

cording to Robert P. Shaw, director of the museum, will be the actual operation of the Leonardo models. His printing press will be operated as in his own day, and his mint, made at the behest of the Medici, will turn out such coins as were minted for the Florentine

Republic 400 years ago. So many and varied are the inventions that only those that corresponded with his own age were used during his lifetime. The majority remained on paper, awaiting the day when civilization should advance to the point where it could use them.

SCIENTIFIC NOTES AND NEWS

PROFESSOR CASWELL GRAVE, head of the department of zoology at Washington University, St. Louis, having reached the age of seventy years, retired from active work on February 1 and became professor emeritus of zoology. At a dinner given on May 11, widely attended by his colleagues, students and friends, it was stated that a scholarship had been established in his honor, which had been made possible by contributions from his many friends. It will be called the Caswell Grave Scholarship for Biological Research and will be awarded annually to a qualified student at Washington University to defray the cost of tuition and partial expenses of attending course work at the Marine Biological Laboratory, Woods Hole, Mass. At the dinner Professor Grave was also presented with a bound volume of personal letters of greeting. He plans to spend his summers at Woods Hole and his winters at Winter Park, Fla.

At the recent meeting of the trustees of Science Service, Dr. Harlow Shapley, Paine professor of astronomy at Harvard University and director of the Harvard Observatory, was elected vice-president and chairman of the executive committee. He succeeds Dr. William H. Howell, emeritus professor of physiology at the Medical School of the Johns Hopkins University, who wished to retire after serving for ten years. An informal luncheon to welcome Dr. Shapley was given by the staff of Science Service at the Cosmos Club, Washington, on May 15.

AN honorary degree will be conferred on Dr. Thomas Parran, Surgeon General of the U. S. Public Health Service, in connection with the commencement exercises in June of St. Bonaventure College, New York.

DR. STUART LESSLEY CRAIG, an alumnus of the Medical College of Virginia, Richmond, surgeon and a director of the New York Eye and Ear Infirmary, New York City, will be awarded the honorary degree of doctor of science at the graduation exercises of the college.

At the forty-third annual meeting of the American Society for Testing Materials during the week beginning on June 24, the fourteenth award of the Charles B. Dudley Medal will be made to T. F. Willis and M. E. De Reus, research engineer and junior engineer, respectively, of the Bureau of Materials of the Missouri

State Highway Department, Jefferson City, Mo., for their paper on "Thermal Volume Change and Elasticity of Aggregates and Their Effect on Concrete." The fifteenth Edgar Marburg Lecture will be presented by P. H. Bates, chemist of the National Bureau of Standards. He will speak on "Portland Cement—Theories and Specifications."

ROYAL MEDALS of the Royal Geographical Society have been awarded as follows: The *Founder's Medal* to Mr. and Mrs. Harold Ingrams for their exploration, travel and studies in the Hadhramaut and the *Patron's Medal* to Lieutenant Alexander R. Glen, for his expeditions in Spitsbergen and North-East Land. The council has made the following awards: The *Victoria Medal* to O. G. S. Crawford, for his archeological maps prepared for the Ordnance Survey and his work on the *Tabula Imperii Romani*. The *Murchison Grant* to Peter Mott, for his surveys in West Greenland; the *Back Grant* to Gerald Seligman, for his glacier studies on the Jungfrau-Joch; the *Cuthbert Peek Grant* to John Hanbury-Tracy, for his work in southeastern Tibet with Mr. Kaulback and his journey in the north of South America; the *Gill Memorial* to Alexander King, for his work in Jan Mayen in 1938.

THE Ettore Marchiafava Prize, founded by the University of Rome in October, 1938, for the best work on morbid anatomy or general pathology, has been awarded to Professor Mario Monacelli, director of the Dermatological Clinic of the University of Messina, and Professor Giulio Raffaele, of the University of Rome.

DR. HENRY A. SCHUETTE, professor of chemistry at the University of Wisconsin, was elected president of the American Oil Chemists' Society at the close of the annual meeting in New Orleans on May 10.

DR. SAMUEL FREDERICK HILDEBRAND, senior ichthyologist of the U. S. Bureau of Fisheries, has been elected to resident membership in the Washington Academy of Sciences in recognition of his "demonstration of the utility of fishes in mosquito control, his work on the life histories of marine fishes of the Atlantic coast and his contributions to the ichthyology of Central America."

