cording to word received from reliable correspondents, the herbaria of Vienna are in good condition, with the exception of 2,500 bundles of herbarium specimens of flowering plants of the Natural History Museum, which had been stored and which were destroyed when the Russian army entered Ober-Höflein.' The other collections of the Natural History Museum are safe in various places in the country. The collections and library of the Botanical Institute at the Rennweg are in good condition. The valuable library of the Zoologische-Botanische Gesellschaft, however, has been destroyed almost entirely.

SCIENTIFIC NOTES AND NEWS

THE Board of Directors of City Trusts of Philadelphia has announced the award of the John Scott Medal Fund jointly to Captain William N. Sullivan, Jr., Sanitary Corps, AUS, and Dr. Lyle D. Goodhue, who developed the aerosol bomb used for insect control purposes. Captain Sullivan is at present stationed at the AAF Center at Orlando, Fla., where he is a member of the AAF Committee on Aerial Dispersal of Insecticides. Dr. Goodhue is senior chemist at the Beltsville, Maryland, Laboratory of the Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture.

DR. JAMES CREESE, since 1928 vice-president of the Stevens Institute of Technology at Hoboken, N. J., has been elected the sixth president of the Drexel Institute of Technology, Philadelphia.

DR. ALBERT RAY OLPIN, executive director of the research foundation of the Ohio State University, has been elected president of the University of Utah. He will take office on July 1, 1946.

DR. ELIOT BLACKWELDER, professor of geology and executive head of the department of geology at Stanford University, will retire at the end of this month. He is succeeded by Arville Irving Levorsen, consulting geologist of Tulsa, Oklahoma.

DR. CARL C. PFEIFFER, formerly chief pharmacologist of Parke, Davis and Company, was released from the Navy on August 15 to become head of the department of pharmacology, materia medica and therapeutics of the University of Illinois.

DR. VICTOR C. MYERS, director of the department of biochemistry of the School of Medicine of Western Reserve University, has been elected director of the newly established department of clinical biochemistry. It is planned to enlarge the department of biochemistry, of which Dr. Myers will continue as director until his successor has been chosen.

PROFESSOR JOHN R. WESKE, of the Case School of Applied Science at Cleveland, will join the department of aeronautical engineering of the Rensselaer Polytechnic Institute, Troy, N. Y.

DR. G. HARLOWE EVANS, of Huntingdon College, Montgomery, Ala., has been appointed to succeed the late F. S. Mortimer as head of the department of chemistry at Illinois Wesleyan University, Bloomington.

DR. C. L. HAMNER, assistant professor of pomology at Cornell University, has been appointed associate professor of horticulture at the Michigan State College, East Lansing.

DR. ELMER H. STOTZ has been named head of the new Division of Food Science and Technology that has been established at the New York State Experiment Station at Geneva by merging the Divisions of Bacteriology and Chemistry. The work of the group is to be guided by a committee consisting of members of the former divisions. This committee will consist of Dr. Stotz, who was head of the Division of Chemistry, *chairman;* Dr. George J. Hucker and Dr. Carl S. Pederson, professors of bacteriology; and Dr. Zoltan I. Kertesz, professor of chemistry.

DR. W. C. PIERCE, associate professor of chemistry at the University of Chicago, has been appointed head of the department of chemistry of Pomona College, Claremont, Calif.

DR. S. EDWARD SULKIN has been promoted to a professorship of bacteriology and immunology and has been made chairman of the department at the Southwestern Medical College, Dallas, Texas.

DR. H. F. STROHECKER, professor of zoology at Kenyon College, Gambier, Ohio, has been appointed professor of zoology at New Mexico Highlands University at Las Vegas, N. M.

DR. DONALD WAYNE TAYLOR, of the Radio Research Laboratory of Harvard University, has been appointed acting assistant professor of psychology and Thomas Welton Stanford fellow at Stanford University. He expects to assume his work there next January.

FURTHER appointments have been announced in the department of agriculture of the University of Minnesota: Dr. Clarence E. Mickel, acting chief of the Division of Entomology and Economic Zoology at the University of Minnesota since the retirement of Dr. William A. Riley on June 15, 1944, has been promoted to be chief of the division; Dr. Mykola H. Haydak has been promoted to an associate professorship of entomology and economic zoology. He will be in charge

of the beekeeping work of the division. He succeeds the late Dr. Maurice C. Tanquary; Dr. Laurence H. Cutkomp has been appointed research associate, and Dr. H. Y. Fan has been appointed research fellow, in the Division of Entomology and Economic Zoology. Both will assist in the research programs in insect physiology.

