epoch-making works on human and comparative anatomy, to send contributions, with their addresses and titles, to Professor M. Fuerbringer or to Professor E. Goeppert, both in Heidelberg. Every contributor will receive a picture of the bust, and casts may be obtained, on special application, from Professor C. Seffner.

A memorial service in honor of the late Professor Alpheus S. Packard was held at Brown University on February 18.

Dr. George Bond Howes, F.R.S., Huxley's successor as professor of zoology at the Royal College of Science, London, known for his contributions to vertebrate morphology, died on February 4, at the age of fifty-one years.

The Rev. Thomas Arthur Preston, who founded the Marlborough Natural History Society and Museum and who did much to promote nature-study in England, died on February 6, at the age of seventy-one years.

Dr. Julius Scriba, professor of surgery at the University of Tokio and the author of contributions on anthropology and botany, has died at the age of fifty-five years.

The United States Civil Service Commission announces that in view of the very small number of applications filed for the examination for assistant in the Philippine service, on March 1–2, this examination has been postponed to April 5–6, 1905, and will be held in different parts of the country, to secure eligibles from which to make certification to fill a large number of positions in the grades of clerk and teacher in the Philippines. As a result of this examination it is desired to secure 140 college graduates, including 20 polytechnic and 20 agricultural graduates, at a salary of $1,200 per annum, and 60 normal school graduates at a salary of $1,000 per annum. Many of the appointees will be required in the position of teacher, while some will be required in the various clerical and administrative offices in the islands. Excellent opportunities for promotion are afforded for well-qualified appointees. For positions requiring college graduates students who graduate in 1905 will be acceptable.

The United States Civil Service Commission announces an examination on March 8, 1905, to secure eligibles from which to make

certification to fill a vacancy in the position of botanist (male) at $75 per month, in the National Museum, and vacancies as they may occur in any branch of the service requiring similar qualifications. The commission also invites attention to the examination for scientific aid, applications for which may be filed at any time. Eligibles are particularly desired at this time to fill a vacancy in the position of scientific aid (male) qualified in animal husbandry, in the Bureau of Animal Industry, Department of Agriculture, at $480 per annum, and other similar vacancies as they may occur in that department. For the specific vacancy mentioned, only such applications will be considered as are filed with the Commission at Washington prior to the hour of closing business on March 8, 1905.

THE N. Y. State Civil Service Commission will hold an examination on March 1, to fill the position of geologist in the State Museum at a salary of $1,500, and of taxidermist in the Museum at a salary of $900.

THE Court of Appeals of Maryland has just rendered a decision which establishes the constitutionality of the State Aid Highway Law of the last legislature, the administration of which has been by law placed under the control of the Maryland Geological Survey. The state survey has maintained a highway division during the past eight years, but has now placed at its disposal $400,000 annually, derived half from the state and half from the counties, for the construction of improved highways. The law becomes operative at once and surveys on a large scale will begin immediately.

THE Argentine gunvessel *Uruguay* has returned to Buenos Ayres after her long voyage in the Antarctic seas, having failed to obtain any news of the French Antarctic expedition under Dr. Charcot.

MR. DAVID SYME, of Melbourne, has given $15,000 to found a prize for the encouragement of original research in science. A prize of $500 and a medal will be annually awarded by the University of Melbourne.

THE London *Times* states that it received the following letter for publication from a correspondent who is a graduate of an English university, but presumably did not specialize in scientific subjects: "The Amount of Coal.—To the Editor of *The Times*.—Sir, —The amount of coal which has been dug out of the earth must be now so considerable as to make an appreciable diminution of the weight of our globe. Is it conceivable that in time this might cause an interference with the working of the solar system. All of the coal that remains behind is a small proportion, in ashes; the only addition that is made to the weight of the earth is by increase of population, and is infinitesimal. I am, Sir, yours faithfully, W. C. B."