AFTER forty years of teaching, Professor Cora J. Beckwith, chairman of the department of zoology at Vassar College, will resign in June. Professor Rudolf

T. Kempton has been appointed chairman of the department.

PROFESSOR C. E. McCLUNG, of the University of Pennsylvania, has been appointed visiting professor of zoology at the University of Illinois for the year 1940-41; Professor Victor E. Shelford has been appointed chairman of the department of zoology.

PROFESSOR WALTER H. BUCHER, head of the department of geology of the University of Cincinnati, has been appointed professor of geology at Columbia University. He will have charge of graduate work in structural geology.

DR. TH. DOBZHANSKY, professor of genetics at the California Institute of Technology, has been appointed professor of zoology at Columbia University. Dr. Marcus M. Rhoades, geneticist of the U. S. Department of Agriculture, has been appointed associate professor of botany. Professor Dobzhansky and Dr. Rhoades will direct research in the laboratory of genetics which was established two years ago to unite work in botany and zoology. They will collaborate with Professor Leslie Dunn, who will become head of the department of zoology on July 1.

W. W. WATSON, associate professor at Yale University, has been promoted to be professor of physics and chairman of the department of physics. Professor Watson succeeds Professor John Zeleny, who retires this year. Dr. George H. Smith, professor of immunology, has been appointed assistant dean of the Yale School of Medicine for the next college year, and Dr. Adolf Magnus-Levy has been appointed research associate in physiology with the rank of professor. Dr. G. Evelyn Hutchinson has been promoted to an associate professorship of zoology.

PROFESSOR HAROLD E. BURTT has been made chairman of the department of psychology at the Ohio State University. He has been serving as acting chairman of the department since the death of Dr. George F. Arps on September 16, 1939.

DR. L. P. ALFORD, professor of administrative engineering and chairman of the department of industrial engineering at New York University, has been made chairman of a newly established department of administrative engineering at Cornell University. In addition to a four-year curriculum leading to the degree of bachelor of administrative engineering, the new department will offer a post-senior course for graduates of engineering schools and certain accredited graduates of liberal arts colleges, which will lead to the baccalaureate degree in the field of administrative engineering.

DRS. O. N. ALLEN, Williard H. Eller and C. J. Hamre, associate professors of bacteriology, physics

and zoology, respectively, have been promoted to the rank of full professor at the University of Hawaii, effective in September.

A GRANT has been made by the Rockefeller Foundation to Duke University for one year in support of the investigation of problems in physical chemistry by Dr. Hans Neurath, assistant professor of biochemistry. A Field Nutrition Study has been established at the university in cooperation with the Rockefeller Foundation and the State Board of Health. Sera coming from a survey area in a rural section are tested in the nutrition laboratory, and medical and dietetic studies will be carried on in the field.

REAR ADMIRAL RICHARD E. BYRD, leader of the U. S. Antarctic Expedition, has arrived in the United States after a five-months absence in Little America. He brought with him a map of the nine hundred mile stretch of hitherto unknown Antarctic coast line, charted at the request of the Navy.

NORMAN NEVILLS will lead an expedition of nine on a trip down the Green and Colorado Rivers, leaving Green River, Wyo., on June 20, and arriving at Boulder Dam about August 25. The group will travel in three specially designed boats and will make botanical and geological observations and collections. Dr. Hugh C. Cutler, of Washington University, is in charge of botanical research, and Mr. Nevills of the geological work.

DR. JAMES E. ACKERT, dean of the Division of Graduate Study and professor of zoology at Kansas State College, Manhattan, delivered the annual out-of-state address before the Medical Science Society of the Oklahoma University School of Medicine on May 8. The subject of the lecture was "Nematode Host-Parasite Relationships."

DR. REGINALD FITZ, lecturer on the history of medicine at the Harvard Medical School, will be the commencement speaker at the Medical College of Virginia, Richmond.

DR. KARL PAUL LINK, professor of biochemistry at the Wisconsin State Agricultural Experiment Station, delivered the annual Phi Lambda Upsilon lecture at the University of Illinois on April 22. He discussed the results of six years of biochemical studies on the genus *Melilotus*.

THE fifth annual Hughlings Jackson lecture of the Montreal Neurological Institute will be given at the institute on October 3 by Dr. Charles H. Best, professor of physiology, University of Toronto. His subject will be "The Factors Affecting the Liberation of Insulin from the Pancreas."

DR. KURT KOFFKA, William Allan Neilson research professor of psychology at Smith College, delivered

during the present month four lectures on human behavior in the Nuffield Institute of the University of Oxford.

THE fifth Pan-American Congress of Tuberculosis will be held from October 13 to 17 in Buenos Aires and Cordoba. Papers to be presented may be submitted until July 1 and titles of contributions to these subjects until September 1.