DR. J. C. C. MCKINSEY, assistant professor at Montana State College, has been appointed to an assistant professorship of mathematics at the University of Nevada.

DR. ROBERT S. BREED, head of the Division of Bacteriology of the New York State Agricultural Experiment Station at Geneva, at his own request has been relieved of administrative work as of August 1, after serving for thirty-two years as head of the division.

DR. EARL K. FISCHER, of the Research Laboratories of the Interchemical Corporation, has become head of the Division of Physical Chemistry of the Institute of Textile Technology, Charlottesville, Va.

DR. GARTH JOHNSON, formerly associated with the College of Medicine of the State University of Iowa and the Iowa State Department of Health, has been appointed director of microbiology at the Ortho Research Foundation, Linden, N. J. He will continue his work on the physiology and chemotherapy of *Trichomonas vaginalis* while directing similar investigations of associated organisms in the vaginal flora.

DR. RAYMOND C. OSBURN, emeritus professor of zoology and entomology of the Ohio State University, has accepted a research position at the Hancock Foundation, University of Southern California, Los Angeles, where he will be engaged for the coming year in the study of the marine Bryozoa of the Hancock Dredging Expeditions, 1932–42.

PROFESSOR ROBERT RAE, agricultural attaché at the British Embassy in Washington and agricultural adviser to the High Commissioner for the United Kingdom in Canada, will soon return to England. He will be succeeded by A. N. Duckham, who has been serving as director of the supply plans division of the Ministry of Food, having joined that department at the beginning of the war.

RESEARCH fellowships, given by the Imperial Chemical Industries Limited to certain British universities, include two fellowships at the University of Durham, each of the value of £600 and tenable in the first instance for three years, to Dr. W. E. Foster, for investigations into plant respiration and nutrition, and to Dr. G. A. Swan, for investigations in the structure of certain alkaloids.

W. L. MCATEE, technical director of the U. S. Fish and Wildlife Service, has deposited in the Manuscripts Division of the Library of Congress a handwriting collection that has been some forty years in the making. It is hoped that the material will be useful in the identification of unknown chirography, both printed and written. The collection may be profitably consulted also for biographical and historical details. It represents the following groups and approximate numbers of individuals: Botanists, 326; entomologists, 500; mammalogists, 140; ornithologists, 1,300; miscellaneous scientists, 423; the Biological Survey, 278; and the Wildlife Society, 136. For the first five of these classes, there remains duplicate material which Mr. McAtee will be glad to donate to any one interested. These residues will be allotted to persons or institutions heard from within a month of publication of this notice.

DR. H. C. BROWN, of Wayne University, has completed a series of five evening lectures at Purdue University which were attended by the staff and graduate students of the department of chemistry and others. Dr. Brown lectured on "Steric Strains in Organic Chemistry" and "High Vacuum Technique."

SIR ALEXANDER FLEMING, F.R.S., professor of bacteriology at St. Mary's Medical School, University of London, presented on July 18 an informal lecture on the development of penicillin before the staff and students of the Division of the Biological Sciences of the University of Chicago.

THE Porter fellowship has been awarded by the American Physiological Society to eighteen different individuals in the twenty years between 1921 and 1941. The annual stipend has been $1,200 given by Dr. W. T. Porter, of the Harvard Apparatus Company, after whom the fellowship is named. Dr. Porter has informed the society that in the future the stipend will amount to $2,400 annually and the society has announced that the award of this fellowship will be resumed in 1946.

FOUR research fellowships of the value of $1,500 each, established through funds provided by the Philco Corporation at Philadelphia, Pa., for study in the frozen food field, will become available at the Cornell University School of Nutrition in the autumn. The fellowships will provide one year of study each in frozen food economics, cookery, engineering and processing. Study in these fields already is under way. The fund provides "opportunity for the students to work into this field while carrying on graduate work."

UNDER the will of John Paine, of Troy, N. Y., bequests amounting to $500,000 have been made to Russell Sage College, and of $250,000 to the Rensselaer Polytechnic Institute.