MR. ANTONIO OLYNTHO, Brazilian commissioner to the Louisiana Purchase Exposition, has, by order of his government, investigated the organization and work of the division of hydrology of the U. S. Geological Survey. The underground water resources of Brazil, which are as yet almost entirely undeveloped, are said to be immense. It is the wish of the Brazilian government to encourage their development, and to this end it is proposed to organize a division of hydrology similar to that maintained by the U. S. Geological Survey. The investigation and development of artesian waters is of particular interest to the Brazilians. As compared with the work of bureaus in other countries, the investigations carried on by the U. S. Geological Survey of both surface and underground waters takes high rank, as is attested by the frequent calls from other governments for information and assistance. During the past year, the Colonial Office of Bermuda has sought advice from our Survey in regard to a water supply for that island, and the government of Peru has borrowed a hydrologist, who is organizing a bureau which is investigating the underground waters of that country in the special hope of obtaining supplies for the nearly rainless coast. The bureau which Brazil proposes to establish will be modeled after the survey's division of hydrology, the plan of which was furnished the commissioner from Brazil by Mr. Myron L. Fuller chief of the eastern section. The work in Brazil will differ, however, in one important particular

from that in the United States. The drilling of test wells by the government survey has seldom been practicable here, but the government of Brazil, like that of Peru, expects to actually drill for water, and drilling outfits have accordingly been purchased in this country for that purpose.

UNIVERSITY AND EDUCATIONAL NEWS.

The University of Pennsylvania has asked from the state an appropriation of $650,000 to be used as follows: (1) University hospital—maintenance, $140,000; new building, $75,000; clinical amphitheater and laboratories for dispensary buildings, $35,000; (2) university—$175,000 for general maintenance, construction of buildings, and the purchase of apparatus; (3) veterinary department—$100,000 for the erection of a suitable building and equipment; (4) free museum of science and art—$125,000 for the construction and equipment of a building for the expansion of the department.

Mr. Charles H. Hackley, of Muskegon, Mich., has made public bequests, as follows: To the Hackley Manual Training School of Muskegon $250,000 is given, which, added to $360,000 already given by Mr. Hackley, makes the school's total endowment $610,000; as an endowment for the Hackley Hospital, $300,000, less any sum given during Mr. Hackley's lifetime for this purpose; for the maintenance of the Hackley Public Library, $200,000; for the purchase of pictures for this library, $150,000.

Mount Holyoke College will receive $172,000 as the residuary legatee of Edmund K. Turner.

The Drapers' Company have voted a further sum of £400 a year for five years towards the statistical work and higher teaching of the department of applied mathematics, and the Mercers' Company have voted £1,000 to the chair of physiology, in University College, London.

We learn from *The Experiment Station Record* that W. C. Stubbs, who has been since 1885 professor of agriculture in the Louisiana State University and director of the experiment stations, has voluntarily retired. He is succeeded by Professor W. R. Dodson, who becomes, by virtue of his office as professor of agriculture at the university, director of the three stations in the state, director of the State Geological Survey, official chemist, etc.

Mr. Thorne M. Carpenter has resigned his position as assistant chemist and assistant in the investigations with the respiration calorimeter, of the Agricultural Station of the Pennsylvania State College to accept a similar position in connection with the investigations on human nutrition at Wesleyan University. The vacancy has been filled by the promotion of Mr. N. C. Hamner, and Mr. W. A. Smith, a graduate of the college in 1901, has been appointed assistant chemist. Mr. J. B. Robb, of the Maryland Agricultural College, who has assisted in the respiration calorimeter investigations during the past three winters, has been temporarily engaged for the same purpose for the present season.

Mr. F. L. Shinin, assistant in physical chemistry at the University of Wisconsin, has just accepted a call to the University of Indiana, as assistant professor of physical chemistry.

M. Jonathan Rigdon, fellow of Clark University, has been appointed instructor in philosophy in Clark College.

Mr. H. H. Higbe, assistant in mechanical engineering at Columbia University, has been appointed instructor in the University of Michigan, and Mr. L. F. Parr has been appointed to fill the vacancy at Columbia University.

Mr. Edgar Schuster, M.A., New College, Oxford, has been appointed to the Francis Galton research fellowship in national eugenics.

Mr. I. L. Tuckett, M.A., of Trinity College, Cambridge, has been appointed demonstrator in physiology.

M. Michael-Lévy has been nominated by the Paris Academy of Sciences for the chair of inorganic chemistry at the Collège de France, vacant by the death of M. Fouqué. M. Cayeux is named as the second choice of the academy.