A SOCIETY of the History of Medicine has recently been founded in Peru. Its aim is to further the progress of medical history, especially that of Peru, and to cultivate relations with foreign countries, especially France. Several French medical historians have been elected honorary members of the new society.

THE annual meeting of the American Psychological Association will be held at the Pennsylvania State College from September 4 to 7. Meeting concurrently with the association will be the Psychometric Society, the Association for Applied Psychology, the Society for the Psychological Study of Social Issues and the American Speech Correction Association.

THE fifty-fourth annual convention of the Association of Land-Grant Colleges and Universities will be held in Chicago on November 11, 12 and 13; pre-convention dates are November 8 to 10, inclusive. Headquarters will be at the Drake Hotel.

THE forty-second annual meeting of the Medical Library Association will be held at the Medical Schools of the University of Oregon, Portland, on June 25, 26 and 27, under the presidency of Colonel Harold W. Jones, of the Army Medical Library, Washington, D. C. Hotel headquarters will be at the Heathman. The program will include talks on the literature of epidemiology of plague, tularemia and Rocky Mountain spotted fever; a symposium on investigations in local medical history, and problems in bibliography based on a study of terminology in the field of nutrition.

THE annual spring meeting of the Indiana Academy of Science was held on May 3 and 4, in Spring Mill State Park. On the first day the program included papers on geology and physiography and the fauna and flora of the region, with field trips on the second day conducted by Professor Louis Agassiz Test, of Purdue University; Professor Clyde A. Malott, of Indiana University; Professor Ray C. Friesner, of Butler University, and O. E. Ackerson, of the State Conservation Department. Frank N. Wallace, state entomologist, is president of the academy.

THE seventh annual meeting of the New York State Geographical Association will be held on October 12 at Rochester, N. Y. There will be papers and reports, a field trip under the leadership of the Monroe County

Planning Board, and a dinner in the evening. Meetings will be held in the Geology Building and Museum of the university. A tentative program can be obtained after September 25 from Robert Simpson, of the department of geology, who is chairman of the meeting.

THE sixth biennial convention of Alpha Epsilon Delta, national honorary pre-medical fraternity, was held with the Oklahoma Alpha chapter at the University of Oklahoma on March 21, 22, 23, 1940, under the presidency of Dr. Charles F. Poe. Following the initiation of candidates by the Oklahoma Alpha chapter, Dr. Felix M. Adams, Eastern Oklahoma State Hospital for the Insane, Vinita, Okla., gave a lecture on "Insulin Shock and Metrazol Treatment," which was illustrated with a film in technicolor. Tours were made of the University of Oklahoma Medical School at Oklahoma City and the Central Oklahoma State Hospital at Norman. On Friday evening, at an Indian dinner and program, members were initiated into the secrets of the training of the Indian medicine man. The convention banquet was held at the Biltmore Hotel, Oklahoma City, on Saturday evening, at which Dr. Henry H. Turner, assistant professor of medicine, School of Medicine, University of Oklahoma, spoke on "The Wagner Health Bill," and Dr. Wendell Long, Oklahoma City, presented "A Brief History of Medicine."

THE Research Council on Problems on Alcohol plans the publication of a quarterly journal on alcohol to be the official organ of the council. It will be published at Yale University. Dr. Howard W. Haggard, associate professor of applied physiology in the Sheffield Scientific School, has been appointed editor. Funds have been made available, through the efforts of Dr. Haggard, to finance the publication for a five-year period. The executive committee has appointed an editorial committee on general policy.

THE first number of a new monthly scientific journal entitled *Ciencia, Revista hispano-americana de Ciencias puras y aplicadas*, published in Mexico City, appeared on March 1. It is edited by a group of scientific men exiled from Spain, headed by Professor Ignacio Bolivar, entomologist and formerly director of the Museum of Natural History of Madrid, with the cooperation of Professors C. Bolivar, I. Costero and F. Giral. In the list of seventy-one collaborators are included scientific men from the American continent and a few from Europe. The North American countries are represented by Drs. Lorente de Nó, New York; R. Matas, New Orleans; J. F. Nonidez, New York; Prados, Montreal, and M. S. Vallarta, Cambridge, Mass. The review is published in Spanish. Each number contains seven sections: I. Modern science, giving bibliographical reviews of diverse sci-

tific topics; II. Short original articles; III. News; IV. Applied science; V. Miscellaneous; VI. New books, and VII. Abstracts of scientific articles.