THE new headquarters of the research laboratories

of the Navy Bureau of Ordnance will be constructed at White Oak, Montgomery County, Maryland, on ground covering 938 acres. This, with the Glenn L. Martin College of Engineering and Aeronautical Sciences of the University of Maryland, will provide for a center of research in the fields of physics and engineering.

GIFTS amounting to $25,000 have been made to the College of Medicine of the Ohio State University by Franz T. Stone, Columbus, in honor of the ninetieth birthday of his father, chairman emeritus of the Board of Trustees. One gift, in the amount of $20,000, goes to establish the Julius F. Stone Fund for Medical Research, the income to be used for research in the field of physical medicine. This fund will be administered by a committee including the dean of the College of Medicine, the chairman of the Department of Medicine and the dean of the Graduate School. The second gift of $5,000 is made to found a Julius F. Stone medical fellowship, for research in the division of physical medicine. The first recipient of this fellowship is Dr. William G. Myers, research associate in the department of bacteriology.

THE School of Medicine of the University of Utah is the recipient of a recent grant of $92,000 from the U. S. Public Health Service for research in muscular dystrophy and related degenerative disorders. A considerable number of cases are available in Utah and near-by states for study, and it is explained that church records and other local factors may throw considerable light on genetic aspects of the research. Dr. M. M. Wintrobe, professor of medicine, is director of the study and an advisory committee of known scientists will be appointed.

CONSTRUCTION will start next spring on a new Structural Research Laboratory at the University of Washington, Seattle. The laboratory will contain four new testing machines, one of which is now being designed and constructed by the Baldwin Southwark Division of the Baldwin Locomotive Works, Philadelphia. Representing the latest word in testing technique and incorporating important features not found in any existing machine, it will have a capacity of 2½ million pounds compression and 2 million pounds in tension. It will accommodate specimens 10 feet wide and as a transverse tester it will accommodate structural assemblies in excess of 80 feet in length and can subject them to a total transverse load of 2½ million pounds—a combination of length and loading much beyond the capacity of any equipment yet built.

APPLICATIONS for grants from the Elizabeth Thompson Science Fund should be made to the secretary, Dr. Jeffries Wyman, Woods Hole Oceanographic Institution, Woods Hole, Mass.

AN agreement has been made by the City of New York and the Columbia-Presbyterian Medical Center for the construction and joint operation of a hospital and health center for the study and treatment of tropical and communicable diseases, to be constructed at a cost of $5,390,000. According to the agreement, it will be built on land conveyed without cost to the city by Columbia University and the Presbyterian Hospital. The site extends 800 feet along the west side of Riverside Drive between 165th and 168th Streets. Two structures are planned—a three-hundred bed hospital and a research building. The latter will house the diagnostic laboratory of the Department of Health, a research center for the Public Health Research Institute and a specialized branch conducted by the Medical School of Columbia University. The capital budget counts on Federal funds for the entire $2,700,000 required for the hospital and for half the $2,690,000 allocated for the research center.

THE establishment has been announced of the Research Foundation of the Oklahoma Agricultural and Mechanical College, following the passage of a bill by the Oklahoma Legislature, authorizing expansion of the research activities of the college. The purpose of the Research Foundation is to coordinate research at the college and to support research in fields lacking formal research problems. The work is under the direction of Drs. K. Starr Chester, director of research; Dr. Otto M. Smith, director of negotiation, and Schiller Scroggs, director of administration. The program at present includes projects in the fields of chemistry, veterinary medicine and wildlife conservation.

A COMPREHENSIVE study of hill culture has been started at the West Virginia Agricultural Experiment Station with the objective of increasing the income of several thousand small hill farmers. Experiments include the production and marketing of holly, native nuts and nut meats, wild fruits, maple sugar, etc. The project is being financed from a grant by the Sears Roebuck Foundation.

THE Nutrition Foundation, New York City, has issued a pamphlet giving a list of the grants that have been made. These are grouped under the following headings: "Human Requirements of Individual Nutrients"; "The Origins and Functions of Individual Nutrients"; "Maternal and Infant Nutrition"; "Public Health Problems in Nutrition"; "Education and Professional Training" and "Nutrition Studies Related Directly to the War Emergency."