ON behalf of the committee of the Joseph Henry Fund of the National Academy of Sciences the following grants have been made: \$575 to Professor A. Franklin Shull, of the department of zoology, University of Michigan, to be used for the purchase of an automatic calculating machine for his researches on the developmental processes and embryonic determination in aphids, and \$400 to Dr. Dorothy Wrinch, visiting lecturer in the department of chemistry of the Johns Hopkins University, to defray the expenses of computations involved in the interpretation of x-ray data in the study of the structure of certain protein molecules, particularly insulin and lactoglobulin.

SIR JOHN SIMON announced in the House of Commons recently, according to the *London Times*, that Parliament would be invited in the estimates, shortly to be presented, to maintain the provision made for the universities and colleges at the existing level—namely, £2,149,000. He added that the government

was fully conscious of the vital part played by the universities in the national life and of the importance of maintaining the standards of university education as far as possible in the strained conditions of war. He was satisfied that the maintenance of the present financial provision was necessary if the universities were to continue to make their essential contribution in various ways to the present national effort. Local authorities, he hoped, would take similar action.

THE *Australian Journal of Science* announces that by an arrangement between the government and the University of Adelaide, the Adelaide Observatory is to become more closely associated with the university. It is expected that its present site will be made available for the Adelaide Boys' High School. A new building is to be provided for the observatory within the university grounds adjacent to the Physics and Engineering Building. The government astronomer, G. F. Dodwell, will be in charge, and it is expected that cooperation between the observatory and the physics department will allow students in physics to receive some teaching in astronomy.

DISCUSSION

RELEASE OF ACETYLCHOLINE BY SYMPATHETIC GANGLIA AND SYNAPTIC TRANSMISSION

EXPERIMENTS performed by the writer¹ on the release of acetylcholine by the superior cervical sympathetic ganglion and the nodosum ganglion of the vagus nerve have yielded results that differ in important details from those previously reported by Feldberg and Vartiainen.² The problem of the release of acetylcholine by these structures has again been investigated by MacIntosh,³ and in making reference to his work, Sir Henry Dale⁴ has recently remarked that the validity of the fundamental observation made by Feldberg and Vartiainen, although challenged by me, has been effectively reinstated by MacIntosh, whose evidence "must stand until it has been directly answered." The discussion which follows will show that MacIntosh's results do in fact disagree with some of my own findings, but that they also disagree with results previously obtained in the same laboratory by Feldberg and his collaborators.

At the start of the artificial perfusion of the superior cervical ganglion, and in the absence of stimulation and of peripheral response, there may appear significant outputs of A.Ch., which do not prevent the prompt appearance of a peripheral response upon

stimulation of the preganglionic trunk. Initial spontaneous outputs had occasionally been observed by Gaddum and Feldberg⁵ and had been described by Brown and Feldberg⁶ in these words: "The venous effluent at the beginning of the perfusion of a ganglion with an eserized Locke solution often contains some A.Ch., the concentration being rarely higher than 0.01 γ per cc. The concentration decreases regularly and A.Ch. has usually disappeared after less than 30 min. perfusion." In a subsequent paper Brown and Feldberg⁷ report that after several minutes of stimulation, synaptic transmission with a well maintained peripheral response is accompanied by the release of A.Ch. by the ganglion in the concentration of 0.01 γ per cc. Therefore, the existence of "spontaneous" outputs of A.Ch. in similar concentrations, but without synaptic transmission, must be regarded as significant. In my early experiments, in which the ganglion was prepared for perfusion according to the technique described by Gaddum and Feldberg and Feldberg and Vartiainen, initial spontaneous outputs as described by these investigators were observed, but later, after improvements in the technique of dissection of the ganglion had been introduced,⁸ the initial spontaneous outputs of A.Ch. became very small or even failed to appear. In MacIntosh's experiments the concentration of A.Ch. in the

¹ R. Lorente de N , *Amer. Jour. Physiol.*, 121: 331, 1938.

² W. Feldberg and A. Vartiainen, *Jour. Physiol.*, 83: 103, 1934.

³ F. C. MacIntosh, *Jour. Physiol.*, 94: 155, 1938.

⁴ H. Dale, *SCIENCE*, 90: 393, 1939.

⁵ J. H. Gaddum and W. Feldberg, *Jour. Physiol.*, 81: 305, 1934.

⁶ G. L. Brown and W. Feldberg, *Jour. Physiol.*, 86: 290, 1936.

⁷ *Ibid.*, 88: 265, 1936.

⁸ R. Lorente de N , *op. cit.*, p. 336.