THE Michigan College of Mining and Technology at Houghton has established a Timber Products and Forest Industries Institute to serve and foster the wood industries of Northern Michigan. Its staff will

conduct research, provide a center of information, hold schools of instruction and demonstration, and organize and direct a practical course in woods industries of two twelve-week terms and one nine-week term.

ERRATUM: Page 148, 2d column, article by Dr. Gregory Shwartzman; the thirteenth line down on the right-hand column reads: "experiments which were all carried out in meat-inferior broth." This should have been "meat infusion broth."

SPECIAL ARTICLES

REVERSIBLE PARALYSIS OF MOTOR FUNCTION IN RATS FROM THE CHRONIC ADMINISTRATION OF DITHIOBIURET

DURING the course of investigations on the antithyroid activity of compounds related to thiourea it was observed that small concentrations of dithiobiuret (NH_2–C(=S)–NH–C(=O)–NH_2) were lethal within seven days.[1] It was soon apparent that death was preceded by paralysis and was presumably due to involvement of the respiratory muscles. This phenomenon was found to be readily reproducible and the effective dosage of dithiobiuret[2] proved to be quite critical. When administered in the drinking water in a concentration of 0.002 per cent. no effect was observed for 2 to 4 days and the animals continued to gain weight; then weakness of the hind quarters became apparent. Soon thereafter the muscles of the entire body with the exception of the muscles of respiration and those of the head and neck became completely paralyzed and the animals lay on their sides breathing with difficulty. If continued in this dosage the compound was uniformly lethal at the end of 5 to 6 days, but if reduced to 0.001 per cent. the animals would survive. By appropriate adjustments in the concentration of the drug between 0.001 per cent. and 0.002 per cent. the animals could readily be maintained in a state of profound muscular paresis for many weeks. With the onset of muscular weakness food and water intakes decreased and the animals began to lose weight; food and water were procured at the expense of great effort. The only constant associated finding was an incrustation about the eyes containing the red porphyrin pigment from the Harderian glands. There later ensued progressive weight loss, muscular wasting and contractures of the paralyzed muscles. The condition was consistently reversible, for despite the presence of extensive paralysis complete recovery followed a few days after withdrawal of the drug; even when atrophy and contractures had become manifest good recovery of muscle function followed within a week or two.

A single subcutaneous or intraperitoneal injection of relatively huge doses of this substance was well tolerated and failed to cause paralysis. A dose of 20 to 50 mg was necessary to kill an adult rat from a single injection, whereas fatal paralysis ensued in 5 days from the daily administration of less than 0.5 mg either in the drinking water or by subcutaneous injection.

The paralysis seemed not to be due to a disturbance of the muscles themselves, of the peripheral nerve or of the myoneural junction, for faradic stimulation of the motor nerves elicited muscular contraction. Nor did there seem to be any disturbance of pain sensation as judged by the responses to painful stimuli in partially paralyzed animals.

The brains, spinal cords and roots, spinal ganglia, sciatic nerves and muscles of animals which had been kept paralyzed for two to three weeks and of control animals were removed and sections were stained for cells, axis cylinders, myelin and fat. Microscopic examination disclosed no visible structural damage, a finding which is in keeping with the reversible nature of the disturbance. Determinations on the content of acetylcholine and of choline esterase in the brains of paralyzed rats yielded normal values.[3]

Attempts to elucidate the phenomenon by the administration of drugs which affect the nervous system and by a search for a remedial agent were unsuccessful. Strychnine failed to induce convulsions in paralyzed animals and double the usual lethal dose was required to produce death, which was accompanied by a slight flexure of the head upon the thorax and cessation of respiration. Pilocarpine and prostigmine did not improve muscular function in doses up to the lethal level. Atropine, epinephrine and ephedrin were likewise ineffective. Large doses of a crude liver extract, thiamin, nicotinic acid, vitamin A, biotin, brewer's yeast or biuret failed to prevent paralysis and caused no improvement when administered to paralyzed animals.

These observations appear to be of interest in that they probably point to the existence of a new mechanism which is essential to the transmission of nervous impulses within the central nervous system. They

[1] E. B. Astwood, *Jour. Pharm. and Exper. Therap.*, 78: 79, 1943.

[2] This compound was made available through the kindness of Dr. R. O. Roblin, of the American Cyanamid Co., Stamford, Conn.

[3] We are indebted to Mr. J. C. Seed for the acetylcholine determinations and to Miss Mary Root for the assays of cholinesterase.